COMPUTING LABORATORY
E E DEPT.

# WISC

# USERS'

# MANUAL

WISCUM--1

Prepared by the Staff

of the

Computing Laboratory

of the

Department of Electrical Engineering

COMPUTING LABORATORY
E E DEPT.

University of Wisconsin

Madison, Wisconsin

# INDEX

| | page |
|---|---|
| General | 1 |
| Words | 1 |
| Binary Format | |
| Decimal Format | |
| Order Format | |
| Modes of Arithmetic Operation | 2 |
| Floating Point-Mode | |
| Ordinary Fixed Point Mode | |
| Special Fixed Point Mode | |
| Orders | 3 |
| Classes of orders | |
| Description of orders | |
| Timing Considerations | 9 |
| Short Memory | |
| Automatic Delays | |
| Subroutines | 11 |
| Library Book | |
| OPSTO | |
| Linkage | |
| Adaptation | |
| Permanently Stored Subroutines | |
| Preparation of Tapes | 12 |
| Format | |
| Flexowriter | |
| Procedure | |
| Operation of Computer | 12 |
| Power | |
| Console | |
| Input | |
| Output | |
| In case of trouble | |
| Precautions | 15 |

Appendix
- A Order Code
- B Drum Storage Assignments
- C Decimal-Hexadecimal Tables
- D Index of Subroutines
- E Users' Sheets
  - CON-DECON
  - MAD
  - ITR
  - Sample
- F Console Diagrams
- G Examples

## GENERAL

The WISC is a synchronous sequential three address binary digital computer located in the Computing Laboratory of the Department of Electrical Engineering of the University of Wisconsin.

The WISC uses a magnetic drum rotating at 3600 R.P.M. to store all data and instructions. There are a total of 1024 storage locations on the drum, each of which is capable of storing a group of 50 binary digits.

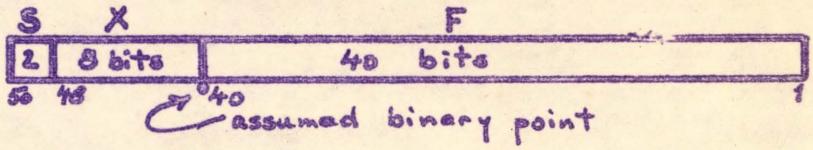
Any arithmetic operation is completed within four drum revolutions, but because of the integrally synchronized nature of the computer, four instructions are being executed at any given time. Hence, the effective time of execution for any arithmetic instruction is one drum revolution (about 17 milliseconds); the basic clock rate of the computer is 100 kilocycles per second.

## WORDS

All words in the WISC consist of 50 binary digits. For convenience, these bits are grouped into sets of four bits each, and references to the actual bits are made in the hexadecimal (base 16) number system. The hexadecimal characters used in this laboratory are the ten Arabic numerals 0 through 9 and the first six lower case letters a through f.

The bits within a work are numbered right to left from one to fifty, representing the time sequence in which they appear within the machine. However, the thirteen hexadecimal characters which are used to make up a word are numbered from left to right. Since this is the sequence most familiar to the user, it is in this order that the hexadecimal characters are supplied to the computer, and it will be in this order that results are delivered from the computer.

If a word is to be treated as a number, the bits are thought of as being grouped into a 40 bit binary fraction and an 8 bit binary exponent of the base two. Both parts of a number carry a sign, with bit 49 representing the sign of the exponent and bit 50 the sign of the fraction (a plus sign is stored as a zero and a minus sign is stored as a one). It should be noted, as shown below, that the assumed binary point separates the fraction from the exponent.




Hence, numbers within the WISC are stored as

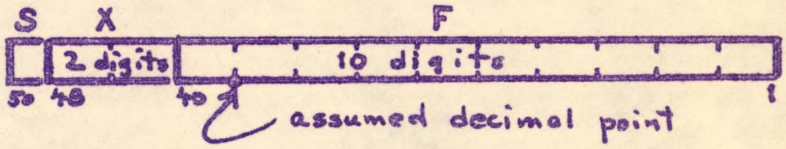
$$2^q \times p$$

where q is the exponent (with its sign) and p is the binary fraction

(with its sign). It should be observed that p must be less than unity in magnitude because it is a binary fraction. Moreover, a "normalized" number is stored so that bit 40 of a normalized number must be a one; this means that p is greater than or equal to one-half in magnitude. Zero, however, is always stored as a completely blank word.

For greater convenience, a decimal format is available for the input and output of data. Conversion between the decimal and normalized binary formats is accomplished by a stored subroutine.

In a decimal format the bits of a word are considered to be grouped into ten digits of significant figures and two digits of an exponent of the base ten. Again, each portion of a number carries a sign with the same convention as used in the binary format. To conform with standard scientific notation, the decimal point is assumed to follow the first significant figure.




A number expressed in this format would be

$$10^{Q} \times P$$

where Q is the decimal exponent (with its sign) and P is the group of significant figures (with its sign). Q is restricted to be less than 76 in magnitude, and P is restricted to be equal to or greater than one, and less than ten in magnitude. As in the binary format, zero is represented by a completely blank word.

If a word is to be treated as an order, the bits are considered to be grouped into five fields: three address fields of 12 bits each, an order field of 4 bits, and a special information field of 10 bits. A complete description of the meaning and use of these fields is given in the section on orders.

## MODES OF ARITHMETIC OPERATION

There are three modes of arithmetic operation available to the user of the WISC. These modes of operation differ primarily in the manner in which the exponent portion of numbers are handled.

The normal operation of the computer is with the "Arithmetic Mode Selector" (mounted on the console) set to the "Floating Point" position. Two modes of operation are then available to the programmer through the use of a key bit in each arithmetic order. If bit 49 of an arithmetic order is a zero the order will be executed in the floating point mode; if bit 49 of an arithmetic order is a one the order will be executed in the ordinary fixed point mode.

With the "Arithmetic Mode Selector" set at the "Fixed Point -- A" position all arithmetic will be performed in the ordinary fixed point mode. With the "Arithmetic Mode Selector" set to "Fixed Point -- O" position all arithmetic will be performed in the special fixed point mode. Bit 49 is not used in any arithmetic order if the selector is set to either of these positions.

In the floating point mode arithmetic is performed with the numbers assumed to be in the normalized binary format described above. All results are delivered in the correct normalized binary format if both operands were in the standard format. If both operands were not in the standard format the result will not, in general, be in the standard format. In some cases the result will be meaningless if both operands were not in the standard format.

In the ordinary fixed point mode arithmetic is performed with the numbers assumed to be only 40 bit binary fractions. The exponent of the A operand will be delivered as the exponent of the result. It is not necessary to have the operands in the normalized format, and the result will not, in general, be in the normalized format. However, since the result is a binary fraction (with an attached exponent), the result of any arithmetic operation must be less than unity in magnitude.

In the special fixed point mode arithmetic is again performed with the numbers assumed to be only 40 bit binary fractions, but the exponent of the result will always be zero.

It should be noted that no saving is time is achieved in any of the modes of operation because of the integrally synchronized nature of WISC operations.

## ORDERS

The WISC employs a three address type of order structure. Each order consists of an order type (one of the sixteen types available), three addresses, and certain special information. Each address refers to a unique storage location on the magnetic drum.

All orders to be executed by the computer are stored on the drum and are read from the drum before execution. Because of the sequential operation of the WISC, orders are normally executed in the sequence in which they appear on the drum; certain orders, however, instruct the computer to take the next instruction from a specified drum position and then to proceed sequentially from that position.

There are four classes of orders available in the sixteen order types of the WISC:

Arithmetic orders instruct the computer to perform some arithmetic on two operands located in specified storage locations and to deliver the result to a specified storage location.

Control orders instruct the computer to perform some control function (such as punching a paper tape) and then to take the next

instruction from a specified drum position rather than from the next sequential location.

Comparison orders combine some of the features of each of the above. They instruct the computer to perform some arithmetic on two operands located in specified storage locations, and depending on the result to take the next instruction from one of two drum positions. If the conditions of the comparison are met the next instruction is taken from a specified drum position, but if the conditions of the comparison are not met the next instruction is taken from the next sequential position.

Logical orders instruct the computer to perform some logical (non-arithmetic) operation on two words located in specified storage locations.

In the following description of the order types, each order will be identified by its name and by a set of three letters which serves as a mnemonic code for that order. The execution time (in milliseconds) for each order is also listed. A skeleton form of each order shows the pertinent parts of the order. The order type is always given by the fourth hexadecimal character of the order. The address of a storage location X is indicated by -X- and the contents of storage location X is indicated by (X) .

If the "Arithmetic Mode Selector" is in the "Floating Point" position all arithmetic and comparison orders have two meanings, with bit 49 serving to decide which mode of operation is to be used for that order. In the order descriptions all arithmetic orders have an n for the first character in the skeleton form to indicate the two possible operations. The mnemonic codes for the two orders are identical: the code for the floating point order (bit 49 is a zero) is in upper case letters; the code for the fixed point order (bit 49 is a one) is in lower case letters.

0 Read Paper Tape (RPT) (34 + 17 N)

0 00 0 -A- -B- -C-

This order fills locations -A- through -B- with words supplied from the input tape reader. After filling these locations the next instruction will be taken from -C- .

Since this order uses the input buffer storage the tape should have been read into the buffer storage before this order is reached in the program. It is desirable to limit all inputs to blocks of 32 words or less, because the buffer storage can hold only 32 words; if more than 32 words are required by a RPT order, operation will be correct, but the computer will have to wait while tape is read into the buffer storage.

If the input is restricted so that the computer does not have to wait for the tape reader, this order requires about 34 + 17 N milliseconds (where N is the number of words to be taken from the

buffer storage) for completion. If tape must be read into the buffer storage this order requires about 34 + 1500 M milliseconds (where M is the number of words to be read into buffer storage) for completion.

1 Extract (EXT) (34)

0 xx 1 -A- zyz -C-

This order replaces a specified number of bits in (C) with bits from (A). The x information identifies where in (A) the extraction is to begin; the y information identifies where in (C) the replacement is to begin; the z information specifies the number of bits to be replaced. Each of these pieces of information is given by six bits. These bits are arranged in the EXT order as shown below:

00 00xx xxxx 0001 AAAA AAAA AAAA zzyy yyyy zzzz CCCC CCCC CCCC

The x information is given by bits 41 through 46. The y information is given by bits 17 through 22. The z information is split into two portions for better compatibility with the hexadecimal code used in input: the two most significant bits are given by bits 23 and 24 and the four least significant bits are given by bits 13 through 16.

1 Clear and Extract (CLE) (34)

1 xx 1 -A- yzy -C-

This order is very similar to the EXT order described above. However, (C) is cleared to a zero (a completely blank word) before the extraction takes place.

2 Multiply (MPY) (mpy) (17)

n 00 ~~3~~ 2 -A- -B- -C-

This order replaces (C) with the product of (A) and (B).

3 Divide (DIV) (div) (17)

n 00 3 -A- -B- -C-

This order replaces (C) with the quotient of (A) divided by (B).

4 No Operation (NOP) (17)

0 00 4 000 000 000

This order does nothing except introduce a delay of 17 milliseconds.

5 Transfer (TRA) (34)

0 00 5 000 000 -C-

This order causes the next instruction to be taken from -C- rather than from the next sequential location.

5 Breakpoint Transfer (BTR) (34 or 17)

1 00 5 0kk 000 -C-

This order is executed like a TRA order IF any of the eight Breakpoint Switches on the console that correspond to bits k (switch No. 1 corresponds to bit 25) are set to "Yes" OR if the Breakpoint Override Switch on the console is set to "Override." If none of these conditions is met this order is executed like a NOP order.

6 Halt and Transfer (HTR) ( - )

0 00 6 000 000 -C-

This order causes the computer to halt after completing all operations than in progress. When the computer halts (C) will be displayed in the order register display on the console. When the computer is started the next instruction will be taken from -C- rather than from the next sequential location.

6 Breakpoint Halt and Transfer (BHT) ( - or 17)

1 00 6 0kk 000 -C-

This order is executed like a HTR order IF any of the eight Breakpoint Switches on the console that correspond to bits k (switch No. 1 corresponds to bit 25) are set to "Yes" OR if the Breakpoint Override Switch on the console is set to "Override." If none of these conditions is met this order is executed like a NOP order.

7 Punch Paper Tape (PPT) (34 + 17 N)
(34 + 1500 M)

0 00 7 -A- -B- -C-

This order causes the contents of -A- through -B- to be punched on paper tape in standard form with the desired format control (as described in the section on console controls). After the specified words are delivered to the output buffer storage, the next instruction will be taken from -C- .

Since this order delivers words to the output buffer storage, which can hold only 32 words, output should be limited to blocks of no more than 32 words. If this is not done, operation will be correct but the computer will have to wait for the punch to punch the paper tape.

If the output is restricted so that the computer does not have to wait for the punch this order requires about 34 + 17 N milliseconds (where N is the number of words to be delivered to the buffer storage) for completion. If the punch must operate this order requires about 34 + 1500 M milliseconds (where M is the number of words to be punched) for completion.

8 Add (ADD) (add) (17)

n 00 8 -A- -B- -C-

This order replaces (C) with (A) + (B) .

9 Add Absolute Values (ADA) (ada) (17)

n 00 9 -A- -B- -C-

This order replaces (C) with $|(A)| + |(B)|$ .

a Subtract (SUB) (sub) (17)

n 00 a -A- -B- -C-

This order replaces (C) with (A) - (B) .

b Subtract Absolute Values (SUA) (sua) (17)

n 00 b -A- -B- -C-

This order replaces (C) with $|(A)| - |(B)|$.

c Transfer on Zero (TZE) (tze) (34 or 51)

n 00 c -A- -B- -C-

This order causes the next instruction to be taken from -C- IF (A) - (B) is zero; if this condition is met this order requires 51 milliseconds for execution. If (A) - (B) is not zero the next instruction is taken from the next sequential location; this order then requires 34 milliseconds for execution.

d Transfer on Zero Absolute (TZA) (tza) (34 or 51)

n 00 d -A- -B- -C-

This order causes the next instruction to be taken from -C- IF $|(A)| - |(B)|$ is zero; if this condition is met this order requires 51 milliseconds for execution. If $|(A)| - |(B)|$ is not zero the next instruction is taken from the next sequential location; this order then requires 34 milliseconds for execution.

e Transfer on Negative (TNE) (tne) (34 or 51)

n 00 e -A- -B- -C-

This order causes the next instruction to be taken from -C- IF (A) - (B) is negative*; if this condition is met this order requires 51 milliseconds for execution. If (A) - (B)

- - - - - - - - - -

* Zero, regardless of how produced, is always treated as positive in the WISC.

is not negative the next instruction is taken from the next sequential location; this order than requires 34 milliseconds for execution.

f Transfer on Negative Absolute (TNA) (tna) (34 or 51)

n 00 f -A- -B- -C-

This order causes the next instruction to be taken from -C- IF |(A)| - |(B)| is negative*; if this condition is met this order requires 51 milliseconds for execution. If |(A)| - |(B)| is not negative the next instruction is taken from the next sequential location; this order than requires 34 milliseconds for execution.

## TIMING CONSIDERATIONS

### Short Memory

Because of the integral synchronization of the WISC, the result of an arithmetic order will not be delivered to the drum location specified by the order in time to be used by the next order. To circumvert this difficulty, all arithmetic results are delivered to a special storage location called "short memory" as soon as they are produced. If short memory coding($800_{16}$*) is used for the A or B address of an arithmetic, extract, or comparison order, the result of the preceding order will be obtained for the specified operand.

If the result of an arithmetic order is to be used only by the next order, short memory coding may be used in place of a drum address for the C address of the former. The result will then be delivered only to short memory, whence it will be available until another arithmetic, comparison, extract, or input order destroys it.

Since all comparison orders are actually subtract and compare operations, the result of the subtraction called for in a comparison order is available from short memory on the same basis as the result of a normal arithmetic order.

Because an extract order requires two cycles for execution, the result of an EXT or CLE order may be obtained by using the drum address of that result in the next order. Do NOT use short memory coding to obtain this result! However, short memory contains that A operand of the extract order (shifted the

- - - - - - - - - - -

* If it is not clear what number system is being used, the base of the number system is used as a subscript to the number

appropriate number of places) at the conclusion of an extract order, and this may be obtained by using short memory coding in the next order. The shifting of the A operand loses bits at one end of the word and supplies zeros at the other end of the word.

## Automatic Delays

Whenever the computer attempts to read a word from the drum at the same time that a word is being written onto the drum an automatic delay of one cycle takes place. During this cycle of delay, writing takes place, and reading is permitted during the next cycle. This will cause all programs to run slightly slower that would be expected from the times listed for the execution of the orders (about 10% increase in running time time is typical).

Because all instructions are read from the drum slightly before they are used, it is necessary to have completed any modifications of an order some time before that order is to be executed. This means that there must be at least two cycles between the instruction that modifies an order and that order itself. It is better to leave at least one more cycle (in addition to the two mentioned above) between the two orders to prevent an automatic delay of one cycle.

## SUBROUTINES

A number of subroutines are available to WISC users for such special operations as: evaluation of commonly used function, solution of differential equations, program modification, etc. The WISC Library Book contains an index of the subroutines available, and Users' Sheets which give for each subroutine:

Operation performed
Data required
Number of memory locations used
Average time for completion
The linkage or calling sequence required

Persons interested in more detailed information about a particular subroutine may consult members of the staff of the Computing Laboratory for more complete descriptions, copies of the program, and flow diagrams.

All subroutines make use of certain shared Operational Storage locations (OPSTO's) on the drum (locations $354-35e_{16}$). The user links to any subroutine by planting a link word in location $35f_{16}$, which is therefore known as Linkage Opsto (LO). In a standard linkage this link word contains the address of the operand, the address for the result, and the address of the next instruction.

To illustrate, suppose that instruction 120 completes the calculation of a quantity y and delivers it to 200, that the square root of y is wanted, and that the square root subroutine is in locations 001-012. The following three word linkage causes the square root of y to be calculated and stored in location 201, and control returned to location 124.

| | | |
|---|---|---|
| 120: | xxx x xxx xxx 200 | |
| 121: | 100 8 123 3ff 35f | LINKAGE TO |
| 122: | 000 5 000 000 001 | SQUARE ROOT |
| 123: | 000 0 200 201 124 | |
| 124: | next operation | |

All subroutines are written to be used in the memory with their first instruction in location 001 . If any subroutine is to be used in another location (as must be the case when more than one are used), it must be adapted for that location. The Modification and Adaption Subroutine (MAD) is a permanently stored subroutine for accomplishing this by examining the addresses of all orders in the subroutine and modifying all that refer to locations within the subroutine.

In addition to MAD, two other important subroutines are permanently stored on the drum for the convenience of the user: CON-DECON and ITR. CON converts any number inserted in floating decimal format to floating binary; DECON accomplishes the reverse conversion of floating binary numbers before output. The selection between these two is made by tagging the link work as + or - , respectively

(see Appendix E 1). The third of these important subroutines is the Introcomputational Test Routine (ITR). This test routine quickly (500 ms) checks almost all the high-speed circuits of the computer, and stops if any fault is discovered. It should be incorporated at frequent intervals in all programs run on the machine.

In addition to the three important subroutines described above, a set of 24 commonly used constants is also permanently stored in the memory (PERSTO). Appendix B provides a list of these constants.

## PREPARATION OF TAPES

After coding is completed, the last step in readying the problem for running on the computer is to cut it on a 6-channel paper tape using the Flexowriter electric typewriter. Each character of a word corresponds to the striking of one key on the Flexowriter, which in turn produces one row of holes on the tape. Each word (instruction or number) must consist of thirteen characters, followed by a comma and either a TAB or a CARRIAGE RETURN. Extra spaces, CR's, or other symbols may be inserted as desired; only the 16 hexadecimal characters 0-9 and a-f , and the comma (End of Word) are of any significance to the computer. At the end of every tape "Stop Code" and several "Tape Feed" sprocket holes should be punched.

It is possible to reproduce a tape by feeding it through the tape reader of the Flexowriter while the "Punch" control is on. In this type of reproduction, however, Code Deletes (a row of holes across the tape which may be used to "erase" errors), Tape Feeds, and Stop Codes are not reproduced.

After cutting the tape, it is good practice to prepare a typed listing of the program from the tape just cut. This listing should then be checked against the original version of the program to catch any mistakes that have occurred in typing. When the programmer is certain that the tape is an accurate copy of his program, he is ready to run his problem on the computer.

## OPERATION OF COMPUTER

Do not turn on the computer ! Only persons designated by the staff of the Computing Laboratory are authorized to energize or deenergize it. If you sign up in advance for computing time, you will minimize waiting and delay.

To identify the following lights and switches, refer to the diagram of the console, Appendix F :

<u>Pilot Lights</u> at the top of the console indicate the state of the machine: Stopped, Running, Emergency Halt.

Order Register, a bank of 50 neons, displays in hexadecimal code the order about to be executed. (It will show certain other features during the odd cycles of multi-cycle orders such as EXT, RPT, PPT, etc.)

Order Counter gives the location of the next order to be executed, unless a comparison or control order already in progress changes the sequence.

Speed Switch allows the user to select the speed of computation: FULL (60 operations a second), RAPID (8), MEDIUM (2), and SLOW (1/2).

Mode Switch selects the type of operation. Under the MANUAL setting the computer will advance one cycle each time the RUN bottom is depressed and released. On the SEMI-AUTOMATIC setting the computer will continue to run as long as the RUN bottom is held down. With this switch set to AUTOMATIC, the computer will start running as soon as the RUN bottom is depressed and released, and will stop only when the STOP buttom is depressed (or a Halt order decoded.)

Clear Button clears the contents of the Order Register to a complete blank. (This should be done only when the computer is stopped to prevent it from overwriting portions of the program.) When the RUN bottom is then depressed the computer will execute the order in the order register. Since this order will now be the order 000 0 000 000 000 , the computer will read one word from input buffer storage, write it into storage location 000 , and then transfer to that location for the next instruction. This is the usual method for getting started.

Breakpoint Switches
Breakpoint Override Switch These are discussed under the BKT and BHT orders. On the Breakpoint Switches up corresponds to "Yes".

Arithmetic Mode Switch is located above the Order Register. It should be left set for floating point operation unless approved by one of the staff members of the Computing Laboratory.

The switches on the extreme left side of the input console control the motors for the reader and the rewind drive.

To load a tape, it should be fed over the reader drive sprocket with the motor stopped. If the "Clear--Empty" button is now depressed, the input unit is ready to accept new information from the tape. When the "Start" button is now depressed, the tape reader will start reading words from the tape and storing them in the buffer storage. Note that the computer may be operating on another part of the program or another program while all this is going on. The reader will stop whenever it reads a Stop Code on the tape, or at the end of the word being read if the input "Stop" button is depressed.

If more than 32 words are loaded at one time it is possible to load the entire tape into the buffer storage ready for high speed transfer to the memory when the computer executes a RPT order. If a tape of more than 32 words is presented to the computer before a RPT order is executed, automatic circuits will halt the tape reader when the buffer is full, and reading will be resumed when buffer has been emptied. Operation will be correct, but time will be lost.

The switch on the right panel of the console controls the motor for the punch. This switch should never be left in the "off" position.

When the "Tape Feed" button is depressed the punch advances the tape and punches sprocket holes but no information. When the "Stop Code" button is depressed Stop Codes are punched on the tape. Before a tape is removed from the punch, a Stop Code should be punched and then the tape advanced by means of the "Tape Feed".

When the "Clear--Empty" button is depressed the output unit is readied to accept information from the computer. As soon as the output unit receives such information the punch begins delivering the information and continues until all the words have been punched on the tape (or the "Clear--Empty" button is again depressed).

Since the output buffer storage can hold 32 words, PPT orders should call for output in blocks of no more than 32 words. If too many words are called for, or PPT orders occur too frequently, automatic delays ensure correct operation, but again time will be lost.

The "Format Control" allows the user to determine the number of columns that will be listed across the page when the output is typed by the Flexowriter.

If it appears that immediate shut-down of the computer is necessary and no staff member can be reached, the main power switch located on the power supply rack near the door to Room 3024 may be thrown to remove all power from the computer. A fire extinguisher is located at the other side of this door.

## PRECAUTIONS

If the B operand (the divisor) of a floating point division is not normalized, a meaningless result will be produced.

If the B operand (the divisor) of a fixed point division is smaller than the A operand a meaningless result will be produced.

If an overflow occurs in any fixed point addition the fraction will be shifted one place to the right to prevent loss of the most significant bit, and the exponent will be adjusted to compensate for this shift.

If the A or B address of an order is the same as the C address of the order preceding (unless the preceding order is an extract order), it cannot be guaranteed that the result of the preceding order will be obtained, nor can it be guaranteed that the previous contents of the location will be obtained. Use short memory coding.

Short memory coding following an extract order will give the shifted A operand. If the result of the extract order is desired, use the address of that result directly.

Do not attempt to achieve an exact equality, such as is tested for by a TZE order, of any two numbers when either or both have passed through CON.

It is impossible to write into PERSTO.

Allow at least two cycles between an order which modifies another order and the order being modified.

# ORDER CODE

Sign of number — Sign of exponent — Exponent — Binary point — Significant bits

NUMBER: 5 | 1 | 1 | 8 | 40

Blank 5 | 50 49 48 | 40 | 36 | 24 | 12 | 1

ORDER: 5 | 1 | 1 | 8 | 4 | 12 | 12 | 12

| CODE | SYMBOL | OPERATION | X | T | A | B | C |
|---|---|---|---|---|---|---|---|
| 0 | RPT | Read Paper Tape | | 0000 | 00 Address for first word | 00 Address for last word | 00 Address of next order |
| 1 | EXT | Extract | 00 00 x(6) | 0001 | s0 Address of operand A | z(2) y(6) z(4) | 00 Address for result |
| 1 | CLE | Clear and Extract | 01 00 x(6) | 0001 | s0 Address of operand A | z(2) y(6) z(4) | 00 Address for result |
| 2 | MPY | Multiply | 0n | 0010 | s0 " | s0 Address of operand B | r0 " |
| 3 | DIV | Divide | 0n | 0011 | s0 " | s0 " | r0 " |
| 4 | NOP | No Operation | | 0100 | | | |
| 5 | TRA | Transfer | 00 | 0101 | | | 00 Address of next order |
| 5 | BTR | Breakpoint Transfer | 01 | 0101 | 00 00 BP switches effective | | 00 " |
| 6 | HTR | Halt and Transfer | 00 | 0110 | | | 00 " |
| 6 | BHT | Breakpoint Halt & Trans | 01 | 0110 | 00 00 BP switches effective | | 00 " |
| 7 | PPT | Punch Paper Tape | 00 | 0111 | 00 Address of first word | 00 Address of last word | 00 " |
| 8 | ADD | Add | 0n | 1000 | s0 Address of operand A | s0 Address of operand B | r0 Address for result |
| 9 | ADA | Add Absolute | 0n | 1001 | s0 " | s0 " | r0 " |
| a | SUB | Subtract | 0n | 1010 | s0 " | s0 " | r0 " |
| b | SUA | Subtract Absolute | 0n | 1011 | s0 " | s0 " | r0 " |
| c | TZE | Transfer on Zero | 0n | 1100 | s0 " | s0 " | 00 Next order if A - B = 0 |
| d | TZA | Transfer on Zero Absolute | 0n | 1101 | s0 " | s0 " | 00 Next order if \|A\| - \|B\| = 0 |
| e | TNE | Transfer on Negative | 0n | 1110 | s0 " | s0 " | 00 Next order if A - B < 0 |
| f | TNA | Transfer on Negative Abs | 0n | 1111 | s0 " | s0 " | 00 Next order if \|A\| - \|B\| < 0 |

n = 0 Do arithmetic in floating point
= 1 " " " fixed point

s = 0 This is an actual address
= 1 Use preceding result for this operand

r = 0 This is an actual address
= 1 Do not deliver result to storage

x: first bit to Extract
y: place to insert first bit
z: number of bits to Extract

SIGN: 0 = plus
1 = minus

# WISC
## DRUM STORAGE ASSIGNMENTS

~~4/27/59~~ 4/27/60

| DEC | HEX | USE | NO. |
|---|---|---|---|
| 0 | 000 | USED FOR INPUT | 1 |
| 1 to 851 | 001 to 353 | AVAILABLE FOR USE | 851 |
| 852 to 862 | 354 to 35e | OPSTO | 11 |
| 863 | 35f | LINKAGE OPSTO | 1 |
| 864 to 943 | 360 to 3af | CONVERSION ROUTINES (0 for CON — 2 for DECON) [ 100 8 L+2 3ff 35f / 5 360 / {0 12} 00 0 IN, [ IN, [ β ] ] | 80 |
| 944 to 977 | 3b0 to 3d1 | MODIFICATION and ADAPTATION ROUTINE [ 100 8 L+2 3ff 35f / 5 3b1 / 0 j IW, [ k β ] ] | 34 |
| 979 to 999 | 3d3 to 3e7 | TEST ROUTINE (ITR) [ 100 8 L+1 3ff 35f / 5 β 3d3 ] | 21 |

DEAD STORAGE (5 TRACKS)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1000 | 3e8 | HALT ORDER | 000 | 6 | 000 | 000 | 3e8 | |
| 1001 | 3e9 | $2^{16} = 1/2 \times 2^{17}$ | 011 | 8 | 000 | 000 | 000 | |
| 1002 | 3ea | $2 = 1/2 \times 2^{2}$ | 002 | 8 | 000 | 000 | 000 | |
| 1003 | 3eb | $2^{-12} = 10^{A}$ | 000 | 0 | 010 | 000 | 000 | |
| 1004 | 3ec | $4^{C}$ | 000 | 0 | 000 | 000 | 004 | |
| 1005 | 3ed | $\sqrt{2} = 1.414213 56$ | 001 | b | 504 | f33 | 3fa | |
| 1006 | 3ee | .1111... | 000 | f | fff | fff | fff | |
| 1007 | 3ef | 4X | 004 | 0 | 000 | 000 | 000 | |
| 1008 | 3f0 | $1 \times 2^{4}$ | 005 | 8 | 000 | 000 | 000 | |
| 1009 | 3f1 | $e = 2.718281828$ | 002 | a | df8 | 545 | 8a3 | |
| 1010 | 3f2 | $\pi = 3.141592654$ | 002 | c | 90f | daa | 222 | 24 |
| 1011 | 3f3 | $2^{a}$ | 000 | 0 | 000 | 000 | 002 | |
| 1012 | 3f4 | $10^{-9}$ | 11d | 8 | 970 | 5f4 | 136 | |
| 1013 | 3f5 | $10^{10}$ | 022 | 9 | 502 | f90 | 000 | |
| 1014 | 3f6 | 10 | 004 | a | 000 | 000 | 000 | |
| 1015 | 3f7 | $2^{-8}$ | 000 | 0 | 100 | 000 | 000 | |
| 1016 | 3f8 | $2^{-1} = .1 = 1/2$ | 000 | 8 | 000 | 000 | 000 | |
| 1017 | 3f9 | $2^{-2} = .01$ | 000 | 4 | 000 | 000 | 000 | |
| 1018 | 3fa | $2^{-4} = .0001 = E$ order $= 1^{F}$ | 000 | 1 | 000 | 000 | 000 | |
| 1019 | 3fb | $1^{A}$ | 000 | 0 | 001 | 000 | 000 | |
| 1020 | 3fc | $1^{B}$ | 000 | 0 | 000 | 001 | 000 | |
| 1021 | 3fd | $1^{C}$ | 000 | 0 | 000 | 000 | 001 | |
| 1022 | 3fe | 1 | 001 | 8 | 000 | 000 | 000 | |
| 1023 | 3ff | 0 | 000 | 0 | 000 | 000 | 000 | |

PERSTO

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 00 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | 01 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| 1 | 02 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| | 03 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 |
| 2 | 04 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 |
| | 05 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 3 | 06 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 |
| | 07 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 |
| 4 | 08 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 |
| | 09 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 |
| 5 | 0a | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 |
| | 0b | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 |
| 6 | 0c | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 |
| | 0d | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 |
| 7 | 0e | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 |
| | 0f | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 |
| 8 | 10 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 |
| | 11 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 |
| 9 | 12 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 |
| | 13 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 |
| 10 | 14 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 |
| | 15 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 |
| 11 | 16 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 |
| | 17 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 |
| 12 | 18 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 |
| | 19 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 |
| 13 | 1a | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 |
| | 1b | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 |
| 14 | 1c | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 |
| | 1d | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 |
| 15 | 1e | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 |
| | 1f | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 |

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 20 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 |
| | 21 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 |
| 17 | 22 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 |
| | 23 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 |
| 18 | 24 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 |
| | 25 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 |
| 19 | 26 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 |
| | 27 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 |
| 20 | 28 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 |
| | 29 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 |
| 21 | 2a | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 |
| | 2b | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 |
| 22 | 2c | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 |
| | 2d | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 |
| 23 | 2e | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 |
| | 2f | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 |
| 24 | 30 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 |
| | 31 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 |
| 25 | 32 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 |
| | 33 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 |
| 26 | 34 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 |
| | 35 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 |
| 27 | 36 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 |
| | 37 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 |
| 28 | 38 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 |
| | 39 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 |
| 29 | 3a | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 |
| | 3b | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 |
| 30 | 3c | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 |
| | 3d | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 |
| 31 | 3e | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 |
| | 3f | 1008 | 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 | 1023 |

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 | 1039 |
| 41 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 |
| 42 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 |
| 43 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 |
| 44 | 1088 | 1089 | 1090 | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 |
| 45 | 1104 | 1105 | 1106 | 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 |
| 46 | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 | 1135 |
| 47 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 |
| 48 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 |
| 49 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 |
| 4a | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 |
| 4b | 1200 | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 |
| 4c | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 |
| 4d | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 |
| 4e | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 | 1261 | 1262 | 1263 |
| 4f | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 | 1279 |
| 50 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 | 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 |
| 51 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 |
| 52 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 |
| 53 | 1328 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 |
| 54 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 | 1359 |
| 55 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 1367 | 1368 | 1369 | 1370 | 1371 | 1372 | 1373 | 1374 | 1375 |
| 56 | 1376 | 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 | 1384 | 1385 | 1386 | 1387 | 1388 | 1389 | 1390 | 1391 |
| 57 | 1392 | 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1400 | 1401 | 1402 | 1403 | 1404 | 1405 | 1406 | 1407 |
| 58 | 1408 | 1409 | 1410 | 1411 | 1412 | 1413 | 1414 | 1415 | 1416 | 1417 | 1418 | 1419 | 1420 | 1421 | 1422 | 1423 |
| 59 | 1424 | 1425 | 1426 | 1427 | 1428 | 1429 | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 | 1438 | 1439 |
| 5a | 1440 | 1441 | 1442 | 1443 | 1444 | 1445 | 1446 | 1447 | 1448 | 1449 | 1450 | 1451 | 1452 | 1453 | 1454 | 1455 |
| 5b | 1456 | 1457 | 1458 | 1459 | 1460 | 1461 | 1462 | 1463 | 1464 | 1465 | 1466 | 1467 | 1468 | 1469 | 1470 | 1471 |
| 5c | 1472 | 1473 | 1474 | 1475 | 1476 | 1477 | 1478 | 1479 | 1480 | 1481 | 1482 | 1483 | 1484 | 1485 | 1486 | 1487 |
| 5d | 1488 | 1489 | 1490 | 1491 | 1492 | 1493 | 1494 | 1495 | 1496 | 1497 | 1498 | 1499 | 1500 | 1501 | 1502 | 1503 |
| 5e | 1504 | 1505 | 1506 | 1507 | 1508 | 1509 | 1510 | 1511 | 1512 | 1513 | 1514 | 1515 | 1516 | 1517 | 1518 | 1519 |
| 5f | 1520 | 1521 | 1522 | 1523 | 1524 | 1525 | 1526 | 1527 | 1528 | 1529 | 1530 | 1531 | 1532 | 1533 | 1534 | 1535 |

400-5ff

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 1536 | 1537 | 1538 | 1539 | 1540 | 1541 | 1542 | 1543 | 1544 | 1545 | 1546 | 1547 | 1548 | 1549 | 1550 | 1551 |
| 61 | 1552 | 1553 | 1554 | 1555 | 1556 | 1557 | 1558 | 1559 | 1560 | 1561 | 1562 | 1563 | 1564 | 1565 | 1566 | 1567 |
| 62 | 1568 | 1569 | 1570 | 1571 | 1572 | 1573 | 1574 | 1575 | 1576 | 1577 | 1578 | 1579 | 1580 | 1581 | 1582 | 1583 |
| 63 | 1584 | 1585 | 1586 | 1587 | 1588 | 1589 | 1590 | 1591 | 1592 | 1593 | 1594 | 1595 | 1596 | 1597 | 1598 | 1599 |
| 64 | 1600 | 1601 | 1602 | 1603 | 1604 | 1605 | 1606 | 1607 | 1608 | 1609 | 1610 | 1611 | 1612 | 1613 | 1614 | 1615 |
| 65 | 1616 | 1617 | 1618 | 1619 | 1620 | 1621 | 1622 | 1623 | 1624 | 1625 | 1626 | 1627 | 1628 | 1629 | 1630 | 1631 |
| 66 | 1632 | 1633 | 1634 | 1635 | 1636 | 1637 | 1638 | 1639 | 1640 | 1641 | 1642 | 1643 | 1644 | 1645 | 1646 | 1647 |
| 67 | 1648 | 1649 | 1650 | 1651 | 1652 | 1653 | 1654 | 1655 | 1656 | 1657 | 1658 | 1659 | 1660 | 1661 | 1662 | 1663 |
| 68 | 1664 | 1665 | 1666 | 1667 | 1668 | 1669 | 1670 | 1671 | 1672 | 1673 | 1674 | 1675 | 1676 | 1677 | 1678 | 1679 |
| 69 | 1680 | 1681 | 1682 | 1683 | 1684 | 1685 | 1686 | 1687 | 1688 | 1689 | 1690 | 1691 | 1692 | 1693 | 1694 | 1695 |
| 6a | 1696 | 1697 | 1698 | 1699 | 1700 | 1701 | 1702 | 1703 | 1704 | 1705 | 1706 | 1707 | 1708 | 1709 | 1710 | 1711 |
| 6b | 1712 | 1713 | 1714 | 1715 | 1716 | 1717 | 1718 | 1719 | 1720 | 1721 | 1722 | 1723 | 1724 | 1725 | 1726 | 1727 |
| 6c | 1728 | 1729 | 1730 | 1731 | 1732 | 1733 | 1734 | 1735 | 1736 | 1737 | 1738 | 1739 | 1740 | 1741 | 1742 | 1743 |
| 6d | 1744 | 1745 | 1746 | 1747 | 1748 | 1749 | 1750 | 1751 | 1752 | 1753 | 1754 | 1755 | 1756 | 1757 | 1758 | 1759 |
| 6e | 1760 | 1761 | 1762 | 1763 | 1764 | 1765 | 1766 | 1767 | 1768 | 1769 | 1770 | 1771 | 1772 | 1773 | 1774 | 1775 |
| 6f | 1776 | 1777 | 1778 | 1779 | 1780 | 1781 | 1782 | 1783 | 1784 | 1785 | 1786 | 1787 | 1788 | 1789 | 1790 | 1791 |
| 70 | 1792 | 1793 | 1794 | 1795 | 1796 | 1797 | 1798 | 1799 | 1800 | 1801 | 1802 | 1803 | 1804 | 1805 | 1806 | 1807 |
| 71 | 1808 | 1809 | 1810 | 1811 | 1812 | 1813 | 1814 | 1815 | 1816 | 1817 | 1818 | 1819 | 1820 | 1821 | 1822 | 1823 |
| 72 | 1824 | 1825 | 1826 | 1827 | 1828 | 1829 | 1830 | 1831 | 1832 | 1833 | 1834 | 1835 | 1836 | 1837 | 1838 | 1839 |
| 73 | 1840 | 1841 | 1842 | 1843 | 1844 | 1845 | 1846 | 1847 | 1848 | 1849 | 1850 | 1851 | 1852 | 1853 | 1854 | 1855 |
| 74 | 1856 | 1857 | 1858 | 1859 | 1860 | 1861 | 1862 | 1863 | 1864 | 1865 | 1866 | 1867 | 1868 | 1869 | 1870 | 1871 |
| 75 | 1872 | 1873 | 1874 | 1875 | 1876 | 1877 | 1878 | 1879 | 1880 | 1881 | 1882 | 1883 | 1884 | 1885 | 1886 | 1887 |
| 76 | 1888 | 1889 | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 |
| 77 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 |
| 78 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 |
| 79 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 |
| 7a | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
| 7b | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
| 7c | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| 7d | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| 7e | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
| 7f | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 |

600-777

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 |
| 81 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 |
| 82 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 |
| 83 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 |
| 84 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 |
| 85 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 |
| 86 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 |
| 87 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 |
| 88 | 2176 | 2177 | 2178 | 2179 | 2180 | 2181 | 2182 | 2183 | 2184 | 2185 | 2186 | 2187 | 2188 | 2189 | 2190 | 2191 |
| 89 | 2192 | 2193 | 2194 | 2195 | 2196 | 2197 | 2198 | 2199 | 2200 | 2201 | 2202 | 2203 | 2204 | 2205 | 2206 | 2207 |
| 8a | 2208 | 2209 | 2210 | 2211 | 2212 | 2213 | 2214 | 2215 | 2216 | 2217 | 2218 | 2219 | 2220 | 2221 | 2222 | 2223 |
| 8b | 2224 | 2225 | 2226 | 2227 | 2228 | 2229 | 2230 | 2231 | 2232 | 2233 | 2234 | 2235 | 2236 | 2237 | 2238 | 2239 |
| 8c | 2240 | 2241 | 2242 | 2243 | 2244 | 2245 | 2246 | 2247 | 2248 | 2249 | 2250 | 2251 | 2252 | 2253 | 2254 | 2255 |
| 8d | 2256 | 2257 | 2258 | 2259 | 2260 | 2261 | 2262 | 2263 | 2264 | 2265 | 2266 | 2267 | 2268 | 2269 | 2270 | 2271 |
| 8e | 2272 | 2273 | 2274 | 2275 | 2276 | 2277 | 2278 | 2279 | 2280 | 2281 | 2282 | 2283 | 2284 | 2285 | 2286 | 2287 |
| 8f | 2288 | 2289 | 2290 | 2291 | 2292 | 2293 | 2294 | 2295 | 2296 | 2297 | 2298 | 2299 | 2300 | 2301 | 2302 | 2303 |
| 90 | 2304 | 2305 | 2306 | 2307 | 2308 | 2309 | 2310 | 2311 | 2312 | 2313 | 2314 | 2315 | 2316 | 2317 | 2318 | 2319 |
| 91 | 2320 | 2321 | 2322 | 2323 | 2324 | 2325 | 2326 | 2327 | 2328 | 2329 | 2330 | 2331 | 2332 | 2333 | 2334 | 2335 |
| 92 | 2336 | 2337 | 2338 | 2339 | 2340 | 2341 | 2342 | 2343 | 2344 | 2345 | 2346 | 2347 | 2348 | 2349 | 2350 | 2351 |
| 93 | 2352 | 2353 | 2354 | 2355 | 2356 | 2357 | 2358 | 2359 | 2360 | 2361 | 2362 | 2363 | 2364 | 2365 | 2366 | 2367 |
| 94 | 2368 | 2369 | 2370 | 2371 | 2372 | 2373 | 2374 | 2375 | 2376 | 2377 | 2378 | 2379 | 2380 | 2381 | 2382 | 2383 |
| 95 | 2384 | 2385 | 2386 | 2387 | 2388 | 2389 | 2390 | 2391 | 2392 | 2393 | 2394 | 2395 | 2396 | 2397 | 2398 | 2399 |
| 96 | 2400 | 2401 | 2402 | 2403 | 2404 | 2405 | 2406 | 2407 | 2408 | 2409 | 2410 | 2411 | 2412 | 2413 | 2414 | 2415 |
| 97 | 2416 | 2417 | 2418 | 2419 | 2420 | 2421 | 2422 | 2423 | 2424 | 2425 | 2426 | 2427 | 2428 | 2429 | 2430 | 2431 |
| 98 | 2432 | 2433 | 2434 | 2435 | 2436 | 2437 | 2438 | 2439 | 2440 | 2441 | 2442 | 2443 | 2444 | 2445 | 2446 | 2447 |
| 99 | 2448 | 2449 | 2450 | 2451 | 2452 | 2453 | 2454 | 2455 | 2456 | 2457 | 2458 | 2459 | 2460 | 2461 | 2462 | 2463 |
| 9a | 2464 | 2465 | 2466 | 2467 | 2468 | 2469 | 2470 | 2471 | 2472 | 2473 | 2474 | 2475 | 2476 | 2477 | 2478 | 2479 |
| 9b | 2480 | 2481 | 2482 | 2483 | 2484 | 2485 | 2486 | 2487 | 2488 | 2489 | 2490 | 2491 | 2492 | 2493 | 2494 | 2495 |
| 9c | 2496 | 2497 | 2498 | 2499 | 2500 | 2501 | 2502 | 2503 | 2504 | 2505 | 2506 | 2507 | 2508 | 2509 | 2510 | 2511 |
| 9d | 2512 | 2513 | 2514 | 2515 | 2516 | 2517 | 2518 | 2519 | 2520 | 2521 | 2522 | 2523 | 2524 | 2525 | 2526 | 2527 |
| 9e | 2528 | 2529 | 2530 | 2531 | 2532 | 2533 | 2534 | 2535 | 2536 | 2537 | 2538 | 2539 | 2540 | 2541 | 2542 | 2543 |
| 9f | 2544 | 2545 | 2546 | 2547 | 2548 | 2549 | 2550 | 2551 | 2552 | 2553 | 2554 | 2555 | 2556 | 2557 | 2558 | 2559 |

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a0 | 2560 | 2561 | 2562 | 2563 | 2564 | 2565 | 2566 | 2567 | 2568 | 2569 | 2570 | 2571 | 2572 | 2573 | 2574 | 2575 |
| a1 | 2576 | 2577 | 2578 | 2579 | 2580 | 2581 | 2582 | 2583 | 2584 | 2585 | 2586 | 2587 | 2588 | 2589 | 2590 | 2591 |
| a2 | 2592 | 2593 | 2594 | 2595 | 2596 | 2597 | 2598 | 2599 | 2600 | 2601 | 2602 | 2603 | 2604 | 2605 | 2606 | 2607 |
| a3 | 2608 | 2609 | 2610 | 2611 | 2612 | 2613 | 2614 | 2615 | 2616 | 2617 | 2618 | 2619 | 2620 | 2621 | 2622 | 2623 |
| a4 | 2624 | 2625 | 2626 | 2627 | 2628 | 2629 | 2630 | 2631 | 2632 | 2633 | 2634 | 2635 | 2636 | 2637 | 2638 | 2639 |
| a5 | 2640 | 2641 | 2642 | 2643 | 2644 | 2645 | 2646 | 2647 | 2648 | 2649 | 2650 | 2651 | 2652 | 2653 | 2654 | 2655 |
| a6 | 2656 | 2657 | 2658 | 2659 | 2660 | 2661 | 2662 | 2663 | 2664 | 2665 | 2666 | 2667 | 2668 | 2669 | 2670 | 2671 |
| a7 | 2672 | 2673 | 2674 | 2675 | 2676 | 2677 | 2678 | 2679 | 2680 | 2681 | 2682 | 2683 | 2684 | 2685 | 2686 | 2687 |
| a8 | 2688 | 2689 | 2690 | 2691 | 2692 | 2693 | 2694 | 2695 | 2696 | 2697 | 2698 | 2699 | 2700 | 2701 | 2702 | 2703 |
| a9 | 2704 | 2705 | 2706 | 2707 | 2708 | 2709 | 2710 | 2711 | 2712 | 2713 | 2714 | 2715 | 2716 | 2717 | 2718 | 2719 |
| aa | 2720 | 2721 | 2722 | 2723 | 2724 | 2725 | 2726 | 2727 | 2728 | 2729 | 2730 | 2731 | 2732 | 2733 | 2734 | 2735 |
| ab | 2736 | 2737 | 2738 | 2739 | 2740 | 2741 | 2742 | 2743 | 2744 | 2745 | 2746 | 2747 | 2748 | 2749 | 2750 | 2751 |
| ac | 2752 | 2753 | 2754 | 2755 | 2756 | 2757 | 2758 | 2759 | 2760 | 2761 | 2762 | 2763 | 2764 | 2765 | 2766 | 2767 |
| ad | 2768 | 2769 | 2770 | 2771 | 2772 | 2773 | 2774 | 2775 | 2776 | 2777 | 2778 | 2779 | 2780 | 2781 | 2782 | 2783 |
| ae | 2784 | 2785 | 2786 | 2787 | 2788 | 2789 | 2790 | 2791 | 2792 | 2793 | 2794 | 2795 | 2796 | 2797 | 2798 | 2799 |
| af | 2800 | 2801 | 2802 | 2803 | 2804 | 2805 | 2806 | 2807 | 2808 | 2809 | 2810 | 2811 | 2812 | 2813 | 2814 | 2815 |
| b0 | 2816 | 2817 | 2818 | 2819 | 2820 | 2821 | 2822 | 2823 | 2824 | 2825 | 2826 | 2827 | 2828 | 2829 | 2830 | 2831 |
| b1 | 2832 | 2833 | 2834 | 2835 | 2836 | 2837 | 2838 | 2839 | 2840 | 2841 | 2842 | 2843 | 2844 | 2845 | 2846 | 2847 |
| b2 | 2848 | 2849 | 2850 | 2851 | 2852 | 2853 | 2854 | 2855 | 2856 | 2857 | 2858 | 2859 | 2860 | 2861 | 2862 | 2863 |
| b3 | 2864 | 2865 | 2866 | 2867 | 2868 | 2869 | 2870 | 2871 | 2872 | 2873 | 2874 | 2875 | 2876 | 2877 | 2878 | 2879 |
| b4 | 2880 | 2881 | 2882 | 2883 | 2884 | 2885 | 2886 | 2887 | 2888 | 2889 | 2890 | 2891 | 2892 | 2893 | 2894 | 2895 |
| b5 | 2896 | 2897 | 2898 | 2899 | 2900 | 2901 | 2902 | 2903 | 2904 | 2905 | 2906 | 2907 | 2908 | 2909 | 2910 | 2911 |
| b6 | 2912 | 2913 | 2914 | 2915 | 2916 | 2917 | 2918 | 2919 | 2920 | 2921 | 2922 | 2923 | 2924 | 2925 | 2926 | 2927 |
| b7 | 2928 | 2929 | 2930 | 2931 | 2932 | 2933 | 2934 | 2935 | 2936 | 2937 | 2938 | 2939 | 2940 | 2941 | 2942 | 2943 |
| b8 | 2944 | 2945 | 2946 | 2947 | 2948 | 2949 | 2950 | 2951 | 2952 | 2953 | 2954 | 2955 | 2956 | 2957 | 2958 | 2959 |
| b9 | 2960 | 2961 | 2962 | 2963 | 2964 | 2965 | 2966 | 2967 | 2968 | 2969 | 2970 | 2971 | 2972 | 2973 | 2974 | 2975 |
| ba | 2976 | 2977 | 2978 | 2979 | 2980 | 2981 | 2982 | 2983 | 2984 | 2985 | 2986 | 2987 | 2988 | 2989 | 2990 | 2991 |
| bb | 2992 | 2993 | 2994 | 2995 | 2996 | 2997 | 2998 | 2999 | 3000 | 3001 | 3002 | 3003 | 3004 | 3005 | 3006 | 3007 |
| bc | 3008 | 3009 | 3010 | 3011 | 3012 | 3013 | 3014 | 3015 | 3016 | 3017 | 3018 | 3019 | 3020 | 3021 | 3022 | 3023 |
| bd | 3024 | 3025 | 3026 | 3027 | 3028 | 3029 | 3030 | 3031 | 3032 | 3033 | 3034 | 3035 | 3036 | 3037 | 3038 | 3039 |
| be | 3040 | 3041 | 3042 | 3043 | 3044 | 3045 | 3046 | 3047 | 3048 | 3049 | 3050 | 3051 | 3052 | 3053 | 3054 | 3055 |
| bf | 3056 | 3057 | 3058 | 3059 | 3060 | 3061 | 3062 | 3063 | 3064 | 3065 | 3066 | 3067 | 3068 | 3069 | 3070 | 3071 |

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| c0 | 3072 | 3073 | 3074 | 3075 | 3076 | 3077 | 3078 | 3079 | 3080 | 3081 | 3082 | 3083 | 3084 | 3085 | 3086 | 3087 |
| c1 | 3088 | 3089 | 3090 | 3091 | 3092 | 3093 | 3094 | 3095 | 3096 | 3097 | 3098 | 3099 | 3100 | 3101 | 3102 | 3103 |
| c2 | 3104 | 3105 | 3106 | 3107 | 3108 | 3109 | 3110 | 3111 | 3112 | 3113 | 3114 | 3115 | 3116 | 3117 | 3118 | 3119 |
| c3 | 3120 | 3121 | 3122 | 3123 | 3124 | 3125 | 3126 | 3127 | 3128 | 3129 | 3130 | 3131 | 3132 | 3133 | 3134 | 3135 |
| c4 | 3136 | 3137 | 3138 | 3139 | 3140 | 3141 | 3142 | 3143 | 3144 | 3145 | 3146 | 3147 | 3148 | 3149 | 3150 | 3151 |
| c5 | 3152 | 3153 | 3154 | 3155 | 3156 | 3157 | 3158 | 3159 | 3160 | 3161 | 3162 | 3163 | 3164 | 3165 | 3166 | 3167 |
| c6 | 3168 | 3169 | 3170 | 3171 | 3172 | 3173 | 3174 | 3175 | 3176 | 3177 | 3178 | 3179 | 3180 | 3181 | 3182 | 3183 |
| c7 | 3184 | 3185 | 3186 | 3187 | 3188 | 3189 | 3190 | 3191 | 3192 | 3193 | 3194 | 3195 | 3196 | 3197 | 3198 | 3199 |
| c8 | 3200 | 3201 | 3202 | 3203 | 3204 | 3205 | 3206 | 3207 | 3208 | 3209 | 3210 | 3211 | 3212 | 3213 | 3214 | 3215 |
| c9 | 3216 | 3217 | 3218 | 3219 | 3220 | 3221 | 3222 | 3223 | 3224 | 3225 | 3226 | 3227 | 3228 | 3229 | 3230 | 3231 |
| ca | 3232 | 3233 | 3234 | 3235 | 3236 | 3237 | 3238 | 3239 | 3240 | 3241 | 3242 | 3243 | 3244 | 3245 | 3246 | 3247 |
| cb | 3248 | 3249 | 3250 | 3251 | 3252 | 3253 | 3254 | 3255 | 3256 | 3257 | 3258 | 3259 | 3260 | 3261 | 3262 | 3263 |
| cc | 3264 | 3265 | 3266 | 3267 | 3268 | 3269 | 3270 | 3271 | 3272 | 3273 | 3274 | 3275 | 3276 | 3277 | 3278 | 3279 |
| cd | 3280 | 3281 | 3282 | 3283 | 3284 | 3285 | 3286 | 3287 | 3288 | 3289 | 3290 | 3291 | 3292 | 3293 | 3294 | 3295 |
| ce | 3296 | 3297 | 3298 | 3299 | 3300 | 3301 | 3302 | 3303 | 3304 | 3305 | 3306 | 3307 | 3308 | 3309 | 3310 | 3311 |
| cf | 3312 | 3313 | 3314 | 3315 | 3316 | 3317 | 3318 | 3319 | 3320 | 3321 | 3322 | 3323 | 3324 | 3325 | 3326 | 3327 |
| d0 | 3328 | 3329 | 3330 | 3331 | 3332 | 3333 | 3334 | 3335 | 3336 | 3337 | 3338 | 3339 | 3340 | 3341 | 3342 | 3343 |
| d1 | 3344 | 3345 | 3346 | 3347 | 3348 | 3349 | 3350 | 3351 | 3352 | 3353 | 3354 | 3355 | 3356 | 3357 | 3358 | 3359 |
| d2 | 3360 | 3361 | 3362 | 3363 | 3364 | 3365 | 3366 | 3367 | 3368 | 3369 | 3370 | 3371 | 3372 | 3373 | 3374 | 3375 |
| d3 | 3376 | 3377 | 3378 | 3379 | 3380 | 3381 | 3382 | 3383 | 3384 | 3385 | 3386 | 3387 | 3388 | 3389 | 3390 | 3391 |
| d4 | 3392 | 3393 | 3394 | 3395 | 3396 | 3397 | 3398 | 3399 | 3400 | 3401 | 3402 | 3403 | 3404 | 3405 | 3406 | 3407 |
| d5 | 3408 | 3409 | 3410 | 3411 | 3412 | 3413 | 3414 | 3415 | 3416 | 3417 | 3418 | 3419 | 3420 | 3421 | 3422 | 3423 |
| d6 | 3424 | 3425 | 3426 | 3427 | 3428 | 3429 | 3430 | 3431 | 3432 | 3433 | 3434 | 3435 | 3436 | 3437 | 3438 | 3439 |
| d7 | 3440 | 3441 | 3442 | 3443 | 3444 | 3445 | 3446 | 3447 | 3448 | 3449 | 3450 | 3451 | 3452 | 3453 | 3454 | 3455 |
| d8 | 3456 | 3457 | 3458 | 3459 | 3460 | 3461 | 3462 | 3463 | 3464 | 3465 | 3466 | 3467 | 3468 | 3469 | 3470 | 3471 |
| d9 | 3472 | 3473 | 3474 | 3475 | 3476 | 3477 | 3478 | 3479 | 3480 | 3481 | 3482 | 3483 | 3484 | 3485 | 3486 | 3487 |
| da | 3488 | 3489 | 3490 | 3491 | 3492 | 3493 | 3494 | 3495 | 3496 | 3497 | 3498 | 3499 | 3500 | 3501 | 3502 | 3503 |
| db | 3504 | 3505 | 3506 | 3507 | 3508 | 3509 | 3510 | 3511 | 3512 | 3513 | 3514 | 3515 | 3516 | 3517 | 3518 | 3519 |
| dc | 3520 | 3521 | 3522 | 3523 | 3524 | 3525 | 3526 | 3527 | 3528 | 3529 | 3530 | 3531 | 3532 | 3533 | 3534 | 3535 |
| dd | 3536 | 3537 | 3538 | 3539 | 3540 | 3541 | 3542 | 3543 | 3544 | 3545 | 3546 | 3547 | 3548 | 3549 | 3550 | 3551 |
| de | 3552 | 3553 | 3554 | 3555 | 3556 | 3557 | 3558 | 3559 | 3560 | 3561 | 3562 | 3563 | 3564 | 3565 | 3566 | 3567 |
| df | 3568 | 3569 | 3570 | 3571 | 3572 | 3573 | 3574 | 3575 | 3576 | 3577 | 3578 | 3579 | 3580 | 3581 | 3582 | 3583 |

# HEXADECIMAL to DECIMAL CONVERSION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | a | b | c | d | e | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| e0 | 3584 | 3585 | 3586 | 3587 | 3588 | 3589 | 3590 | 3591 | 3592 | 3593 | 3594 | 3595 | 3596 | 3597 | 3598 | 3599 |
| e1 | 3600 | 3601 | 3602 | 3603 | 3604 | 3605 | 3606 | 3607 | 3608 | 3609 | 3610 | 3611 | 3612 | 3613 | 3614 | 3615 |
| e2 | 3616 | 3617 | 3618 | 3619 | 3620 | 3621 | 3622 | 3623 | 3624 | 3625 | 3626 | 3627 | 3628 | 3629 | 3630 | 3631 |
| e3 | 3632 | 3633 | 3634 | 3635 | 3636 | 3637 | 3638 | 3639 | 3640 | 3641 | 3642 | 3643 | 3644 | 3645 | 3646 | 3647 |
| e4 | 3648 | 3649 | 3650 | 3651 | 3652 | 3653 | 3654 | 3655 | 3656 | 3657 | 3658 | 3659 | 3660 | 3661 | 3662 | 3663 |
| e5 | 3664 | 3665 | 3666 | 3667 | 3668 | 3669 | 3670 | 3671 | 3672 | 3673 | 3674 | 3675 | 3676 | 3677 | 3678 | 3679 |
| e6 | 3680 | 3681 | 3682 | 3683 | 3684 | 3685 | 3686 | 3687 | 3688 | 3689 | 3690 | 3691 | 3692 | 3693 | 3694 | 3695 |
| e7 | 3696 | 3697 | 3698 | 3699 | 3700 | 3701 | 3702 | 3703 | 3704 | 3705 | 3706 | 3707 | 3708 | 3709 | 3710 | 3711 |
| e8 | 3712 | 3713 | 3714 | 3715 | 3716 | 3717 | 3718 | 3719 | 3720 | 3721 | 3722 | 3723 | 3724 | 3725 | 3726 | 3727 |
| e9 | 3728 | 3729 | 3730 | 3731 | 3732 | 3733 | 3734 | 3735 | 3736 | 3737 | 3738 | 3739 | 3740 | 3741 | 3742 | 3743 |
| ea | 3744 | 3745 | 3746 | 3747 | 3748 | 3749 | 3750 | 3751 | 3752 | 3753 | 3754 | 3755 | 3756 | 3757 | 3758 | 3759 |
| eb | 3760 | 3761 | 3762 | 3763 | 3764 | 3765 | 3766 | 3767 | 3768 | 3769 | 3770 | 3771 | 3772 | 3773 | 3774 | 3775 |
| ec | 3776 | 3777 | 3778 | 3779 | 3780 | 3781 | 3782 | 3783 | 3784 | 3785 | 3786 | 3787 | 3788 | 3789 | 3790 | 3791 |
| ed | 3792 | 3793 | 3794 | 3795 | 3796 | 3797 | 3798 | 3799 | 3800 | 3801 | 3802 | 3803 | 3804 | 3805 | 3806 | 3807 |
| ee | 3808 | 3809 | 3810 | 3811 | 3812 | 3813 | 3814 | 3815 | 3816 | 3817 | 3818 | 3819 | 3820 | 3821 | 3822 | 3823 |
| ef | 3824 | 3825 | 3826 | 3827 | 3828 | 3829 | 3830 | 3831 | 3832 | 3833 | 3834 | 3835 | 3836 | 3837 | 3838 | 3839 |
| f0 | 3840 | 3841 | 3842 | 3843 | 3844 | 3845 | 3846 | 3847 | 3848 | 3849 | 3850 | 3851 | 3852 | 3853 | 3854 | 3855 |
| f1 | 3856 | 3857 | 3858 | 3859 | 3860 | 3861 | 3862 | 3863 | 3864 | 3865 | 3866 | 3867 | 3868 | 3869 | 3870 | 3871 |
| f2 | 3872 | 3873 | 3874 | 3875 | 3876 | 3877 | 3878 | 3879 | 3880 | 3881 | 3882 | 3883 | 3884 | 3885 | 3886 | 3887 |
| f3 | 3888 | 3889 | 3890 | 3891 | 3892 | 3893 | 3894 | 3895 | 3896 | 3897 | 3898 | 3899 | 3900 | 3901 | 3902 | 3903 |
| f4 | 3904 | 3905 | 3906 | 3907 | 3908 | 3909 | 3910 | 3911 | 3912 | 3913 | 3914 | 3915 | 3916 | 3917 | 3918 | 3919 |
| f5 | 3920 | 3921 | 3922 | 3923 | 3924 | 3925 | 3926 | 3927 | 3928 | 3929 | 3930 | 3931 | 3932 | 3933 | 3934 | 3935 |
| f6 | 3936 | 3937 | 3938 | 3939 | 3940 | 3941 | 3942 | 3943 | 3944 | 3945 | 3946 | 3947 | 3948 | 3949 | 3950 | 3951 |
| f7 | 3952 | 3953 | 3954 | 3955 | 3956 | 3957 | 3958 | 3959 | 3960 | 3961 | 3962 | 3963 | 3964 | 3965 | 3966 | 3967 |
| f8 | 3968 | 3969 | 3970 | 3971 | 3972 | 3973 | 3974 | 3975 | 3976 | 3977 | 3978 | 3979 | 3980 | 3981 | 3982 | 3983 |
| f9 | 3984 | 3985 | 3986 | 3987 | 3988 | 3989 | 3990 | 3991 | 3992 | 3993 | 3994 | 3995 | 3996 | 3997 | 3998 | 3999 |
| fa | 4000 | 4001 | 4002 | 4003 | 4004 | 4005 | 4006 | 4007 | 4008 | 4009 | 4010 | 4011 | 4012 | 4013 | 4014 | 4015 |
| fb | 4016 | 4017 | 4018 | 4019 | 4020 | 4021 | 4022 | 4023 | 4024 | 4025 | 4026 | 4027 | 4028 | 4029 | 4030 | 4031 |
| fc | 4032 | 4033 | 4034 | 4035 | 4036 | 4037 | 4038 | 4039 | 4040 | 4041 | 4042 | 4043 | 4044 | 4045 | 4046 | 4047 |
| fd | 4048 | 4049 | 4050 | 4051 | 4052 | 4053 | 4054 | 4055 | 4056 | 4057 | 4058 | 4059 | 4060 | 4061 | 4062 | 4063 |
| fe | 4064 | 4065 | 4066 | 4067 | 4068 | 4069 | 4070 | 4071 | 4072 | 4073 | 4074 | 4075 | 4076 | 4077 | 4078 | 4079 |
| ff | 4080 | 4081 | 4082 | 4083 | 4084 | 4085 | 4086 | 4087 | 4088 | 4089 | 4090 | 4091 | 4092 | 4093 | 4094 | 4095 |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

0000-0400

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 000 | 001 | 002 | 003 | 004 | 005 | 006 | 007 | 008 | 009 |
| 1 | 00a | 00b | 00c | 00d | 00e | 00f | 010 | 011 | 012 | 013 |
| 2 | 014 | 015 | 016 | 017 | 018 | 019 | 01a | 01b | 01c | 01d |
| 3 | 01e | 01f | 020 | 021 | 022 | 023 | 024 | 025 | 026 | 027 |
| 4 | 028 | 029 | 02a | 02b | 02c | 02d | 02e | 02f | 030 | 031 |
| 5 | 032 | 033 | 034 | 035 | 036 | 037 | 038 | 039 | 03a | 03b |
| 6 | 03c | 03d | 03e | 03f | 040 | 041 | 042 | 043 | 044 | 045 |
| 7 | 046 | 047 | 048 | 049 | 04a | 04b | 04c | 04d | 04e | 04f |
| 8 | 050 | 051 | 052 | 053 | 054 | 055 | 056 | 057 | 058 | 059 |
| 9 | 05a | 05b | 05c | 05d | 05e | 05f | 060 | 061 | 062 | 063 |
| 10 | 064 | 065 | 066 | 067 | 068 | 069 | 06a | 06b | 06c | 06d |
| 11 | 06e | 06f | 070 | 071 | 072 | 073 | 074 | 075 | 076 | 077 |
| 12 | 078 | 079 | 07a | 07b | 07c | 07d | 07e | 07f | 080 | 081 |
| 13 | 082 | 083 | 084 | 085 | 086 | 087 | 088 | 089 | 08a | 08b |
| 14 | 08c | 08d | 08e | 08f | 090 | 091 | 092 | 093 | 094 | 095 |
| 15 | 096 | 097 | 098 | 099 | 09a | 09b | 09c | 09d | 09e | 09f |
| 16 | 0a0 | 0a1 | 0a2 | 0a3 | 0a4 | 0a5 | 0a6 | 0a7 | 0a8 | 0a9 |
| 17 | 0aa | 0ab | 0ac | 0ad | 0ae | 0af | 0b0 | 0b1 | 0b2 | 0b3 |
| 18 | 0b4 | 0b5 | 0b6 | 0b7 | 0b8 | 0b9 | 0ba | 0bb | 0bc | 0bd |
| 19 | 0be | 0bf | 0c0 | 0c1 | 0c2 | 0c3 | 0c4 | 0c5 | 0c6 | 0c7 |
| 20 | 0c8 | 0c9 | 0ca | 0cb | 0cc | 0cd | 0ce | 0cf | 0d0 | 0d1 |
| 21 | 0d2 | 0d3 | 0d4 | 0d5 | 0d6 | 0d7 | 0d8 | 0d9 | 0da | 0db |
| 22 | 0dc | 0dd | 0de | 0df | 0e0 | 0e1 | 0e2 | 0e3 | 0e4 | 0e5 |
| 23 | 0e6 | 0e7 | 0e8 | 0e9 | 0ea | 0eb | 0ec | 0ed | 0ee | 0ef |
| 24 | 0f0 | 0f1 | 0f2 | 0f3 | 0f4 | 0f5 | 0f6 | 0f7 | 0f8 | 0f9 |
| 25 | 0fa | 0fb | 0fc | 0fd | 0fe | 0ff | 100 | 101 | 102 | 103 |
| 26 | 104 | 105 | 106 | 107 | 108 | 109 | 10a | 10b | 10c | 10d |
| 27 | 10e | 10f | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 |
| 28 | 118 | 119 | 11a | 11b | 11c | 11d | 11e | 11f | 120 | 121 |
| 29 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 12a | 12b |
| 30 | 12c | 12d | 12e | 12f | 130 | 131 | 132 | 133 | 134 | 135 |
| 31 | 136 | 137 | 138 | 139 | 13a | 13b | 13c | 13d | 13e | 13f |
| 32 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 |
| 33 | 14a | 14b | 14c | 14d | 14e | 14f | 150 | 151 | 152 | 153 |
| 34 | 154 | 155 | 156 | 157 | 158 | 159 | 15a | 15b | 15c | 15d |
| 35 | 15e | 15f | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 |
| 36 | 168 | 169 | 16a | 16b | 16c | 16d | 16e | 16f | 170 | 171 |
| 37 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 17a | 17b |
| 38 | 17c | 17d | 17e | 17f | 180 | 181 | 182 | 183 | 184 | 185 |
| 39 | 186 | 187 | 188 | 189 | 18a | 18b | 18c | 18d | 18e | 18f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

0400-0799

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 40 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 |
| 41 | 19a | 19b | 19c | 19d | 19e | 19f | 1a0 | 1a1 | 1a2 | 1a3 |
| 42 | 1a4 | 1a5 | 1a6 | 1a7 | 1a8 | 1a9 | 1aa | 1ab | 1ac | 1ad |
| 43 | 1ae | 1af | 1b0 | 1b1 | 1b2 | 1b3 | 1b4 | 1b5 | 1b6 | 1b7 |
| 44 | 1b8 | 1b9 | 1ba | 1bb | 1bc | 1bd | 1be | 1bf | 1c0 | 1c1 |
| 45 | 1c2 | 1c3 | 1c4 | 1c5 | 1c6 | 1c7 | 1c8 | 1c9 | 1ca | 1cb |
| 46 | 1cc | 1cd | 1ce | 1cf | 1d0 | 1d1 | 1d2 | 1d3 | 1d4 | 1d5 |
| 47 | 1d6 | 1d7 | 1d8 | 1d9 | 1da | 1db | 1dc | 1dd | 1de | 1df |
| 48 | 1e0 | 1e1 | 1e2 | 1e3 | 1e4 | 1e5 | 1e6 | 1e7 | 1e8 | 1e9 |
| 49 | 1ea | 1eb | 1ec | 1ed | 1ee | 1ef | 1f0 | 1f1 | 1f2 | 1f3 |
| 50 | 1f4 | 1f5 | 1f6 | 1f7 | 1f8 | 1f9 | 1fa | 1fb | 1fc | 1fd |
| 51 | 1fe | 1ff | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 |
| 52 | 208 | 209 | 20a | 20b | 20c | 20d | 20e | 20f | 210 | 211 |
| 53 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 21a | 21b |
| 54 | 21c | 21d | 21e | 21f | 220 | 221 | 222 | 223 | 224 | 225 |
| 55 | 226 | 227 | 228 | 229 | 22a | 22b | 22c | 22d | 22e | 22f |
| 56 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 |
| 57 | 23a | 23b | 23c | 23d | 23e | 23f | 240 | 241 | 242 | 243 |
| 58 | 244 | 245 | 246 | 247 | 248 | 249 | 24a | 24b | 24c | 24d |
| 59 | 24e | 24f | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 |
| 60 | 258 | 259 | 25a | 25b | 25c | 25d | 25e | 25f | 260 | 261 |
| 61 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 26a | 26b |
| 62 | 26c | 26d | 26e | 26f | 270 | 271 | 272 | 273 | 274 | 275 |
| 63 | 276 | 277 | 278 | 279 | 27a | 27b | 27c | 27d | 27e | 27f |
| 64 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 |
| 65 | 28a | 28b | 28c | 28d | 28e | 28f | 290 | 291 | 292 | 293 |
| 66 | 294 | 295 | 296 | 297 | 298 | 299 | 29a | 29b | 29c | 29d |
| 67 | 29e | 29f | 2a0 | 2a1 | 2a2 | 2a3 | 2a4 | 2a5 | 2a6 | 2a7 |
| 68 | 2a8 | 2a9 | 2aa | 2ab | 2ac | 2ad | 2ae | 2af | 2b0 | 2b1 |
| 69 | 2b2 | 2b3 | 2b4 | 2b5 | 2b6 | 2b7 | 2b8 | 2b9 | 2ba | 2bb |
| 70 | 2bc | 2bd | 2be | 2bf | 2c0 | 2c1 | 2c2 | 2c3 | 2c4 | 2c5 |
| 71 | 2c6 | 2c7 | 2c8 | 2c9 | 2ca | 2cb | 2cc | 2cd | 2ce | 2cf |
| 72 | 2d0 | 2d1 | 2d2 | 2d3 | 2d4 | 2d5 | 2d6 | 2d7 | 2d8 | 2d9 |
| 73 | 2da | 2db | 2dc | 2dd | 2de | 2df | 2e0 | 2e1 | 2e2 | 2e3 |
| 74 | 2e4 | 2e5 | 2e6 | 2e7 | 2e8 | 2e9 | 2ea | 2eb | 2ec | 2ed |
| 75 | 2ee | 2ef | 2f0 | 2f1 | 2f2 | 2f3 | 2f4 | 2f5 | 2f6 | 2f7 |
| 76 | 2f8 | 2f9 | 2fa | 2fb | 2fc | 2fd | 2fe | 2ff | 300 | 301 |
| 77 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 30a | 30b |
| 78 | 30c | 30d | 30e | 30f | 310 | 311 | 312 | 313 | 314 | 315 |
| 79 | 316 | 317 | 318 | 319 | 31a | 31b | 31c | 31d | 31e | 31f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

0800-1199

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 |
| 81 | 32a | 32b | 32c | 32d | 32e | 32f | 330 | 331 | 332 | 333 |
| 82 | 334 | 335 | 336 | 337 | 338 | 339 | 33a | 33b | 33c | 33d |
| 83 | 33e | 33f | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 |
| 84 | 348 | 349 | 34a | 34b | 34c | 34d | 34e | 34f | 350 | 351 |
| 85 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 35a | 35b |
| 86 | 35c | 35d | 35e | 35f | 360 | 361 | 362 | 363 | 364 | 365 |
| 87 | 366 | 367 | 368 | 369 | 36a | 36b | 36c | 36d | 36e | 36f |
| 88 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 |
| 89 | 37a | 37b | 37c | 37d | 37e | 37f | 380 | 381 | 382 | 383 |
| 90 | 384 | 385 | 386 | 387 | 388 | 389 | 38a | 38b | 38c | 38d |
| 91 | 38e | 38f | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 |
| 92 | 398 | 399 | 39a | 39b | 39c | 39d | 39e | 39f | 3a0 | 3a1 |
| 93 | 3a2 | 3a3 | 3a4 | 3a5 | 3a6 | 3a7 | 3a8 | 3a9 | 3aa | 3ab |
| 94 | 3ac | 3ad | 3ae | 3af | 3b0 | 3b1 | 3b2 | 3b3 | 3b4 | 3b5 |
| 95 | 3b6 | 3b7 | 3b8 | 3b9 | 3ba | 3bb | 3bc | 3bd | 3be | 3bf |
| 96 | 3c0 | 3c1 | 3c2 | 3c3 | 3c4 | 3c5 | 3c6 | 3c7 | 3c8 | 3c9 |
| 97 | 3ca | 3cb | 3cc | 3cd | 3ce | 3cf | 3d0 | 3d1 | 3d2 | 3d3 |
| 98 | 3d4 | 3d5 | 3d6 | 3d7 | 3d8 | 3d9 | 3da | 3db | 3dc | 3dd |
| 99 | 3de | 3df | 3e0 | 3e1 | 3e2 | 3e3 | 3e4 | 3e5 | 3e6 | 3e7 |
| 100 | 3e8 | 3e9 | 3ea | 3eb | 3ec | 3ed | 3ee | 3ef | 3f0 | 3f1 |
| 101 | 3f2 | 3f3 | 3f4 | 3f5 | 3f6 | 3f7 | 3f8 | 3f9 | 3fa | 3fb |
| 102 | 3fc | 3fd | 3fe | 3ff | 400 | 401 | 402 | 403 | 404 | 405 |
| 103 | 406 | 407 | 408 | 409 | 40a | 40b | 40c | 40d | 40e | 40f |
| 104 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 |
| 105 | 41a | 41b | 41c | 41d | 41e | 41f | 420 | 421 | 422 | 423 |
| 106 | 424 | 425 | 426 | 427 | 428 | 429 | 42a | 42b | 42c | 42d |
| 107 | 42e | 42f | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 |
| 108 | 438 | 439 | 43a | 43b | 43c | 43d | 43e | 43f | 440 | 441 |
| 109 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 44a | 44b |
| 110 | 44c | 44d | 44e | 44f | 450 | 451 | 452 | 453 | 454 | 455 |
| 111 | 456 | 457 | 458 | 459 | 45a | 45b | 45c | 45d | 45e | 45f |
| 112 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 |
| 113 | 46a | 46b | 46c | 46d | 46e | 46f | 470 | 471 | 472 | 473 |
| 114 | 474 | 475 | 476 | 477 | 478 | 479 | 47a | 47b | 47c | 47d |
| 115 | 47e | 47f | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 |
| 116 | 488 | 489 | 48a | 48b | 48c | 48d | 48e | 48f | 490 | 491 |
| 117 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 49a | 49b |
| 118 | 49c | 49d | 49e | 49f | 4a0 | 4a1 | 4a2 | 4a3 | 4a4 | 4a5 |
| 119 | 4a6 | 4a7 | 4a8 | 4a9 | 4aa | 4ab | 4ac | 4ad | 4ae | 4af |

DECIMAL TO HEXADECIMAL

CONVERSION TABLE

1200-1599

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 120 | 4b0 | 4b1 | 4b2 | 4b3 | 4b4 | 4b5 | 4b6 | 4b7 | 4b8 | 4b9 |
| 121 | 4ba | 4bb | 4bc | 4bd | 4be | 4bf | 4c0 | 4c1 | 4c2 | 4c3 |
| 122 | 4c4 | 4c5 | 4c6 | 4c7 | 4c8 | 4c9 | 4ca | 4cb | 4cc | 4cd |
| 123 | 4ce | 4cf | 4d0 | 4d1 | 4d2 | 4d3 | 4d4 | 4d5 | 4d6 | 4d7 |
| 124 | 4d8 | 4d9 | 4da | 4db | 4dc | 4dd | 4de | 4df | 4e0 | 4e1 |
| 125 | 4e2 | 4e3 | 4e4 | 4e5 | 4e6 | 4e7 | 4e8 | 4e9 | 4ea | 4eb |
| 126 | 4ec | 4ed | 4ee | 4ef | 4f0 | 4f1 | 4f2 | 4f3 | 4f4 | 4f5 |
| 127 | 4f6 | 4f7 | 4f8 | 4f9 | 4fa | 4fb | 4fc | 4fd | 4fe | 4ff |
| 128 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 |
| 129 | 50a | 50b | 50c | 50d | 50e | 50f | 510 | 511 | 512 | 513 |
| 130 | 514 | 515 | 516 | 517 | 518 | 519 | 51a | 51b | 51c | 51d |
| 131 | 51e | 51f | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 |
| 132 | 528 | 529 | 52a | 52b | 52c | 52d | 52e | 52f | 530 | 531 |
| 133 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 53a | 53b |
| 134 | 53c | 53d | 53e | 53f | 540 | 541 | 542 | 543 | 544 | 545 |
| 135 | 546 | 547 | 548 | 549 | 54a | 54b | 54c | 54d | 54e | 54f |
| 136 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 |
| 137 | 55a | 55b | 55c | 55d | 55e | 55f | 560 | 561 | 562 | 563 |
| 138 | 564 | 565 | 566 | 567 | 568 | 569 | 56a | 56b | 56c | 56d |
| 139 | 56e | 56f | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 |
| 140 | 578 | 579 | 57a | 57b | 57c | 57d | 57e | 57f | 580 | 581 |
| 141 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 58a | 58b |
| 142 | 58c | 58d | 58e | 58f | 590 | 591 | 592 | 593 | 594 | 595 |
| 143 | 596 | 597 | 598 | 599 | 59a | 59b | 59c | 59d | 59e | 59f |
| 144 | 5a0 | 5a1 | 5a2 | 5a3 | 5a4 | 5a5 | 5a6 | 5a7 | 5a8 | 5a9 |
| 145 | 5aa | 5ab | 5ac | 5ad | 5ae | 5af | 5b0 | 5b1 | 5b2 | 5b3 |
| 146 | 5b4 | 5b5 | 5b6 | 5b7 | 5b8 | 5b9 | 5ba | 5bb | 5bc | 5bd |
| 147 | 5be | 5bf | 5c0 | 5c1 | 5c2 | 5c3 | 5c4 | 5c5 | 5c6 | 5c7 |
| 148 | 5c8 | 5c9 | 5ca | 5cb | 5cc | 5cd | 5ce | 5cf | 5d0 | 5d1 |
| 149 | 5d2 | 5d3 | 5d4 | 5d5 | 5d6 | 5d7 | 5d8 | 5d9 | 5da | 5db |
| 150 | 5dc | 5dd | 5de | 5df | 5e0 | 5e1 | 5e2 | 5e3 | 5e4 | 5e5 |
| 151 | 5e6 | 5e7 | 5e8 | 5e9 | 5ea | 5eb | 5ec | 5ed | 5ee | 5ef |
| 152 | 5f0 | 5f1 | 5f2 | 5f3 | 5f4 | 5f5 | 5f6 | 5f7 | 5f8 | 5f9 |
| 153 | 5fa | 5fb | 5fc | 5fd | 5fe | 5ff | 600 | 601 | 602 | 603 |
| 154 | 604 | 605 | 606 | 607 | 608 | 609 | 60a | 60b | 60c | 60d |
| 155 | 60e | 60f | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 |
| 156 | 618 | 619 | 61a | 61b | 61c | 61d | 61e | 61f | 620 | 621 |
| 157 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 62a | 62b |
| 158 | 62c | 62d | 62e | 62f | 630 | 631 | 632 | 633 | 634 | 635 |
| 159 | 636 | 637 | 638 | 639 | 63a | 63b | 63c | 63d | 63e | 63f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

1600-1999

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 160 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 |
| 161 | 64a | 64b | 64c | 64d | 64e | 64f | 650 | 651 | 652 | 653 |
| 162 | 654 | 655 | 656 | 657 | 658 | 659 | 65a | 65b | 65c | 65d |
| 163 | 65e | 65f | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 |
| 164 | 668 | 669 | 66a | 66b | 66c | 66d | 66e | 66f | 670 | 671 |
| 165 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 67a | 67b |
| 166 | 67c | 67d | 67e | 67f | 680 | 681 | 682 | 683 | 684 | 685 |
| 167 | 686 | 687 | 688 | 689 | 68a | 68b | 68c | 68d | 68e | 68f |
| 168 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 |
| 169 | 69a | 69b | 69c | 69d | 69e | 69f | 6a0 | 6a1 | 6a2 | 6a3 |
| 170 | 6a4 | 6a5 | 6a6 | 6a7 | 6a8 | 6a9 | 6aa | 6ab | 6ac | 6ad |
| 171 | 6ae | 6af | 6b0 | 6b1 | 6b2 | 6b3 | 6b4 | 6b5 | 6b6 | 6b7 |
| 172 | 6b8 | 6b9 | 6ba | 6bb | 6bc | 6bd | 6be | 6bf | 6c0 | 6c1 |
| 173 | 6c2 | 6c3 | 6c4 | 6c5 | 6c6 | 6c7 | 6c8 | 6c9 | 6ca | 6cb |
| 174 | 6cc | 6cd | 6ce | 6cf | 6d0 | 6d1 | 6d2 | 6d3 | 6d4 | 6d5 |
| 175 | 6d6 | 6d7 | 6d8 | 6d9 | 6da | 6db | 6dc | 6dd | 6de | 6df |
| 176 | 6e0 | 6e1 | 6e2 | 6e3 | 6e4 | 6e5 | 6e6 | 6e7 | 6e8 | 6e9 |
| 177 | 6ea | 6eb | 6ec | 6ed | 6ee | 6ef | 6f0 | 6f1 | 6f2 | 6f3 |
| 178 | 6f4 | 6f5 | 6f6 | 6f7 | 6f8 | 6f9 | 6fa | 6fb | 6fc | 6fd |
| 179 | 6fe | 6ff | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 |
| 180 | 708 | 709 | 70a | 70b | 70c | 70d | 70e | 70f | 710 | 711 |
| 181 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 71a | 71b |
| 182 | 71c | 71d | 71e | 71f | 720 | 721 | 722 | 723 | 724 | 725 |
| 183 | 726 | 727 | 728 | 729 | 72a | 72b | 72c | 72d | 72e | 72f |
| 184 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 |
| 185 | 73a | 73b | 73c | 73d | 73e | 73f | 740 | 741 | 742 | 743 |
| 186 | 744 | 745 | 746 | 747 | 748 | 749 | 74a | 74b | 74c | 74d |
| 187 | 74e | 74f | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 |
| 188 | 758 | 759 | 75a | 75b | 75c | 75d | 75e | 75f | 760 | 761 |
| 189 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 76a | 76b |
| 190 | 76c | 76d | 76e | 76f | 770 | 771 | 772 | 773 | 774 | 775 |
| 191 | 776 | 777 | 778 | 779 | 77a | 77b | 77c | 77d | 77e | 77f |
| 192 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 |
| 193 | 78a | 78b | 78c | 78d | 78e | 78f | 790 | 791 | 792 | 793 |
| 194 | 794 | 795 | 796 | 797 | 798 | 799 | 79a | 79b | 79c | 79d |
| 195 | 79e | 79f | 7a0 | 7a1 | 7a2 | 7a3 | 7a4 | 7a5 | 7a6 | 7a7 |
| 196 | 7a8 | 7a9 | 7aa | 7ab | 7ac | 7ad | 7ae | 7af | 7b0 | 7b1 |
| 197 | 7b2 | 7b3 | 7b4 | 7b5 | 7b6 | 7b7 | 7b8 | 7b9 | 7ba | 7bb |
| 198 | 7bc | 7bd | 7be | 7bf | 7c0 | 7c1 | 7c2 | 7c3 | 7c4 | 7c5 |
| 199 | 7c6 | 7c7 | 6c8 | 7c9 | 7ca | 7cb | 7cc | 7cd | 7ce | 7cf |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

2000-2399

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 7d0 | 7d1 | 7d2 | 7d3 | 7d4 | 7d5 | 7d6 | 7d7 | 7d8 | 7d9 |
| 201 | 7da | 7db | 7dc | 7dd | 7de | 7df | 7e0 | 7e1 | 7e2 | 7e3 |
| 202 | 7e4 | 7e5 | 7e6 | 7e7 | 7e8 | 7e9 | 7ea | 7eb | 7ec | 7ed |
| 203 | 7ee | 7ef | 7f0 | 7f1 | 7f2 | 7f3 | 7f4 | 7f5 | 7f6 | 7f7 |
| 204 | 7f8 | 7f9 | 7fa | 7fb | 7fc | 7fd | 7fe | 7ff | 800 | 801 |
| 205 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 80a | 80b |
| 206 | 80c | 80d | 80e | 80f | 810 | 811 | 812 | 813 | 814 | 815 |
| 207 | 816 | 817 | 818 | 819 | 81a | 81b | 81c | 81d | 81e | 81f |
| 208 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 |
| 209 | 82a | 82b | 82c | 82d | 82e | 82f | 830 | 831 | 832 | 833 |
| 210 | 834 | 835 | 836 | 837 | 838 | 839 | 83a | 83b | 83c | 83d |
| 211 | 83e | 83f | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 |
| 212 | 848 | 849 | 84a | 84b | 84c | 84d | 84e | 84f | 850 | 851 |
| 213 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 85a | 85b |
| 214 | 85c | 85d | 85e | 85f | 860 | 861 | 862 | 863 | 864 | 865 |
| 215 | 866 | 867 | 868 | 869 | 86a | 86b | 86c | 86d | 86e | 86f |
| 216 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 |
| 217 | 87a | 87b | 87c | 87d | 87e | 87f | 880 | 881 | 882 | 883 |
| 218 | 884 | 885 | 886 | 887 | 888 | 889 | 88a | 88b | 88c | 88d |
| 219 | 88e | 88f | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 |
| 220 | 898 | 899 | 89a | 89b | 89c | 89d | 89e | 89f | 8a0 | 8a1 |
| 221 | 8a2 | 8a3 | 8a4 | 8a5 | 8a6 | 8a7 | 8a8 | 8a9 | 8aa | 8ab |
| 222 | 8ac | 8ad | 8ae | 8af | 8b0 | 8b1 | 8b2 | 8b3 | 8b4 | 8b5 |
| 223 | 8b6 | 8b7 | 8b8 | 8b9 | 8ba | 8bb | 8bc | 8bd | 8be | 8bf |
| 224 | 8c0 | 8c1 | 8c2 | 8c3 | 8c4 | 8c5 | 8c6 | 8c7 | 8c8 | 8c9 |
| 225 | 8ca | 8cb | 8cc | 8cd | 8ce | 8cf | 8d0 | 8d1 | 8d2 | 8d3 |
| 226 | 8d4 | 8d5 | 8d6 | 8d7 | 8d8 | 8d9 | 8da | 8db | 8dc | 8dd |
| 227 | 8de | 8df | 8e0 | 8e1 | 8e2 | 8e3 | 8e4 | 8e5 | 8e6 | 8e7 |
| 228 | 8e8 | 8e9 | 8ea | 8eb | 8ec | 8ed | 8ee | 8ef | 8f0 | 8f1 |
| 229 | 8f2 | 8f3 | 8f4 | 8f5 | 8f6 | 8f7 | 8f8 | 8f9 | 8fa | 8fb |
| 230 | 8fc | 8fd | 8fe | 8ff | 900 | 901 | 902 | 903 | 904 | 905 |
| 231 | 906 | 907 | 908 | 909 | 90a | 90b | 90c | 90d | 90e | 90f |
| 232 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 |
| 233 | 91a | 91b | 91c | 91d | 91e | 91f | 920 | 921 | 922 | 923 |
| 234 | 924 | 925 | 926 | 927 | 928 | 929 | 92a | 92b | 92c | 92d |
| 235 | 92e | 92f | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 |
| 236 | 938 | 939 | 93a | 93b | 93c | 93d | 93e | 93f | 940 | 941 |
| 237 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 94a | 94b |
| 238 | 94c | 94d | 94e | 94f | 950 | 951 | 952 | 953 | 954 | 955 |
| 239 | 956 | 957 | 958 | 959 | 95a | 95b | 95c | 95d | 95e | 95f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

2400-2799

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 |
| 241 | 96a | 96b | 96c | 96d | 96e | 96f | 970 | 971 | 972 | 973 |
| 242 | 974 | 975 | 976 | 977 | 978 | 979 | 97a | 97b | 97c | 97d |
| 243 | 97e | 97f | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 |
| 244 | 988 | 989 | 98a | 98b | 98c | 98d | 98e | 98f | 990 | 991 |
| 245 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 99a | 99b |
| 246 | 99c | 99d | 99e | 99f | 9a0 | 9a1 | 9a2 | 9a3 | 9a4 | 9a5 |
| 247 | 9a6 | 9a7 | 9a8 | 9a9 | 9aa | 9ab | 9ac | 9ad | 9ae | 9af |
| 248 | 9b0 | 9b1 | 9b2 | 9b3 | 9b4 | 9b5 | 9b6 | 9b7 | 9b8 | 9b9 |
| 249 | 9ba | 9bb | 9bc | 9bd | 9be | 9bf | 9c0 | 9c1 | 9c2 | 9c3 |
| 250 | 9c4 | 9c5 | 9c6 | 9c7 | 9c8 | 9c9 | 9ca | 9cb | 9cc | 9cd |
| 251 | 9ce | 9cf | 9d0 | 9d1 | 9d2 | 9d3 | 9d4 | 9d5 | 9d6 | 9d7 |
| 252 | 9d8 | 9d9 | 9da | 9db | 9dc | 9dd | 9de | 9df | 9e0 | 9e1 |
| 253 | 9e2 | 9e3 | 9e4 | 9e5 | 9e6 | 9e7 | 9e8 | 9e9 | 9ea | 9eb |
| 254 | 9ec | 9ed | 9ee | 9ef | 9f0 | 9f1 | 9f2 | 9f3 | 9f4 | 9f5 |
| 255 | 9f6 | 9f7 | 9f8 | 9f9 | 9fa | 9fb | 9fc | 9fd | 9fe | 9ff |
| 256 | a00 | a01 | a02 | a03 | a04 | a05 | a06 | a07 | a08 | a09 |
| 257 | a0a | a0b | a0c | a0d | a0e | a0f | a10 | a11 | a12 | a13 |
| 258 | a14 | a15 | a16 | a17 | a18 | a19 | a1a | a1b | a1c | a1d |
| 259 | a1e | a1f | a20 | a21 | a22 | a23 | a24 | a25 | a26 | a27 |
| 260 | a28 | a29 | a2a | a2b | a2c | a2d | a2e | a2f | a30 | a31 |
| 261 | a32 | a33 | a34 | a35 | a36 | a37 | a38 | a39 | a3a | a3b |
| 262 | a3c | a3d | a3e | a3f | a40 | a41 | a42 | a43 | a44 | a45 |
| 263 | a46 | a47 | a48 | a49 | a4a | a4b | a4c | a4d | a4e | a4f |
| 264 | a50 | a51 | a52 | a53 | a54 | a55 | a56 | a57 | a58 | a59 |
| 265 | a5a | a5b | a5c | a5d | a5e | a5f | a60 | a61 | a62 | a63 |
| 266 | a64 | a65 | a66 | a67 | a68 | a69 | a6a | a6b | a6c | a6d |
| 267 | a6e | a6f | a70 | a71 | a72 | a73 | a74 | a75 | a76 | a77 |
| 268 | a78 | a79 | a7a | a7b | a7c | a7d | a7e | a7f | a80 | a81 |
| 269 | a82 | a83 | a84 | a85 | a86 | a87 | a88 | a89 | a8a | a8b |
| 270 | a8c | a8d | a8e | a8f | a90 | a91 | a92 | a93 | a94 | a95 |
| 271 | a96 | a97 | a98 | a99 | a9a | a9b | a9c | a9d | a9e | a9f |
| 272 | aa0 | aa1 | aa2 | aa3 | aa4 | aa5 | aa6 | aa7 | aa8 | aa9 |
| 273 | aaa | aab | aac | aad | aae | aaf | ab0 | ab1 | ab2 | ab3 |
| 274 | ab4 | ab5 | ab6 | ab7 | ab8 | ab9 | aba | abb | abc | abd |
| 275 | abe | abf | ac0 | ac1 | ac2 | ac3 | ac4 | ac5 | ac6 | ac7 |
| 276 | ac8 | ac9 | aca | acb | acc | acd | ace | acf | ad0 | ad1 |
| 277 | ad2 | ad3 | ad4 | ad5 | ad6 | ad7 | ad8 | ad9 | ada | adb |
| 278 | adc | add | ade | adf | ae0 | ae1 | ae2 | ae3 | ae4 | ae5 |
| 279 | ae6 | ae7 | ae8 | ae9 | aea | aeb | aec | aed | aee | aef |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

2800-3199

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 280 | af0 | af1 | af2 | af3 | af4 | af5 | af6 | af7 | af8 | af9 |
| 281 | afa | afb | afc | afd | afe | aff | b00 | b01 | b02 | b03 |
| 282 | b04 | b05 | b06 | b07 | b08 | b09 | b0a | b0b | b0c | b0d |
| 283 | b0e | b0f | b10 | b11 | b12 | b13 | b14 | b15 | b16 | b17 |
| 284 | b18 | b19 | b1a | b1b | b1c | b1d | b1e | b1f | b20 | b21 |
| 285 | b22 | b23 | b24 | b25 | b26 | b27 | b28 | b29 | b2a | b2b |
| 286 | b2c | b2d | b2e | b2f | b30 | b31 | b32 | b33 | b34 | b35 |
| 287 | b36 | b37 | b38 | b39 | b3a | b3b | b3c | b3d | b3e | b3f |
| 288 | b40 | b41 | b42 | b43 | b44 | b45 | b46 | b47 | b48 | b49 |
| 289 | b4a | b4b | b4c | b4d | b4e | b4f | b50 | b51 | b52 | b53 |
| 290 | b54 | b55 | b56 | b57 | b58 | b59 | b5a | b5b | b5c | b5d |
| 291 | b5e | b5f | b60 | b61 | b62 | b63 | b64 | b65 | b66 | b67 |
| 292 | b68 | b69 | b6a | b6b | b6c | b6d | b6e | b6f | b70 | b71 |
| 293 | b72 | b73 | b74 | b75 | b76 | b77 | b78 | b79 | b7a | b7b |
| 294 | b7c | b7d | b7e | b7f | b80 | b81 | b82 | b83 | b84 | b85 |
| 295 | b86 | b87 | b88 | b89 | b8a | b8b | b8c | b8d | b8e | b8f |
| 296 | b90 | b91 | b92 | b93 | b94 | b95 | b96 | b97 | b98 | b99 |
| 297 | b9a | b9b | b9c | b9d | b9e | b9f | ba0 | ba1 | ba2 | ba3 |
| 298 | ba4 | ba5 | ba6 | ba7 | ba8 | ba9 | baa | bab | bac | bad |
| 299 | bae | baf | bb0 | bb1 | bb2 | bb3 | bb4 | bb5 | bb6 | bb7 |
| 300 | bb8 | bb9 | bba | bbb | bbc | bbd | bbe | bbf | bc0 | bc1 |
| 301 | bc2 | bc3 | bc4 | bc5 | bc6 | bc7 | bc8 | bc9 | bca | bcb |
| 302 | bcc | bcd | bce | bcf | bd0 | bd1 | bd2 | bd3 | bd4 | bd5 |
| 303 | bd6 | bd7 | bd8 | bd9 | bda | bdb | bdc | bdd | bde | bdf |
| 304 | be0 | be1 | be2 | be3 | be4 | be5 | be6 | be7 | be8 | be9 |
| 305 | bea | beb | bec | bed | bee | bef | bf0 | bf1 | bf2 | bf3 |
| 306 | bf4 | bf5 | bf6 | bf7 | bf8 | bf9 | bfa | bfb | bfc | bfd |
| 307 | bfe | bff | c00 | c01 | c02 | c03 | c04 | c05 | c06 | c07 |
| 308 | c08 | c09 | c0a | c0b | c0c | c0d | c0e | c0f | c10 | c11 |
| 309 | c12 | c13 | c14 | c15 | c16 | c17 | c18 | c19 | c1a | c1b |
| 310 | c1c | c1d | c1e | c1f | c20 | c21 | c22 | c23 | c24 | c25 |
| 311 | c26 | c27 | c28 | c29 | c2a | c2b | c2c | c2d | c2e | c2f |
| 312 | c30 | c31 | c32 | c33 | c34 | c35 | c36 | c37 | c38 | c39 |
| 313 | c3a | c3b | c3c | c3d | c3e | c3f | c40 | c41 | c42 | c43 |
| 314 | c44 | c45 | c46 | c47 | c48 | c49 | c4a | c4b | c4c | c4d |
| 315 | c4e | c4f | c50 | c51 | c52 | c53 | c54 | c55 | c56 | c57 |
| 316 | c58 | c59 | c5a | c5b | c5c | c5d | c5e | c5f | c60 | c61 |
| 317 | c62 | c63 | c64 | c65 | c66 | c67 | c68 | c69 | c6a | c6b |
| 318 | c6c | c6d | c6e | c6f | c70 | c71 | c72 | c73 | c74 | c75 |
| 319 | c76 | c77 | c78 | c79 | c7a | c7b | c7c | c7d | c7e | c7f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

3200-3599

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 320 | c80 | c81 | c82 | c83 | c84 | c85 | c86 | c87 | c88 | c89 |
| 321 | c8a | c8b | c8c | c8d | c8e | c8f | c90 | c91 | c92 | c93 |
| 322 | c94 | c95 | c96 | c97 | c98 | c99 | c9a | c9b | c9c | c9d |
| 323 | c9e | c9f | ca0 | ca1 | ca2 | ca3 | ca4 | ca5 | ca6 | ca7 |
| 324 | ca8 | ca9 | caa | cab | cac | cad | cae | caf | cb0 | cb1 |
| 325 | cb2 | cb3 | cb4 | cb5 | cb6 | cb7 | cb8 | cb9 | cba | cbb |
| 326 | cbc | cbd | cbe | cbf | cc0 | cc1 | cc2 | cc3 | cc4 | cc5 |
| 327 | cc6 | cc7 | cc8 | cc9 | cca | ccb | ccc | ccd | cce | ccf |
| 328 | cd0 | cd1 | cd2 | cd3 | cd4 | cd5 | cd6 | cd7 | cd8 | cd9 |
| 329 | cda | cdb | cdc | cdd | cde | cdf | ce0 | ce1 | ce2 | ce3 |
| 330 | ce4 | ce5 | ce6 | ce7 | ce8 | ce9 | cea | ceb | cec | ced |
| 331 | cee | cef | cf0 | cf1 | cf2 | cf3 | cf4 | cf5 | cf6 | cf7 |
| 332 | cf8 | cf9 | cfa | cfb | cfc | cfd | cfe | cff | d00 | d01 |
| 333 | d02 | d03 | d04 | d05 | d06 | d07 | d08 | d09 | d0a | d0b |
| 334 | d0c | d0d | d0e | d0f | d10 | d11 | d12 | d13 | d14 | d15 |
| 335 | d16 | d17 | d18 | d19 | d1a | d1b | d1c | d1d | d1e | d1f |
| 336 | d20 | d21 | d22 | d23 | d24 | d25 | d26 | d27 | d28 | d29 |
| 337 | d2a | d2b | d2c | d2d | d2e | d2f | d30 | d31 | d32 | d33 |
| 338 | d34 | d35 | d36 | d37 | d38 | d39 | d3a | d3b | d3c | d3d |
| 339 | d3e | d3f | d40 | d41 | d42 | d43 | d44 | d45 | d46 | d47 |
| 340 | d48 | d49 | d4a | d4b | d4c | d4d | d4e | d4f | d50 | d51 |
| 341 | d52 | d53 | d54 | d55 | d56 | d57 | d58 | d59 | d5a | d5b |
| 342 | d5c | d5d | d5e | d5f | d60 | d61 | d62 | d63 | d64 | d65 |
| 343 | d66 | d67 | d68 | d69 | d6a | d6b | d6c | d6d | d6e | d6f |
| 344 | d70 | d71 | d72 | d73 | d74 | d75 | d76 | d77 | d78 | d79 |
| 345 | d7a | d7b | d7c | d7d | d7e | d7f | d80 | d81 | d82 | d83 |
| 346 | d84 | d85 | d86 | d87 | d88 | d89 | d8a | d8b | d8c | d8d |
| 347 | d8e | d8f | d90 | d91 | d92 | d93 | d94 | d95 | d96 | d97 |
| 348 | d98 | d99 | d9a | d9b | d9c | d9d | d9e | d9f | da0 | da1 |
| 349 | da2 | da3 | da4 | da5 | da6 | da7 | da8 | da9 | daa | dab |
| 350 | dac | dad | dae | daf | db0 | db1 | db2 | db3 | db4 | db5 |
| 351 | db6 | db7 | db8 | db9 | dba | dbb | dbc | dbd | dbe | dbf |
| 352 | dc0 | dc1 | dc2 | dc3 | dc4 | dc5 | dc6 | dc7 | dc8 | dc9 |
| 353 | dca | dcb | dcc | dcd | dce | dcf | dd0 | dd1 | dd2 | dd3 |
| 354 | dd4 | dd5 | dd6 | dd7 | dd8 | dd9 | dda | ddb | ddc | ddd |
| 355 | dde | ddf | de0 | de1 | de2 | de3 | de4 | de5 | de6 | de7 |
| 356 | de8 | de9 | dea | deb | dec | ded | dee | def | df0 | df1 |
| 357 | df2 | df3 | df4 | df5 | df6 | df7 | df8 | df9 | dfa | dfb |
| 358 | dfc | dfd | dfe | dff | e00 | e01 | e02 | e03 | e04 | e05 |
| 359 | e06 | e07 | e08 | e09 | e0a | e0b | e0c | e0d | e0e | e0f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

3600-3999

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 360 | e10 | e11 | e12 | e13 | e14 | e15 | e16 | e17 | e18 | e19 |
| 361 | e1a | e1b | e1c | e1d | e1e | e1f | e20 | e21 | e22 | e23 |
| 362 | e24 | e25 | e26 | e27 | e28 | e29 | e2a | e2b | e2c | e2d |
| 363 | e2e | e2f | e30 | e31 | e32 | e33 | e34 | e35 | e36 | e37 |
| 364 | e38 | e39 | e3a | e3b | e3c | e3d | e3e | e3f | e40 | e41 |
| 365 | e42 | e43 | e44 | e45 | e46 | e47 | e48 | e49 | e4a | e4b |
| 366 | e4c | e4d | e4e | e4f | e50 | e51 | e52 | e53 | e54 | e55 |
| 367 | e56 | e57 | e58 | e59 | e5a | e5b | e5c | e5d | e5e | e5f |
| 368 | e60 | e61 | e62 | e63 | e64 | e65 | e66 | e67 | e68 | e69 |
| 369 | e6a | e6b | e6c | e6d | e6e | e6f | e70 | e71 | e72 | e73 |
| 370 | e74 | e75 | e76 | e77 | e78 | e79 | e7a | e7b | e7c | e7d |
| 371 | e7e | e7f | e80 | e81 | e82 | e83 | e84 | e85 | e86 | e87 |
| 372 | e88 | e89 | e8a | e8b | e8c | e8d | e8e | e8f | e90 | e91 |
| 373 | e92 | e93 | e94 | e95 | e96 | e97 | e98 | e99 | e9a | e9b |
| 374 | e9c | e9d | e9e | e9f | ea0 | ea1 | ea2 | ea3 | ea4 | ea5 |
| 375 | ea6 | ea7 | ea8 | ea9 | eaa | eab | eac | ead | eae | eaf |
| 376 | eb0 | eb1 | eb2 | eb3 | eb4 | eb5 | eb6 | eb7 | eb8 | eb9 |
| 377 | eba | ebb | ebc | ebd | ebe | ebf | ec0 | ec1 | ec2 | ec3 |
| 378 | ec4 | ec5 | ec6 | ec7 | ec8 | ec9 | eca | ecb | ecc | ecd |
| 379 | ece | ecf | ed0 | ed1 | ed2 | ed3 | ed4 | ed5 | ed6 | ed7 |
| 380 | ed8 | ed9 | eda | edb | edc | edd | ede | edf | ee0 | ee1 |
| 381 | ee2 | ee3 | ee4 | ee5 | ee6 | ee7 | ee8 | ee9 | eea | eeb |
| 382 | eec | eed | eee | eef | ef0 | ef1 | ef2 | ef3 | ef4 | ef5 |
| 383 | ef6 | ef7 | ef8 | ef9 | efa | efb | efc | efd | efe | eff |
| 384 | f00 | f01 | f02 | f03 | f04 | f05 | f06 | f07 | f08 | f09 |
| 385 | f0a | f0b | f0c | f0d | f0e | f0f | f10 | f11 | f12 | f13 |
| 386 | f14 | f15 | f16 | f17 | f18 | f19 | f1a | f1b | f1c | f1d |
| 387 | f1e | f1f | f20 | f21 | f22 | f23 | f24 | f25 | f26 | f27 |
| 388 | f28 | f29 | f2a | f2b | f2c | f2d | f2e | f2f | f30 | f31 |
| 389 | f32 | f33 | f34 | f35 | f36 | f37 | f38 | f39 | f3a | f3b |
| 390 | f3c | f3d | f3e | f3f | f40 | f41 | f42 | f43 | f44 | f45 |
| 391 | f46 | f47 | f48 | f49 | f4a | f4b | f4c | f4d | f4e | f4f |
| 392 | f50 | f51 | f52 | f53 | f54 | f55 | f56 | f57 | f58 | f59 |
| 393 | f5a | f5b | f5c | f5d | f5e | f5f | f60 | f61 | f62 | f63 |
| 394 | f64 | f65 | f66 | f67 | f68 | f69 | f6a | f6b | f6c | f6d |
| 395 | f6e | f6f | f70 | f71 | f72 | f73 | f74 | f75 | f76 | f77 |
| 396 | f78 | f79 | f7a | f7b | f7c | f7d | f7e | f7f | f80 | f81 |
| 397 | f82 | f83 | f84 | f85 | f86 | f87 | f88 | f89 | f8a | f8b |
| 398 | f8c | f8d | f8e | f8f | f90 | f91 | f92 | f93 | f94 | f95 |
| 399 | f96 | f97 | f98 | f99 | f9a | f9b | f9c | f9d | f9e | f9f |

DECIMAL to HEXADECIMAL

CONVERSION TABLE

4000-4095

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 400 | fa0 | fa1 | fa2 | fa3 | fa4 | fa5 | fa6 | fa7 | fa8 | fa9 |
| 401 | faa | fab | fac | fad | fae | faf | fb0 | fb1 | fb2 | fb3 |
| 402 | fb4 | fb5 | fb6 | fb7 | fb8 | fb9 | fba | fbb | fbc | fbd |
| 403 | fbe | fbf | fc0 | fc1 | fc2 | fc3 | fc4 | fc5 | fc6 | fc7 |
| 404 | fc8 | fc9 | fca | fcb | fcc | fcd | fce | fcf | fd0 | fd1 |
| 405 | fd2 | fd3 | fd4 | fd5 | fd6 | fd7 | fd8 | fd9 | fda | fdb |
| 406 | fdc | fdd | fde | fdf | fe0 | fe1 | fe2 | fe3 | fe4 | fe5 |
| 407 | fe6 | fe7 | fe8 | fe9 | fea | feb | fec | fed | fee | fef |
| 408 | ff0 | ff1 | ff2 | ff3 | ff4 | ff5 | ff6 | ff7 | ff8 | ff9 |
| 409 | ffa | ffb | ffc | ffd | ffe | fff | | | | |

WISC LIBRARY



# INDEX

| | | |
|---|---|---|
| 0.01.01 | PAT | Pseudo-Assembler Translater |
| .02 | | |
| .03.01 | CON | Conversion-Deconversion |
| .04.01 | MAD | Modification and Adaptation |
| .03 | MOV | Move |
| .05.01 | LOD | Load |
| .02 | LAD | Load and Adapt |
| 1.01.01 | FAIR | Floating Arithmetic Interpretive Routine |
| 2.01.01 | SQR | Square Root (Newton-Raphson iteration) |
| .02 | EXS | Exponential (infinite series) |
| .03 | SCS | Sine-Cosine (infinite series) |
| .04 | LNS | Logarithm (base e) (infinite series) |
| .05 | ATS | Arctangent (infinite series) |
| .06 | ATP | Arctangent (polynomial approximation) |
| .07 | CUR | Cube Root (Newton-Raphson iteration) |
| .08 | EXP | Exponential (polynomial approximation) |
| .09 | LNP | Logarithm (either base) (polynomial approximation) |
| .10 | GAP | Gamma Function (polynomial approximation) |
| .02.01 | CAC | Complex Arithmetic (Cartesian) |
| .03.01 | ILT | Inverse Laplace Transform |
| 3.01 | | |
| .02.01 | RKS | Runge-Kutta Step |
| .02 | IIT | Integral Interval Tester |
| .03 | | |
| .04 | | |
| .05.01 | PRS | Polynomial Root Solver |
| 3.05.02 | QUF | Quadratic Formula |
| .06.01 | SER | Simultaneous Equations Routine (algebraic) |
| 4.01 | | |
| .02 | | |
| .03 | LS3 | least Squares--Cubic |
| 5 | | |
| 6 | | |
| 7.01.01 | NIM | Nim |
| .02 | STS | Saints |
| .02 | | |
| .03 | | |
| .04 | | |
| .05 | | |
| .06 | | |
| .07.01 | SP4 | Spangenberg--Problem 6-4 |
| .08 | | |
| .09 | | |
| 9.01.01 | ITR | Intracomputational Test Routine |
| .02 | VER | Verification |

12/25/59

WISC LIBRARY

INDEX

| | | |
|---|---|---|
| 0.01 | | |
| .02 | | |
| .03.01 | CON | Conversion-Deconversion |
| .04.01 | ADA | Adaptation |
| .02 | MOD | Modification |
| .03 | MOV | Move |
| 0.05.01 | LOD | Load |
| .02 | LAD | Load and Adapt |
| 1.01.01 | FAIR | Floating Arithmetic Interpretive Routine |
| 2.01.01 | SQR | Square Root |
| .02 | EXS | Exponential (infinite series) |
| .03 | SCR | Sine-Cosine Routine (infinite series) |
| .04 | LNS | Logarithm (base e) |
| .05 | ATS | Arctangent (infinite series iteration) |
| .06 | ATP | Arctangent (polynomial approximation) |
| .07 | CUR | Cube Root |
| .08 | EXP | Exponential (polynomial approximation) |
| .09 | INP | Logarithm (either base) (polynomial approximation) |
| .10 | GAP | Gamma Function (polynomial approximation) |
| .02.01 | CAC | Complex Arithmetic (Cartesian) |
| .03.01 | ILT | Inverse Laplace Transform |
| 3.01 | | |
| .02.01 | RKS | Runge-Kutta Step |
| .02 | IIT | Integral Interval Tester |
| .03 | | |
| .04 | | |
| .05.01 | PRS | Polynomial Root Solver |
| 3.05.02 | QUF | Quadratic Formula |
| .06.01 | SER | Simultaneous Equations Routine (algebraic) |
| 4.01 | | |
| .02 | | |
| .03 | LS3 | least Squares--Cubic |
| 5 | | |
| 6 | | |
| 7.01.01 | NIM | Nim |
| .02 | STS | Saints |
| .02 | | |
| .03 | | |
| .04 | | |
| .05 | | |
| .06 | | |
| .07.01 | SP4 | Spangenberg--Problem 8-4 |
| .08 | | |
| .09 | | |
| 9.01.01 | ITR | Intracomputational Test Routine |
| .02 | VER | Verification |
| .03 | RWC | Read-Write Check |

WISC LIBRARY

Appendix E-1

File No. 0.03.01

Conversion-Deconversion

CON

Correct Master

## Operation

$$P \times 10^{Q} \rightleftharpoons p \times 2^{q}$$

## Use

a) Calling Linkage

| | | | | | | |
|---|---|---|---|---|---|---|
| L | : | 100 | 8 | L+2 | 3ff | 35f |
| L + 1 | : | 000 | 5 | — | — | 360 |
| L + 2 | : | 200 | 0 | $-N_1-$ | $-N_L-$ | β |

where

$-N_1-$ = address of first number to be converted

$-N_L-$ = address of last number to be converted

0 for CON (dec to bin)

2 for DECON (bin to dec)

b) Storage

DEAD STORAGE
360 to 3af

11 opstos: 355 to 35f

## Requirements and Performance

a) Method of operation

Floating point

b) Range and form of variable

Floating point

$|Q| \leq 76$ $|q| \leq 255$

c) Accuracy

CON --- 33 bits

DECON -- ±1 in 10th digit

d) Performance time

CON --- about 3 sec/no.

DECON -- about 3 sec/no.

NUMBER FORMATS

307 1.234 567 890

signs; decimal exponent; most sig decimal digit; decimal point; 9 more significant digits

11 0000 0111.0001 0010 0011 --- 0000

sign of number; sign of exponent; binary exponent; binary point; 40 significant bits

SIGN CODE

| sign of no. | sign of exp. | bit 5: 49 | 1st char |
|---|---|---|---|
| | | 0 | 0 |
| | | 1 | 1 |
| | | 2 | 2 |
| | | 3 | 3 |

WISC LIBRARY



File No. 0.04.01

Modification and Adaption Routine

MAD

## ADAPTATION

Operation

To modify the INTERNAL (or RELATIVE) addresses of a subroutine to apply to the present location of the subroutine

Use

a) Calling Linkage

| | | | | | |
|---|---|---|---|---|---|
| L : | 100 | 8 | L+2 | 3ff | 35f |
| L + 1 : | 000 | 5 | 000 | 000 | 3bl |
| L + 2 : | 0 | j | $W_1$ | k | β |

b) Explanation of Symbols

Assume a library subroutine consists of j words, the first k of which are orders. It is written for storage starting with location 001, but is presently loaded into a block of j locations starting with $W_1$.

## MODIFICATION

Operation

To modify the addresses of a group of orders that refer to a band of words that have been relocated.

Use

a) Calling Linkage

| | | | | | |
|---|---|---|---|---|---|
| L : | 100 | 8 | L+2 | 3ff | 35f |
| L + 1 : | 000 | 5 | 000 | 000 | 3bl |
| L + 2 : | 2 | L+3 | m | p | β |
| L + 3 : | 000 | 0 | f | l | s |

b) Explanation of Symbols

Assume of group of orders located in positions m to p refer to a band of words which were located in positions f to l, but these words have been moved to a band starting with position s.

# GENERAL

## Storage

Dead storage 3b0 to 3d1
Also uses the Set-Up and Completion blocks of CON.
Eleven opstos: 355 to 35f.

## Requirements and Performance

a) Method of Operation: Address modification, either in fixed or floating point computer.

b) Other information required: The subroutine or orders to be modified, which may be either fixed or floating point hexadecimally coded WISC orders

c) Performance time: Approximately.5 sec/order

d) Limitations: MAD does not move any words . It merely accounts for some movement of words that has taken place.

Also please note that the A address of BTR and BIT orders are treated as drum addresses.

Operation

Intracomputational Test Routine

A brief (21 word) test routine to be scheduled frequently by the programmer during the course of a computation.

ITR

Use

a) Calling Linkage

| | | | | | |
|---|---|---|---|---|---|
| L | : | 100 8 | L+1 | 3ff | 35f |
| L + 1 | : | 000 5 | 000 | β | 3d3 |

c) Storage

Dead storage: 3d3 to 3e7

4 opstos: 35e to 35f

Requirements and Performance

a) Method of operation Floating point

b) Additional routines required None

c) Performance time Approximately .50 sec

d) Recommended frequency of use Every 2000-5000 machine cycles at convenient points in a program.

General

ITR is to be programmed during a problem, its purpose being to provide some degree of assurance that the machine is working correctly on the problem. Each successful passing of this routine will be interpreted as a reasonable guarantee of the reliability of the machine results up to that point.

Please note, however, that ITR does not test input, output, or half orders, and tests very few storage locations.

If the computer fails to pass ITR, it will halt with 100 9 3e5 3ff 35e showing in the lights. Call the engineer in charge.

WISC LIBRARY

Appendix B-4

File No. 2.01.01

Square Root Routine

SQR

## Operation

$$r = \sqrt{b}$$

## Use

a) Calling Linkage

| | | | | | |
|---|---|---|---|---|---|
| L : | 100 | 8 | [ L+2 ] | [ 3ff ] | [ 35f ] |
| L + 1 : | — | 5 | [ — ] | [ — ] | [SQR:1] |
| L + 2 : | — | 0 | - b - | - r - | β |

b) Adaptation Link Word

| | | | | |
|---|---|---|---|---|
| L + 2 : | 012 | $-W_1-$ | 012 | β |

c) Storage

j = 18 words

k = 18 orders

0 constants

3 opstos: 35d to 35f

## Requirements and Performance

a) Method of operation Floating point -- successive Newton-Ralphson iterations

b) Additional routines required None

c) Range and form of variable b must be real and normalized

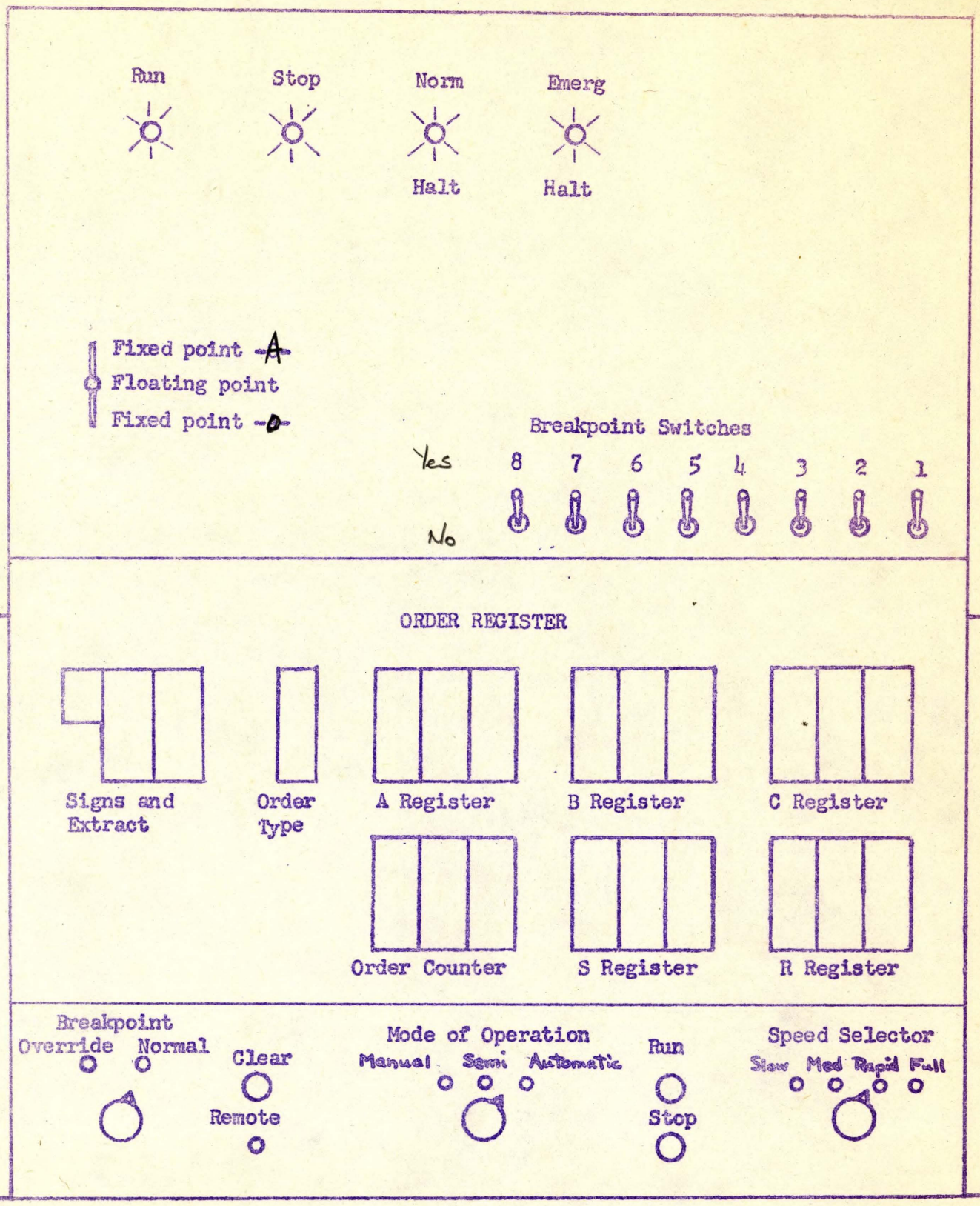
If $b < 0$, $r = \sqrt{|b|}$ is furnished with a negative sign.

d) Accuracy $1 \times 2^{-40}$ of significant number.

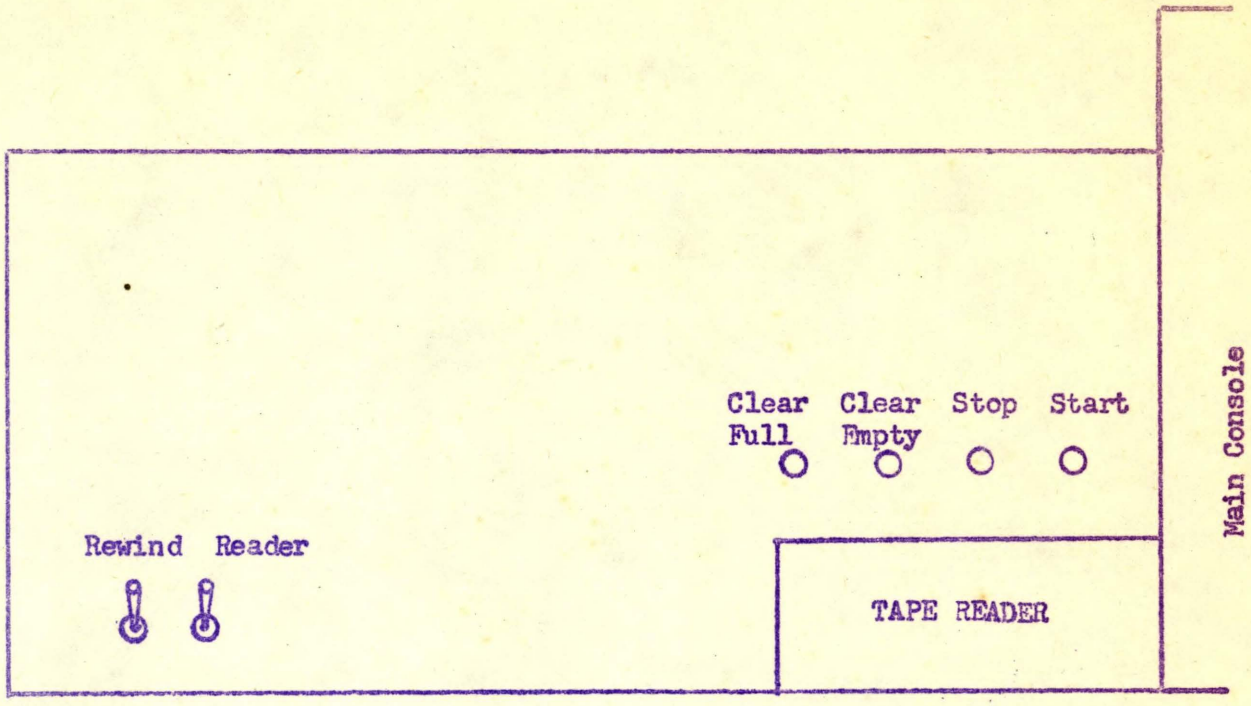
e) Performance time

About 1.1 sec.

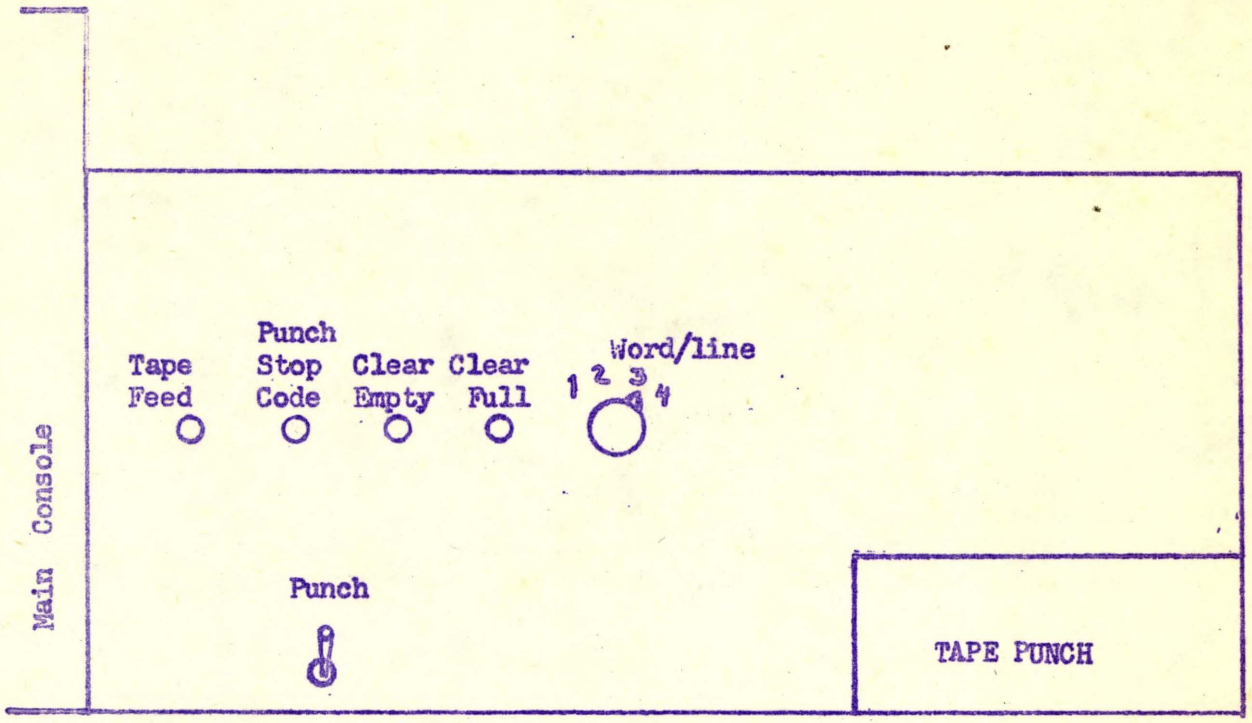
# MAIN CONSOLE



Appendix F-2




INPUT CONSOLE




OUTPUT CONSOLE

# EXAMPLE #1

$$f = \frac{(x + y + z^2)^2}{|w| + |x+y|}$$

$w = 0.51$ $\quad$ $x = -3.8$

$y = -0.49$ $\quad$ $z = 1.23$

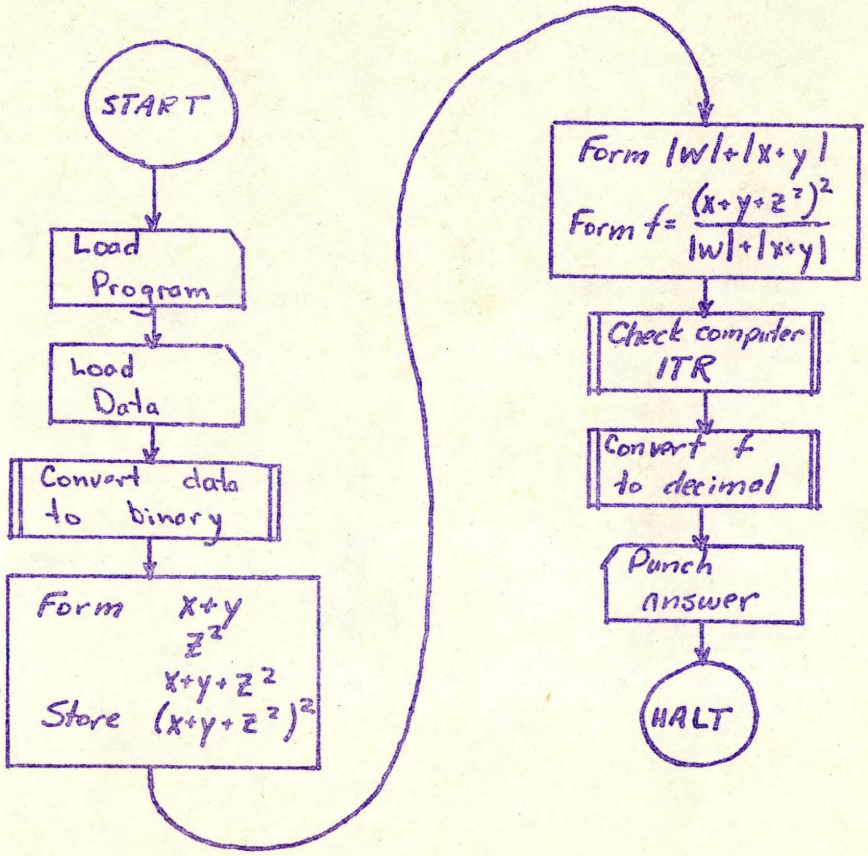
Note links to subroutines:

CON - DECON - ITR.

Note use of short memory (800) for A, B, and C addresses.

Note final transfer to 308.

Note use of floating and fixed point operations.



WISCoding for Example #1 $f = \frac{(x+y+z^2)^2}{|w| \div |x+y|}$

By CWMc Date 5-2-60 Page 2 of 2

| FLOW # | ORDER # | X | TYPE | A | B | C | # | HEXADECIMAL X | T | A | B | C | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | RPT | [ ] | [ ] | [ ] | | / | 0 | 101 | 110 | 101 | |
| | | | RPT | [201] w, x, y, z | [204] | *+1 [102] | 101 | / | 0 | 201 | 204 | 102 | |
| | | | add | *+2 [104] + | 0 [3ff] | → LO [35f] | 2 | 100 | 8 | 104 | 3ff | 35f | CON |
| | | | TRA | [ ] | [ ] | CON [360] | 3 | / | 5 | / | / | 360 | CON |
| | | | — | [201] w, x, y, z | [204] | *+1 [105] | 4 | / | 0 | 201 | 204 | 105 | CON |
| | | | ADD | x [201] + | y [203] | → STORE [301] | 5 | / | 8 | 202 | 203 | 301 | |
| | | | MPY | " [204] × | z [204] | " [ ] | 6 | / | 2 | 204 | 204 | 800 | |
| | | | ADD | x+y [301] + | $z^2$ [ ] | " [ ] | 7 | / | 8 | 301 | 800 | 800 | |
| | | | MPY | " [ ] " | [ ] | → Num [302] | 8 | / | 2 | 800 | 800 | 302 | |
| | | | ADA | \|w\| [201] + | \|x+y\| [301] | " [ ] | 9 | / | 9 | 201 | 301 | 800 | |
| | | | DIV | Num [302] ÷ | " [ ] | → f [303] | a | / | 3 | 302 | 800 | 303 | |
| | | | add | *+1 [10c] + | 0 [3ff] | → LO [35f] | b | 100 | 8 | 10c | 3ff | 35f | ITR |
| | | | TRA | [ ] | [ ] | ITR [3d3] | c | / | 5 | / | / | 3d3 | ITR |
| | | | add | *+2 [10f] + | 0 [3ff] | → LO [35f] | d | 100 | 8 | 10f | 3ff | 35f | DECON |
| | | | TRA | [ ] | [ ] | DECON [360] | e | / | 5 | / | / | 360 | DECON |
| | | | — | [303] f | [303] | *+1 [110] | f | 200 | 0 | 303 | 303 | 110 | DECON |
| | | | PPT | [303] f | [303] | HALT [3e8] | 110 | / | 7 | 303 | 303 | 3e8 | |
| | | | | [ ] | [ ] | [ ] | | | | | | | |
| | | | | [ ] | [ ] | [ ] | | | | | | | |
| | | | | .51 [ ] | [ ] | [ ] W | 201 | 101 | 5 | 100 | / | / | |
| | | | | -3.8 [ ] | [ ] | [ ] X | 2 | 200 | 3 | 800 | / | / | |
| | | | | -.49 [ ] | [ ] | [ ] Y | 3 | 301 | 4 | 900 | / | / | |
| | | | | 1.23 [ ] | [ ] | [ ] Z | 4 | / | 1 | 230 | / | / | |
| | | | | [ ] | [ ] | [ ] | | | | | | | |
| | | | | [ ] | [ ] | [ ] | | | | | | | |