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SYNTACTIC DESCRIPTIONS AND BACKUS-NAUR FORM

The 'Backus-Naur' form of syntactic description is used throughout this manual to define the legal construction of statements.

In Backus-Naur form syntactic constructs are denoted by English words enclosed in '<' and '>' signs. These words are chosen to suggest the nature and meaning of the construct which they represent. For example, '<expression>' is used often and denotes any legal combination of arithmetic variables and operators (addition, multiplication, etc).

The vertical slash '/' is used to separate mutually exclusive possibilities and may be read as 'or'. For example

$\langle \text{expression} \rangle ::= (\langle \text{expression} \rangle) / \langle \text{expression} \rangle$

means that an expression may be another expression enclosed in brackets or just another expression. (This form of recursive definition is common in the description of 'high level languages'.)

Finally there exists the symbol '::=' which may be read as 'is defined as being', or just 'is'. An example is given above.

These three basic symbols are used to describe the syntax of statements and statement construction.

Those symbols which appear on their own (i. e. are not enclosed by '<' and '>') are actual characters and symbols which appear in the text which is being described. The simplest example of this is the Backus-Naur of the 'RETURN statement'

$\langle \text{return statement} \rangle ::= \text{RETURN}$

ENTERING COMMANDS AND TEXT

All input to the Basic interpreter is made through an inbuilt single line text editor. Whilst the user is in communication with the editor certain control characters are reserved for special functions.

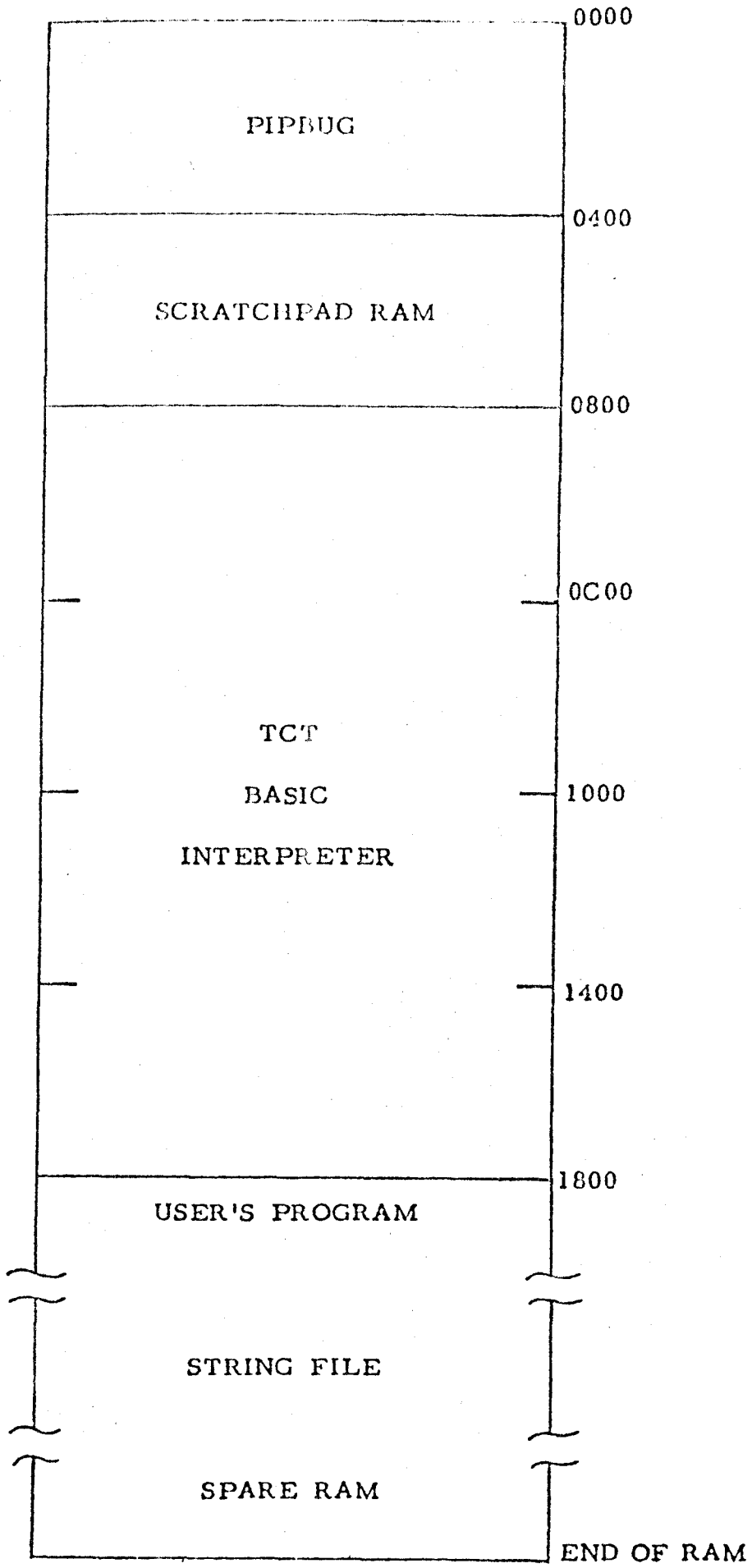
These characters are:

CR	Used to delimit the current line of input.
BS	Deletes one character from the end of the current line.
DEL	Deletes the entire line which has been input up to that point and re-prompts.

When CR is pressed control is passed to the rest of the interpreter. At this stage there are two possibilities, that the line is entered into the users program file, or it is interpreted as a command and executed immediately. The criteria which determines which of these is performed is whether or not a number precedes the statements on a line.

In general if an input line starts with a number it will be interpreted as a line to be entered into the user's program file at the appropriate point. If an input line has no recognisable number preceding it then it will be executed immediately, irrespective of whether it is a command or an executable statement.

To delete a line from the program file the line's number should be typed followed by a CR.



STRING HANDLING CAPABILITIES

The manner in which strings are handled in TCT BASIC is somewhat different from that of most other BASICs and so will be discussed in some detail.

In most implementations of the BASIC language strings are identified by a letter of the alphabet with either a leading or trailing '\$' sign. This construct has severe limitations in that there is only a very limited number of strings available, and more importantly, strings cannot be referenced by some calculation, which also limits the number of strings which can be effectively handled.

To overcome this limitation it was decided to identify strings with four digit numbers, and allow expressions to be used to determine these numbers in all string handling operations. These string identifying numbers obey all the rules associated with line numbers, i. e. they must be greater than zero and less than 10000. Truncation of string identifying numbers is performed in all operations.

In this manner strings may be handled in volume and with ease, yet there are of course limitations imposed by the physical size of the BASIC interpreter. These points are noted below.

1) Strings may not be 'merged' or in any way 'put together' or 'taken apart'. I. e. constructs of the form $S1 = S2 + S3$ are not allowed. (This is perhaps the only major limitation.)

2) The only comparisons which may be made between strings are those of equality or inequality, and these comparisons must be made in terms of string identifiers, not literals enclosed in quote marks.

3) Due to the large number of possible strings it is of course necessary to release memory space occupied by a null string (i. e. an empty string, which all strings are before they are assigned a value) completely. For this reason it is impossible to operate on a null string. However it is possible to detect that a string is empty by the provision that it returns a true value for all comparisons. This is a useful facility when dealing with user input where the response to a request is often just a carriage return.

Strings are stored in memory from the end of the program text onwards through available RAM. It is the user's responsibility to ensure that the length of the file does not exceed the machines memory limit.

THE COMMAND 'DUMP'

The DUMP command is the means by which an existing BASIC program may be recorded for latter loading and use.

The form of the DUMP statement is the word DUMP followed by an optional line number.

The DUMP command is fundamentally the same as the LIST command except that no line feed is performed at the end of each listed line and a delay is inserted instead. This allows a program listed in this manner to simply be played back from the tape recorder and inserted as text in the program file.

The procedure for using this command is:

- 1) Type the word 'DUMP' followed by a line number if desired.
- 2) Set the tape recorder to 'RECORD'.
- 3) Type carriage return.
- 4) when dumping is completed stop the tape recorder.

To reload a recorded program:

Merely play the tape back whilst in command mode. The interpreter will initially respond with a syntax error, this should however be ignored and is only due to an unavoidable 'hash' on the tape.

We are sorry to say that some tapes posses errors effecting the execution of the DUMP command, if you have one of these tapes the fault may be remedied by performing the the following operations in PIPBUG.

*A17D3

17D3 3F 77

17D4 02 10

17D5 86 06

17D6 E4 08

17D7 0D 12

17D8 14 1A

17D9 3F 7D

17DA 02 3F

17DB B4 02

17DC 77 AD

17DD 10 C1

17DE 02 3F

17DF 75 17

17E0 10 F7

17E1 17 3F

*

THE COMMAND 'NEW'

The typing of the word NEW followed by a carriage return eliminates all trace of any program file which may have been present, resets all internal stacks and pointers and clears all variables including strings.

If the BASIC interpreter is entered at the HEX address 0800 then a NEW command is executed automatically. However if it is entered at 080A then the program file will be unaltered (although variables will be cleared).

If the NEW command is ever entered accidentally your program file may be recovered by exiting the BASIC interpreter and changing the locations starting at HEX 1801 to:

- 1801 The high order BCD code of the first line number.
- 1802 The low order BCD code of the first line number.
- 1803 The ASCII code of the first character of your text.
- 1804 The ASCII code of the second character of your text.

Then entering the BASIC interpreter at 080A.

THE COMMAND 'CLEAR'

The CLEAR command sets all variables to zero, and eliminates all strings.

It is implemented by typing the word CLEAR followed by a carriage return.

THE COMMAND 'LIST'

The LIST command is the means by which the program file may be inspected, in part or whole.

The form of the LIST command is the word LIST followed by a carriage return, or the word LIST followed by a line number. The first form will start listing the program file from the first line, while the second form will start from that line with a line number greater than or equal to the specified number.

To suspend the listing process hold down the 'break' key, if the 'break' key is not implemented or connected on your keyboard then hold down 'rept' (repeat) and 'space', listing should cease within a few lines.

THE COMMAND 'RUN'

The RUN command causes the interpreter to enter 'execution mode' and begin execution of the program stored in the program file at that line which possesses the lowest line number.

The RUN command is implemented by typing RUN followed by a carriage return.

After a RUN command has been executed the user's BASIC program will begin execution and continue until a STOP command or an error is encountered, or the 'break' key is depressed.

If it is desired to start program execution at some point other than the first line then a GOTO statement may be used. This will automatically put the interpreter in 'execution mode' and begin execution from the line specified. (c.f. 'THE GOTO STATEMENT')

THE COMMAND 'SIZE'

The SIZE command returns the HEX values of the start of the program file and the end for the user to check on the available RAM left. (NOTE: This includes that area of RAM taken up with strings.)

The form of the SIZE statement is simply the word SIZE followed by a carriage return.

The response is:

	XXXX
	YYYY

Where XXXX is the address of the first byte of your file
and YYYY is the address of the last byte of your file

(On this version of TCT BASIC XXXX will of course always be 1800.)

THE 'LET' OR ASSIGNMENT STATEMENT

The LET statement is the basic operational statement of the BASIC language. It is by means of this statement that data is transferred and transformed between variables, whether they be numeric variables or literal strings.

The fundamental form of the LET statement is the word LET (optional), followed by either a letter (for a numeric variable), or a '\$' followed by any legal numeric expression (for a literal or 'string' variable.) This variable identifier is followed by an '=', which is in turn followed by any legal numeric expression or a '\$' followed by any legal numeric expression or a simple string.

This construct, when executed, will place the value derived from the right hand side into the variable specified on the left hand side. To make this aspect clearer it is best read 'is assigned the value of' in place of the '=' sign.

NOTE 1) The types of the expressions or variables on each side of the '=' should agree: that is if the right hand side returns a numeric value then the left hand side should be a numeric variable, and if the right hand side is a string, then the left hand side should be a string identifier (i.e. have '\$' prefix).

2) The initial LET keyword is entirely optional and may be deleted if desired.

3) The values of the variables on the right of the '=' remain unchanged unless they appear on the left of the statement.

The syntax of the LET statement may be summarised as follows:

```
<let statement> ::= LET <assignment statement> / <assignment statement>
<assignment statement> ::= <variable> = <expression> / <string identifier> =
    <string>
<string> ::= <simple string> / <string identifier>
```

EXAMPLES OF THE LET STATEMENT

```
LET A=127*3
C=2*PI*R*R
$1="YES"
$A*5=$INT(B/27)
```

The following are illegal uses of the LET statement due to mixed types:

```
A="YES"
LET $1=2*PI*R*R
```

THE 'GOTO' STATEMENT

The GOTO statement is the means by which program flow is broken and resumed at another point.

The form of the GOTO statement is GOTO <expression>. Where the value returned by the expression must be a number greater than zero and less than 10000 (truncation is automatic).

When executed, program flow will be resumed at the beginning of the line which has a number corresponding to the value of the expression, if no such line exists a 'NOGO ERROR' will result.

NOTE 1) A space may be inserted between the GO and the TO, that is the CCTO statement may read CO TO<expression>.

2) The value of the expression need not be an integer, it will be truncated automatically.

The syntax of the GOTO statement is,

<goto statement> ::= GOTO <expression>

EXAMPLES OF THE 'GOTO' STATEMENT

```
GOTO 120
GOTO A+B*10
GO TO 970
```

EXECUTION MODE

The following pages describe those commands which may be executed within a program. Most of these commands or 'statements' may also be executed in command mode. However no commands are executable in execution mode (That is those commands which appear on the preceding pages may not appear in a program.)

There are certain executable statements which may not be executed in command mode, these are:

```
INPUT
DO
UNTIL
FOR
NEXT
```

THE 'IF' STATEMENT

The IF statement is the mechanism by which decisions are made within a BASIC program, and different action taken depending on some condition.

The fundamental form of the IF statement is the word IF followed by either a string identifier or an expression. This is followed by a 'relational operator' which is in turn followed by another string identifier or expression. This is followed by any collection of statements on the same line.

If expressions were used in the IF statement, then upon execution these will be evaluated to two single numbers and compared in relation to the given 'relational operator', or if strings were used they will be compared letter for letter.

If the resultant 'relational expression' is true, then the rest of the line will be executed, however if it is false then control will immediately pass to the next line.

NOTE 1) Permissible relational operators for expressions are:

- = equal to
- <> not equal to
- <= less than or equal to
- >= greater than or equal to
- < less than
- > greater than

Permissible relational operators for strings are:

- = equal to

2) TCT BASIC's implementation of the IF statement is non-standard, strictly only a GOTO statement or the word THEN followed by a line number should follow the IF statement.

3) The word THEN may be placed between an IF statement and its succeeding statement, yet this has no effect on its operation.

4) Simple strings may not be compared directly, i. e. all string comparisons must be made between predefined strings denoted by string identifiers.

The syntax of the IF statement is:

```
<if statement> ::= IF <if value> <relational operator> <if value>  
                <if terminator>  
<if value> ::= <string identifier> / <expression>  
<relational operator> ::= =/<> /<= />= /</>  
<if terminator> ::= <> / THEN
```

THE 'PRINT' STATEMENT

The PRINT statement is the means by which output is obtained from a BASIC program while it is executing; output of both the numeric values of expressions or literal strings may be obtained.

The form of the PRINT statement is the word PRINT which may be abbreviated to PR in most circumstances, followed by a list of items to be printed. Separate items in the list are separated by commas and may be either strings or expressions. Expressions are printed as a numeric value the format of which may be controlled by the FIX statement (c.f.), while strings are reproduced verbatim less their leading and trailing quote marks. Normally a carriage return line feed is transmitted at the end of each PRINT statement. However this may be suppressed if desired by the inclusion of a semicolon after the last item of the 'print list'.

NOTE 1) There is one circumstance in which the abbreviation PR may not be used. This is something of the form PRINT INT(<expression>), for if the abbreviated form is used this becomes PRINT(<expression>), which will cause the value of the expression to be printed, not the integer part as would happen in the first instance. (However anything of the form PR "HELLO", INT(A / PI) is still legal.)

2) If a trailing ';' is used then the next PRINT statement will print on the same line.

3) The word PRINT by itself will not cause a line to be fed as in some BASICs: that is a PRINT statement without a print list is not allowed and the form PR"" should be used instead.

4) There is no mechanism for the inclusion of " marks to appear in strings and therefore they may not be printed, this is true of all special symbols except carriage return, which may be printed indirectly.

The syntax of the PRINT statement may be summarised as follows:

```
<print statement> ::= PRINT <print list> <print terminator> / PR <print list>
                        <print terminator>
<print list> ::= <print item> / <print list> <print item>
<print item> ::= <expression> / <string>
<print terminator> ::= <> / ;
```

EXAMPLES OF THE PRINT STATEMENT

```
PRINT "YOUR CURRENT POSITION IS ", X, Y, "AND VELOCITY ", V
PR RND(R)
PR $1, A, $4;
```

THE 'FIX' STATEMENT

The FIX statement is the means by which the format of numeric output may be controlled.

The form of the FIX statement is the word FIX followed by a single digit or the letter 'S'.

Execution of the FIX statement merely sets a flag as to the format of numeric output, it has no effect on the internal calculations or manipulations of numbers at all. When a PRINT statement is executed and a number is to be printed, this flag is inspected, if a fix of 'S' was specified the number is printed in scientific notation: that is, as a ten digit number followed by an 'E' and then the power of ten to which it should be raised. If a digit was specified then the number will be printed in floating point format with the specified number of decimal places displayed; if the number is too large or too small to represent in floating point format then it will be printed in scientific format automatically.

NOTE 1) NO rounding is performed on the printing of floating point numbers.

The syntax of the FIX statement is,

```
<fix statement> ::= FIX<fix>  
<fix> ::= 0/1/2/3/4/5/6/7/8/9/S
```

EXAMPLES OF THE 'FIX' STATEMENT

```
FIX 1      result of a subsequent 'PR 127.89' is 127.8  
FIX S      result of a subsequent 'PR 127.89' is 0.1278900000E 03  
FIX 9      result of a subsequent 'PR 127.89' is 127.890000000
```


The GOSUB statement is the mechanism by which subroutines may be called in a BASIC program.

The form of the GOSUB statement is `GOSUB expression`. Where the value of the expression is a number greater than zero and less than 10000 (truncation is automatic).

When executed program flow will be temporarily diverted to the line with the number returned by the expression. Upon encountering a RETURN statement program flow will be resumed from the line following the line where the last GOSUB appeared. If subroutines are nested too deeply a 'NET ERROR' will result. If the line number specified in the expression does not correspond to an actual line a 'NOGO ERROR' will result.

The syntax of the GOSUB statement is;

`<gosub statement> ::= GOSUB <expression>`

EXAMPLES OF THE 'GOSUB' STATEMENT

```
GOSUB 1000
GOSUB INT( N/RND(R))
```

THE 'RETURN' STATEMENT

The RETURN statement is the means by which control is reverted to some main program after a GOSUB has been executed.

The form of the RETURN statement is merely the word RETURN.

When executed, control will pass to the line after the line on which the last GOSUB occurred. If a RETURN is encountered by a program and no GOSUB has been executed corresponding to it (i. e. the program is at zero subroutine level) a 'RTN ERROR' will result.

NOTE 1) A RETURN statement must be the last statement on a line, for all statements after it will be ignored due to the fact that program flow has been resumed at another point.

The syntax of the RETURN statement is;

```
RETURN
```

EXAMPLE OF THE RETURN AND GOSUB STATEMENTS:

```
100 GOSUB 500
```

```
500 PRINT "PLEASE ANSWER ONLY 'YES' OR 'NO' "
510 RETURN
```

THE 'FOR' STATEMENT

The FOR statement is the standard method of creating loops in BASIC. A FOR NEXT loop, as it is called, will repeatedly execute a set of BASIC statements while incrementing a specified variable by a specified amount, until that variable reaches, or exceeds, a particular value.

The form of the FOR statement is the word FOR followed by a numeric variable (the 'for-variable') this is in turn followed by '=' then an expression (the 'start value') followed by the word TO then a second expression (the 'finish value'). After this an optional 'step' may be specified by the word STEP and an expression (the 'step value').

When executed the 'for-variable' is set to the 'start value' and control is passed to the subsequent set of statements. When the corresponding NEXT statement is reached the 'for-variable' is incremented by the 'step value' (if no step value was specified it is assumed to be 1), and compared to the 'finish value'. If the 'for variable' is greater than or equal to the 'finish value' control passes to the next statement. If the 'for-variable' is less than the 'finish value' a GOTO is executed to the statement after the FOR statement.

As a result if a construct of the form

```
FOR I=1 TO N
    any collection of statements
NEXT I
```

is used then the collection of statements will be executed N times.

NOTE 1) Fractional 'step values' are allowed, yet if recurring decimals are used it should be remembered that they do not return an exact value.

2) It is not permissible to have a 'final value' less than the 'start value' or a negative 'step value'.

3) FOR loops may only be nested 4 levels deep else a 'NST ERROR' will result.

4) FOR loops are the fastest method of performing recursive operations in TCT BASIC.

5) 'Offset' nesting of FOR loops is of course not allowed, i. e. The first NEXT after a particular FOR must match that FOR.

The syntax of the FOR statement is;

```
<for statement> ::= <simple for> / <simple for> <step>
<simple for> ::= FOR <numeric variable> = <expression> TO <expression>
<step> ::= STEP <expression>
```

(FOR EXAMPLES SEE 'THE NEXT STATEMENT')

THE 'NEXT' STATEMENT

The NEXT statement is the loop delimiter corresponding to the FOR statement.

The form of the NEXT statement is the word NEXT followed by the same variable as was specified in the last FOR statement. If a different variable is given a 'NXT ERROR' will result.

For a description of the effect of the NEXT statement see the FOR statement.

NOTE 1) A 'NXT ERROR' will result if a NEXT is encountered before a corresponding FOR statement.

The syntax for the NEXT statement is;

<next statement> ::= NEXT <for variable>

EXAMPLES OF THE FOR AND NEXT STATEMENTS

```
FOR I=1 TO 10  
PRINT ""  
NEXT I
```

```
FOR A=1 TO INT(RND(R)*N): PRINT "JUST ONCE MORE": NEXT A
```

```
FOR N=0.0 TO 25 STEP 2  
M=M+N  
PRINT M  
NEXT N
```

THE 'DO' STATEMENT

The DO statement is a non standard provision of TCT BASIC for the construction of loops. The DO UNTIL construct is in fact identical to the REPEAT UNTIL construct found in PASCAL. The DO statement is used when it is unknown how many times a particular operation is to be performed (unlike the FOR statement where it is necessary to know this at the loop's commencement).

The form of the DO statement is simply the word DO followed by any group of statements.

When executed, no immediate action is taken which has any effect on the users program, the address in text of the DO statement is merely stored on an internal stack for reference by the next UNTIL statement. (See 'THE UNTIL STATEMENT' for a description of the operation of a DO-UNTIL loop.)

NOTE 1) A DO statement need not be the last statement on a line.

2) DO loops are non-standard BASIC and bear no relation to the DO loops of FORTRAN, yet are similar to the REPEAT loops of PASCAL.

The syntax of the DO statement is;

<do statement>::= DO

(FOR EXAMPLES SEE 'THE UNTIL STATEMENT'.)

THE 'UNTIL' STATEMENT

The UNTIL statement is the loop delimiter corresponding to the DO statement.

The form of the UNTIL statement is the word 'UNTIL' followed by any relational expression (for an explanation of relational expressions see the IF statement.)

The effect of a DO UNTIL loop is to repeat the set of statements between the 'DO' and the 'UNTIL' repeatedly until the relational expression after the 'UNTIL' returns a true value.

NOTE 1) The statements between the 'DO' and the 'UNTIL' will always be executed at least once.

The syntax of the UNTIL statement is:

until statement ::= UNTIL relational expression

EXAMPLES OF THE DO AND UNTIL STATEMENTS

```
DO
A=A+1
UNTIL $A=$1000
```

```
DO :INPUT ? A : UNTIL A<25
```

THE 'REM' STATEMENT

The REM statement is the means of inserting documentation into a BASIC program.

The form of the REM statement is the word REM followed by any string of characters.

The REM statement is ignored completely during execution of a program.

THE 'STOP' STATEMENT

The STOP statement is used to terminate an executing Basic program.

The form of the STOP statement is the word STOP followed by any string of characters.

When this statement is executed the string of characters following the word STOP is printed out and the interpreter returns to command mode.

THE 'PIPBUG' STATEMENT

The PIPBUG statement is used to return control to the Philips monitor program 'PIPBUG' or any other program located at 0000.

The form of the PIPBUG statement is simply the word 'PIPBUG'.

FUNCTIONS

There are four inbuilt functions in TCT BASIC. These are:

ABS	Returns the absolute value of its argument.
MOD	Calculates $A * \text{FRAC}(B/A)$ where 'A' is the first argument and 'B' is the second.
INT	Returns the integer portion of its argument.
FRAC	Returns the fractional portion of its argument.

The arguments to the functions are listed within brackets after the function name and separated by commas.

Two optional functions are available (RND and SIN) for details of their operation see the sheet supplied with the tape of TCT BASIC.

While on certain other tapes FRAC may not work correctly until the following is performed.

*A161A

161A D9 DE

*

To implement RND and SIN the relevant section of the tape must be loaded.

- SIN(A) will return the sin of A
The function will only return true value if the number is between plus and minus pi.
- RND(G) will randomize the variable and return the number.

BACUS NAUR

<basic program> ::= <basic line> / <basic program> <basic line>
<basic line> ::= <sequence number> <basic statement> CARRIAGE RETURN
<sequence number> ::= NUMBER
<basic statement> ::= <basic statement> / <basic statements> : <basic statement>
<basic statement> ::= <let statement> / <fix statement> / <if statement> / <until statement> / <do statement> /
 <goto statement> / <gosub statement> / <return statement> / <next statement> /
 <for statement> / <print statement> / <input statement> / <stop statement> /
 <machine statement> / <rem statement>
<let statement> ::= LET <assignment statement> / <assignment statement>
<assignment statement> ::= <variable> = <expression> / <string identifier> = <string>
<fix statement> ::= FIX <fix>
<fix> ::= <digit> / S
<if statement> ::= IF <relational expression> <if terminator> <basic statements>
<if terminator> ::= <> / THEN
<until statement> ::= UNTIL <relational expression>
<relational expression> ::= <string relation> / <expression> <relational operator> <expression>
<relational operator> ::= <>/<=>/</>
<string relation> ::= <string identifier> = <string identifier>
<do statement> ::= DO
 <gotostatement> ::= GOTO <expression>
 <gosub statement> ::= GOSUB <expression>
 <return statement> ::= RETURN
 <next statement> ::= NEXT <variable>
 <for statement> ::= FOR <variable> = <expression> TO <expression> <step>
 <step> ::= <> / STEP <expression>
 <print statement> ::= PRINT <print list> <print terminator> / PR <print list> <print terminator>
 <print list> ::= <print item> / <print list> , <print item>
 <print item> ::= <expression> / <string>
 <print terminator> ::= <> /
 <input statement> ::= INPUT <prompt> <input list>
 <input list> ::= <input item> / <input list> , <input item>
 <input item> ::= <string identifier> / <variable>
 <prompt> ::= <non-special character>

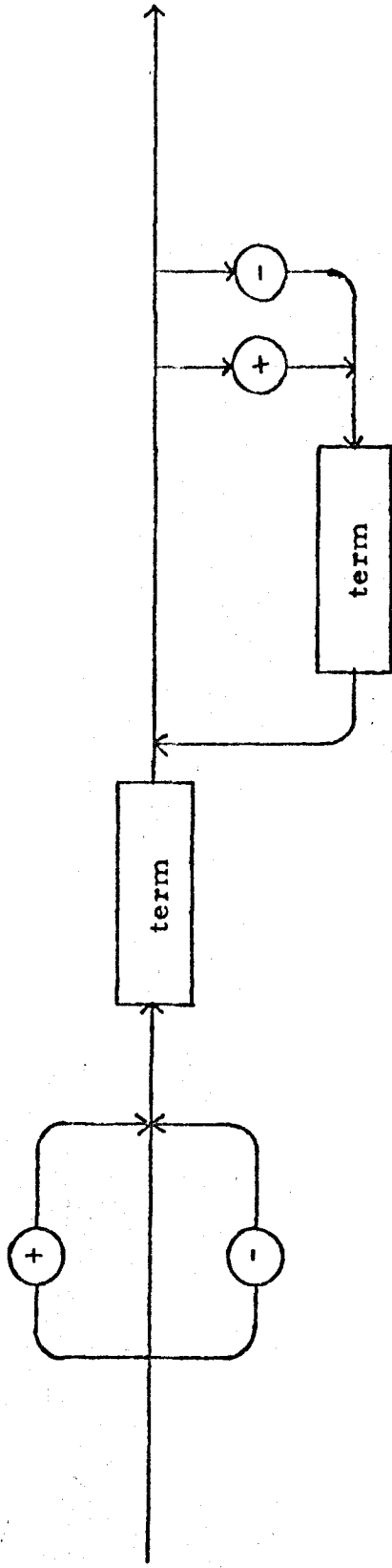
```

<stop statement> ::= STOP <comment>
<rem statement> ::= REM <comment>
<comment> ::= {} / <character list>
<machine statement> ::= PIPBUG
<expression> ::= ( <expression> ) / <expression> <operator> <expression> / <value identifier>
<value identifier> ::= <number> / <variable identifier> / <function> / <constant>
<function> ::= <function identifier> ( <expression list> )
<expression list> ::= <expression> / <expression> , <expression list>
<operator> ::= + / - / * / /
<variable identifier> ::= A / B / C / D / E / F / G / H / I / J / K / L / M / N / O / P / Q / R / S / T / U / V / W / X / Y / Z
<function identifier> ::= ABS / MOD / INT / FRAC / <optional function>
<optional function> ::= RND / SIN
<constant> ::= PI
<number> ::= <decimal part> / <decimal part> <exponent>
<decimal part> ::= <integer> / <integer> . <integer> / . <integer> / <integer> .
<integer> ::= <digit> / <integer> <digit>
<digit> ::= 0 / 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8 / 9
<exponent> ::= E <integer> / E <sign> <integer>
<sign> ::= + / -
<string> ::= <simple string> / <string identifier>
<string identifier> ::= $ <expression>
<simple string> ::= " <character list> "
<character list> ::= <non special character> / <character list> <non special character>
<non special character> ::= <any ASCII character except CR " DEL BS >

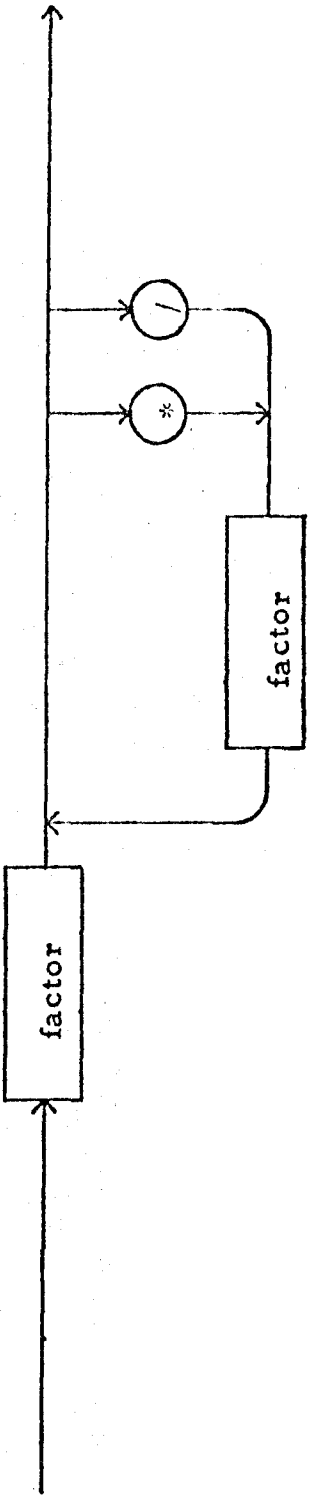
```

FLOW CHART REPRESENTATION OF THE SYNTAX OF AN EXPRESSION

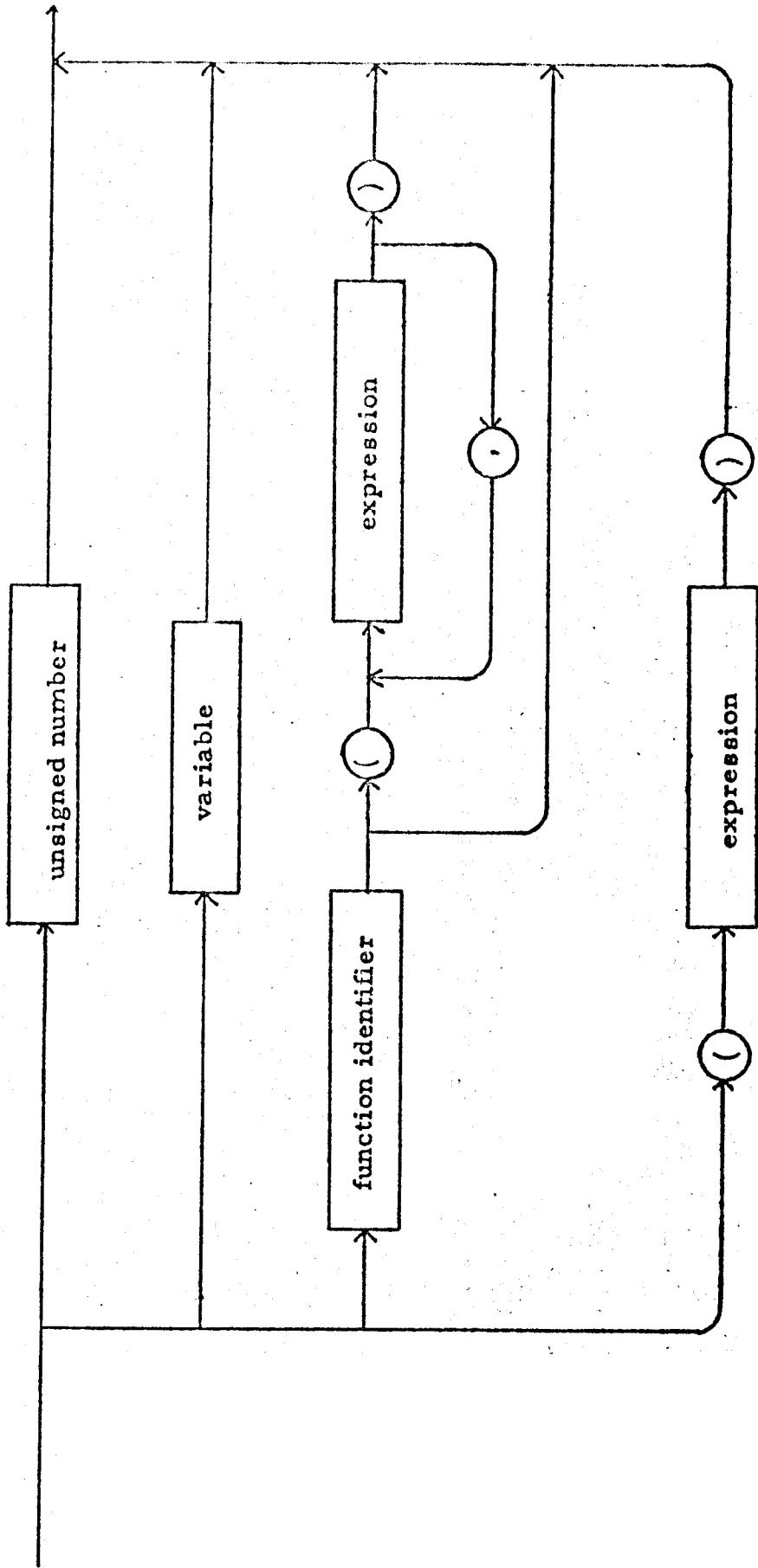
expression



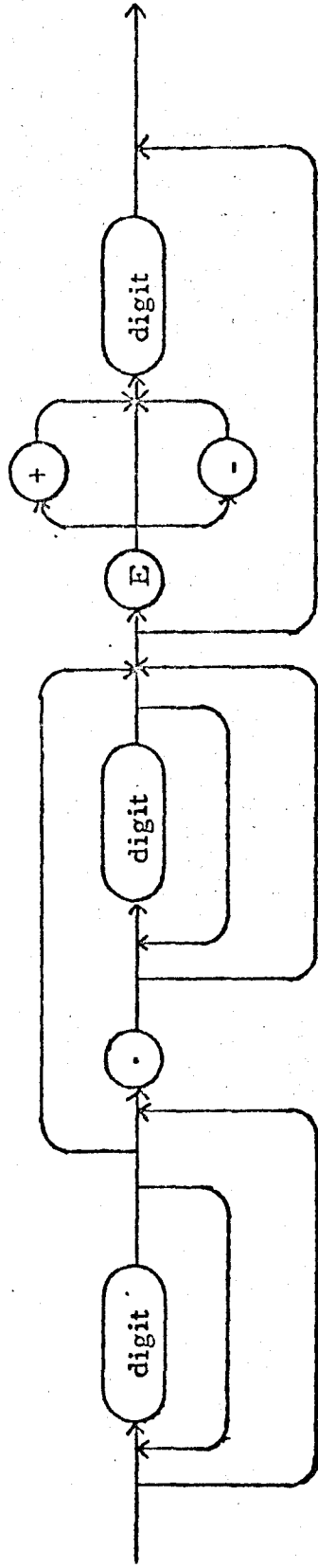
term



factor



FLOW CHART REPRESENTATION OF THE SYNTAX OF AN UNSIGNED NUMBER



ERROR MESSAGES

Line numbers given are those at which the error is detected.

STP ERROR	No STOP on the end of the program. Line number given is the line number of the last line executed.
STMT ERROR	Character(s) remaining after the logical end of statement.
VALU ERROR	Computed value of an expression is out of range for a function or an overflow has occurred.
NO " ERROR	A string definition has no " to terminate it.
NOGO ERROR	Line number evaluated does not exist.
RTRN ERROR	A RETURN has been encountered without a GOSUB.
NEST ERROR	Too many pending operations in an arithmetic expression or too many nested FOR-NEXT or DO-UNTIL loops, or subroutines.
DIV 0 ERROR	A zero divisor has occurred in an expression.
UNTL ERROR	An UNTIL has occurred without a DO.
NO \$ ERROR	A NEXT has been encountered without a FOR, or the variable of the NEXT statement is not the same as that of the preceding FOR statement.
SNTX ERROR	Incorrect syntax - see Bacus-Naur.
BUFF OVF ERROR	Input buffer length is exceeded.
CHAR ERROR	Indicates that a string was not found.
NEXT ERROR	Indicates that a NEXT was encountered without a FOR, or the NEXT variable did not match that in the previous FOR statement.

```

0001 REM      THIS IS A PROGRAM TO DEMONSTRATE CERTAIN UNIQUE
0002 REM      FEATURES OF TCT BASIC
0003 REM
0004 REM      IT TAKES A NUMBER BETWEEN 0 AND 999 INCLUSIVE AND
0005 REM      WRITES IT OUT IN WORDS
0006 REM
0010 $1="ONE "           :REM      SET UP A LOOKUP TABLE
0020 $2="TWO "          :REM      OF KEY WORDS
0030 $3="THREE "
0040 $4="FOUR "
0050 $5="FIVE "
0060 $6="SIX "
0070 $7="SEVEN "
0080 $8="EIGHT "
0090 $9="NINE "
0100 $10="TEN "
0110 $11="ELEVEN "
0120 $12="TWELVE "
0130 $13="THIR"        :REM      ITS EASIER TO PRINT
0140 $14="FOUR"        :REM      "TEEN" LATER THAN
0150 $15="FIF"         :REM      REPEATEDLY TYPE IT NOW
0160 $16="SIX"
0170 $17="SEVEN"
0180 $18="EIGH"
0190 $19="NINE"
0200 $20="TWEEN"
0500 PRINT "PLEASE GIVE ME A NUMBER"
0510 DO:INPUT ? A: UNTIL A<1000:REM      INORE BAD INPUTS
0515 IF A=0 PRINT "ZERO"GOTO 510:REM      ZERO IS A SPECIAL CASE
0520 IF A<100 GOTO 600           :REM      TEST FOR ABSENCE OF
0530 PRINT $INT(A/100),"HUNDRED":REM: "HUNDRED'S" DIGIT
0560 A= MOD(A,100)
0570 IF A<>0 PRINT " AND ";
0600 IF A<20 GOTO 700           :REM      TEST FOR AN ABSENSE OF
0605 IF INT(A/10)=2 PRINT "TWEN":GOTO 650 :REM      "TEN'S" DIGIT
0610 PRINT $INT(A/10)+10;
0650 PRINT "TY ";
0660 A= MOD(A,10)
0700 IF A=0 GOTO 800
0710 PRINT $A;
0720 IF A>=13 PRINT "TEEN";
0800 PRINT ""
0810 GOTO 510

```

0800 04 0D CC 18 00 04 FE CC 18 01 3F 0E 27 07 32 0D
0810 87 F2 3F 08 53 E5 FE 98 76 04 0D CC 87 F2 3B F3
0820 04 FF CC 87 F2 3F 0E EC 12 9E 0E 68 07 3A 3B 23
0830 0D 87 FA 3B 1E 0E 87 FA 01 44 1F CC 07 E3 CE 07
0840 E4 F5 20 1C 08 AA F5 80 18 2F F5 40 18 22 3F 87
0850 E3 1B 55 0F 67 C1 D8 0C CF 67 C1 0F 67 00 84 01
0860 CF 67 00 17 CF 67 C1 17 28 6A AC 53 6E 00 00 17
0870 CC 07 FA CE 07 FB 1F 08 28 45 1F 0F 07 F9 E7 30
0880 1A 05 07 21 1F 0A 12 00 07 FA CF 25 D7 0C 07 FB
0890 CF 25 D7 0B E7 C9 F1 CA F5 1F 08 28 07 28 00 87
08A0 E8 E4 20 15 16 3F 08 53 1B 74 C1 3B 6F 06 00 01
08B0 1A 1B 0E A7 FA C1 44 7F EC 87 E8 98 04 3B E7 1B
08C0 6E A6 01 1C 0E F7 3F 0C C3 FA 7B 1B F7 07 3A 3B
08D0 D5 FA 7C 1F 08 28 0F 07 F9 0F 65 D7 CC 07 FB 0F
08E0 45 D7 CC 07 FA A7 01 CB EE 17 0F 07 FC E7 10 1A
08F0 05 07 21 1F 0A 12 0C 07 E8 CF 26 77 0C 07 E9 CF
0900 26 77 CB E7 17 00 00 00 00 00 00 00 00 00 3F 08
0910 0C 0D 87 E8 2F 08 53 E5 0D 14 E5 3A 14 07 0D 1B
0920 52 0F 07 FC 19 04 07 1D 1B 75 0F 46 78 02 0F 46
0930 78 0B EF 01 E4 05 18 0C CC 07 E8 CE 07 E9 04 01
0940 CC 07 F4 17 20 1B 79 07 88 3F 0A 1B 1F 08 00 07
0950 28 00 87 28 3F 08 53 01 E4 22 14 E4 0D 18 05 3F
0960 02 B4 1B 6D 07 15 1F 0A 12 1A 07 04 20 75 02 1F
0970 02 B4 04 2D 1B 79 3F 14 C1 0F 66 9A 3B 6B 00 00
0980 0F 66 99 02 E6 10 9E 09 FC F6 80 18 FA 0D 07 E2
0990 18 F5 0F 66 98 18 06 01 A4 02 A2 1A EA 1F 16 26
09A0 0F 66 98 1A 14 3B 2F FA 7C A5 01 18 CA 3B 23 3B
09B0 25 F7 05 18 02 F9 78 1B 13 A5 01 3B 11 02 18 08
09C0 04 30 3B A2 A5 01 FA 78 3B 0C F9 7C 1B AB 04 30
09D0 3B 94 04 2E 1B 90 0F 66 9B B5 02 98 0B 75 02 87
09E0 01 44 0F 64 30 1F 02 B4 77 02 50 50 50 50 1B 71
09F0 3B 50 05 0A 3B 60 F9 7C 3F 09 6B 04 45 3B E7 0F
0A00 66 93 3F 09 69 06 02 0F 66 94 3B 4D FA 79 1B E9
0A10 07 39 74 07 3F 00 8A 3B 02 1B 0E 0F 2A 63 50 C1
0A20 44 7F 3F 02 B4 01 9A 73 17 07 00 3B 6E 0C 07 F4
0A30 1C 0E 68 3B 66 3B 20 CB 9F 04 04 CF 66 91 0C 07
0A40 F8 CF 66 94 0C 07 F7 CF 66 93 04 20 CC 07 FB 04
0A50 12 CC 07 FA 1F 08 28 0F 07 FD 20 06 08 CF 26 97
0A60 FA 7B 17 17 40 8A A4 A4 9E A5 40 82 A9 A6 A8 A1
0A70 40 A6 A8 9A A9 AC 82 98 AB 9C 9E 40 45 9C 9E 8E
0A80 9F A4 A8 A4 9D 9C 8A A6 A9 54 88 55 88 92 AC 40
0A90 61 AA 9C A8 99 86 90 82 A5 9C 8A B0 A9 A6 9C A8
0AA0 B1 84 AA 8C 8C 40 9E AC 8D 0C 07 F4 18 05 0C 07
0AB0 E7 1B 02 04 3E 06 00 3F 02 B4 3F 17 D3 C1 18 7A
0AC0 E4 08 98 06 A6 01 1A 61 1B 70 CE 25 77 E4 0D 18
0AD0 0E E4 7F 1C 14 F7 E6 60 98 60 07 3D 1F 0A 12 3F
0AE0 00 8A 05 05 0D 07 E8 05 78 1F 14 F3 A8 86 A8 40
0AF0 84 82 A6 92 86 76 40 AE A4 92 A8 A8 8A 9C 40 84
0B00 B2 74 1A 14 A8 5C 98 9E 9C 8E 58 40 A8 5C AE 9E
0B10 9E 98 98 8A A4 58 40 86 5C 84 82 A4 A4 82 A8 A8
0B20 5C 1A 14 50 86 52 40 62 72 6E 70 41 40 40 40 75
0B30 02 05 0A 3F 0A 57 CF 07 FD 0A FC 3F 08 9C 0C 87
0B40 E8 E4 2D 98 08 04 FC CE 66 92 3F 08 53 0C 87 E8
0B50 00 00 00 00 3B 30 18 39 E4 2E 9C 14 C1 3B EC 0C

GB6G 87 E8 E4 3C 98 54 F9 75 1B 5C 54 5A A1 CE 66 91
GB7G 18 55 54 FC CE 66 9C 55 5A 3B 5B 98 56 3B 33 3B
GB8G CA F9 76 1F 5B D5 5C 87 E8 E4 3C 16 E4 39 15 EC
GB9G 17 3B 73 18 14 54 5A A1 5F 57 FD CF 66 91 5C 87
GBAG E8 E4 2E 98 5E 57 28 1B 56 3B 57 3F 58 53 F9 61
GBBG 1B 1B 44 5F B5 52 18 5A D5 D5 D5 D5 CE 66 93 77
GBCG 52 17 75 52 6E 66 93 CE 66 93 86 51 17 5A CA 54
GBDG 15 5C CE 66 91 5A C2 77 52 3F 58 9C E4 45 9C 5D
GBEG C2 55 5C 3F 58 A5 F4 2D 98 55 55 FC 3F 58 53 3F
GBFG 5B 86 9C 5C 41 44 5F C2 CA 8E 3B F1 3B F2 98 5C
GC0G 44 5F D2 D2 D2 D2 62 CC 57 EA 3B E1 5E 57 FD 5E
GC1G 66 91 C3 5E 66 9C E1 18 16 EB ED 98 54 2C C1 1B
GC2G 14 19 56 58 E3 A3 94 1B 5C C1 AB DC 97 1B 55 87
GC3G 66 8B D5 97 53 5B D6 CF 66 91 51 CF 66 9C 1F 5D
GC4G C2 3F 5C C3 5C 87 E8 E4 45 98 76 1B F2 5F 57 FD
GC5G A7 58 CB FA 5F 66 9B C2 5F 66 9C C1 5F 66 98 1A
GC6G 55 5F 66 99 19 55 57 11 1F 5A 12 E4 55 9A 77 C3
GC7G E7 54 18 13 54 FC 52 52 52 52 42 46 5F 51 51 51
GC8G 51 45 5F 61 C1 DB 69 CE 57 FE CD 57 EF 17 2C CC
GC9G 57 F3 55 18 CD 57 F2 CD 57 EB 57 32 5D 87 F2 3F
GCAG 58 53 E5 5D 98 76 5D 87 F2 F5 FE 14 77 52 3B FC
GCBG 5E 87 F2 E9 D3 1A 65 19 5A EE 57 EF 1A 5E 19 53
GCCG 25 C8 D5 53 77 1C C3 5F 67 5C C1 5F 27 5C C2 A6
GCDG 51 77 58 A5 5C 75 58 52 CF 67 5C 51 CF 47 5C 75
GCEG 15 17 5D 57 EB 56 FF 5E A7 E8 E4 5D 98 79 52 61
GCFG 1C 5D 6E 52 14 51 38 F9 86 53 3F 5D 5B 5D 87 E5
GD0G 57 23 3F 58 53 57 25 3B FA E5 FF 98 7C 52 C1 3B
GD1G F2 F9 7C 57 23 3F 5C C3 57 25 3B FA 5C 87 E3 CC
GD2G 87 E5 5C 57 E4 EC 57 F3 98 69 5C 57 E3 EC 57 F2
GD3G 98 61 5F 57 EE CF 87 F2 57 32 3F 58 53 5C 57 EF
GD4G CC 87 F2 3B F6 1B 53 CC 3B F1 5C 87 E8 CC 87 F2
GD5G E4 5D 14 57 28 3B E4 57 32 1B 6D 5F 57 F2 CF 57
GD6G E3 CF 57 E5 5F 57 F3 CF 57 E4 CF 57 E6 17 3B 6B
GD7G 57 23 3F 58 53 5D 87 E3 E5 5D 98 76 3B F5 5C 87
GD8G E3 CC 87 E5 E4 FF 14 57 25 3B E8 57 23 1B 6D 57
GD9G 32 3F 17 BF 1B 54 3B FA 3B 97 5D 87 F2 E5 FE 14
GDAG 3B 1D 3B 8D 5D 87 F2 3B 16 54 2C 3F 52 B4 12 15
GDBG 3F 58 53 5C 87 F2 E4 5D 18 5C 3F 52 B4 1B 71 1F
GDCG 52 69 3F 5A 57 CF 57 FD 3F 11 A3 3F 11 D9 1F 5E
GDDG B9 5C 57 F4 18 2A 57 28 3F 5C C3 5C 87 E3 E4 5D
GDEG 98 11 3F 58 53 5C 87 E8 3F 5E 59 5C 87 E8 CC 57
GDFG F8 5C 5C 3B EE 55 12 56 58 CD 57 FA CE 57 FB 17
GEG 25 C8 CF CC 57 FD CC 57 F9 55 11 56 FF 1B 6A 2C
GE1G CC 57 FE CC 57 FC CC 57 FF 54 51 CC 57 F4 CC 57
GE2G E9 54 18 CC 57 E8 17 54 51 CC 57 F3 54 13 CC 57
GE3G F2 17 55 5C 3F 58 9C E4 53 18 59 3F 5B 89 9C 5A
GE4G 15 A4 2F C1 CD 57 E2 1F 58 53 58 F9 CC 57 EB 54
GE5G 51 C8 F2 17 58 F7 C8 ED 17 E4 FE 98 55 57 59 1F
GE6G 5A 12 CC 57 F7 1F 58 53 2C CC 57 F4 CC 57 FD CC
GE7G 57 F9 54 11 56 FF 1F 58 7C 2C 3F 5E 29 3B 5C 57
GE8G 32 3F 58 53 5C 87 F2 E4 FF 98 76 5D 57 F2 3F 52
GE9G 69 5D 57 F3 3B F9 1F 5C 8A 3F 58 9C 3F 14 B3 15
GEAG 16 C2 3F 58 53 5C 87 E8 3B F3 1C 5C C3 3F 14 BB
GEBG D5 5D 57 FD CD 26 97 C9 F9 57 3A 3B E6 1B E4 59

0E00 F1 0D 46 98 02 07 08 0E 26 EF CD 26 97 FB 78 C9
0E05 E1 17 07 28 75 FF 1F 0A 12 07 11 1B 77 00 00 00
0E10 20 C3 CF 66 00 CF 67 00 DB 78 04 03 CC 07 E2 04
0E15 3E CC 07 E7 1F 0E 68 0C 07 E3 0E 07 E4 1F 08 70
0E20 05 08 0D C4 40 CD 64 ED 0D E4 42 CD 64 E4 59 72
0E25 CD 04 EC 05 08 20 CD 44 F5 59 7B 17 0F 84 44 27
0E30 F0 1B 03 0F 84 44 77 0A 3B 56 CF 04 E6 75 01 0D
0E35 04 ED ED 04 E4 18 16 59 0E 04 04 05 E4 06 08 3F
0E40 11 38 3F 11 56 1B 66 04 04 05 ED 1B 70 00 04 EE
0E45 EC 04 E5 19 62 18 04 59 60 1B 6C 0C 04 E6 EF 04
0E50 EF 98 10 3B 2C 06 09 04 04 05 ED 3F 11 38 3F 11
0E55 56 1B 1B 77 01 3B 31 1A 04 3B 3A 1B 11 CF 04 EF
0E60 06 06 0E 44 E7 AE 64 F0 94 CE 64 F0 5A 74 1F 0F
0E65 F0 75 01 05 00 06 06 51 0E 44 F0 84 66 D1 8E 64
0E70 E7 94 CE 64 F0 5A 70 17 06 FA 0E 63 F6 EE 63 ED
0E75 98 02 DA 76 17 77 01 06 06 0E 44 F0 AE 64 E7 94
0E80 CE 64 F0 5A 74 17 07 0B 05 00 3B 5C 1A 07 3B 65
0E85 85 66 95 1B 75 8D 04 FB CD 04 FB 04 04 05 ED 06
0E90 0F 3F 10 48 FB 62 3F 11 56 07 0B 3F 10 51 FB 7B
0E95 04 04 05 ED 06 0A 3B 14 3F 11 20 0C 04 FC 90 0E
1000 D9 07 08 0F 44 ED CF E4 46 5B 78 17 CE 04 E2 CC
1005 04 EG CD 04 E1 07 00 05 02 75 01 0D A4 EG 98 19
1010 87 02 E5 08 98 75 C1 04 F0 CC 84 EG 04 99 CD A4
1015 EG 20 CD A4 EG CC 04 FC 17 44 F0 98 02 87 01 03
1020 14 3B 0E 3B 21 FB 7A 17 CE 04 E2 CC 04 EG CD 04
1025 E1 05 04 0E 04 E2 75 01 0E C4 EG DG CE E4 EG E6
1030 03 98 75 F9 6E 17 0D A4 EG 0E 84 EG 18 0A 84 67
1035 94 10 0E D9 CD E4 EG 17 58 0F EC 04 FC 98 07 06
1040 F0 CE 84 EG 1B 68 CC 04 FC A4 00 94 1B 66 07 80
1045 0E 84 42 26 F0 1B 05 07 00 0E 84 42 77 0B 3F 0F
1050 00 03 18 06 0C 04 E7 10 0E D2 0C 04 EF EC 04 E6
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1095 B5 01 16 3B 0C 3B 1F 17 CE 04 E2 CC 04 EG CD 04
1100 E1 05 04 06 02 0E A4 EG 00 CE E4 EG EE 04 E2 98
1105 74 75 01 F9 6E 17 0D A4 EG 0E 84 EG 98 0E 84 67
1110 94 98 05 05 01 CD 04 FC CD E4 EG 17 58 03 CC 04
1115 FC A4 00 94 58 72 CC 84 EG 1B 6D 0D 07 FD 0D 46
1120 90 84 08 C2 07 08 0D 46 99 CE 46 F0 FB 78 C9 EC
1125 17 0B E9 20 CF 66 92 17 0B E2 0F 66 92 24 F0 CF
1130 66 92 17 0B D7 87 98 06 06 02 C1 51 03 AD 71 C1
1135 C3 CE 44 40 04 06 CE 44 40 5A 6E CF 04 47 CC 04
1140 46 17 08 02 06 0F 07 F4 15 1F 0A 10 07 28 0D 87
1145 E8 3F 08 53 E5 0D 14 1B 75 3F 0F 23 1B 0D 3F 0F
1150 1C 1B 08 3F 10 8E 1B 03 3F 10 97 75 FF 0F 07 FD
1155 A7 08 CB FA 0F 66 93 15 16 CF 66 90 CF 66 91 17
1200 00 8A 0A A9 32 08 8D 52 01 0B 2F 52 14 0C 4D 0C
1210 8E 0C E2 52 01 32 34 4C 49 53 D4 17 BA 52 4F 0C

1220 4D 0C 8E 52 26 0E 27 0D 8F 51 FF 0A 10 0E 4A 09
1230 76 0E 54 0E 00 32 3F 52 55 0E 09 0E 0E 0F 0D D1
1240 32 48 43 4C 45 41 D2 08 0A 34 97 4E 45 D7 08 00
1250 0B 2F 52 24 52 1E 00 00 00 32 5D 4C 45 D4 0E 99
1260 52 6C 32 2A BD 93 D5 11 7B 09 0E 0D D1 32 77 46
1270 49 D8 0E 32 09 0E 0D D1 32 89 49 C6 96 37 32 83
1280 54 48 45 0E 08 6F 15 4C 52 58 32 9A 55 4E 54 49
1290 0C 11 C5 96 37 09 0E 15 72 0D D1 32 A4 44 CF 09
12A0 0E 15 55 0D D1 32 C5 47 CF 32 B2 54 CF 93 D5 09
12B0 0E 52 BD 32 2A 53 55 C2 93 D5 09 0E 08 EA 0C 4D
12C0 0C 8E 14 DB 0D D1 32 D3 52 45 54 55 52 0E 09 0E
12D0 09 21 0D D1 32 EA 4E 45 58 D4 11 C5 0E 99 52 2A
12E0 09 0E 16 8D 93 D3 16 77 0D D1 00 33 14 46 4F D2
12F0 11 C5 0E 99 52 2A 32 2A BD 93 D5 32 2A 54 CF 93
1300 D5 33 0A 53 54 45 D0 93 D5 53 0C 15 D7 09 0E 16
1310 47 11 7B 0D D1 33 30 A4 93 D5 32 2A BD 33 25 A2
1320 0C 4D 17 0E 53 2C 32 2A A4 94 13 17 40 09 0E 0D
1330 D1 33 5D 50 D2 33 39 49 4E D4 33 40 A2 09 4F 53
1340 4D 33 49 A4 93 D5 16 F3 53 4D 93 D5 09 76 33 52
1350 AC 53 39 33 57 BB 53 59 00 8A 09 0E 0D D1 33 89
1360 49 4E 50 55 D4 15 90 11 C5 0E 99 53 7F 15 15 93
1370 D5 11 7B 15 00 33 77 AC 0E 99 53 59 15 00 48 67
1380 32 2A A4 94 13 17 38 53 59 11 33 93 53 54 4F D0
1390 14 C9 0E 00 33 A0 50 49 50 42 55 C7 00 00 00 00
13A0 00 34 A3 52 45 CD 11 CC 0D D1 93 D5 33 B2 BD 93
13B0 D5 15 1E 33 C7 BC 33 BC BD 93 D5 15 20 33 C3 BE
13C0 93 D5 15 24 93 D5 15 1C 32 2A BE 33 D1 BD 93 D5
13D0 15 1A 93 D5 15 22 33 DE AD 93 FB 11 98 53 E3 33
13E0 E1 AB 93 FB 33 EE AB 93 FB 11 A3 11 D9 53 E3 33
13F0 F9 AD 93 FB 11 A3 11 DE 53 E3 08 D6 94 13 34 08
1400 AA 94 13 11 A3 11 E8 53 FD 33 F9 AF 94 13 11 A3
1410 11 E3 53 FD 0E 99 54 1B 0E BF 08 D6 0B 2F 54 21
1420 08 D6 34 2B A8 93 D5 32 2A A9 54 31 34 33 50 C9
1430 15 D5 08 D6 34 41 41 42 D3 32 2A A8 94 24 11 91
1440 08 D6 54 54 53 49 0E 32 2A A8 94 24 04 50 08 D6
1450 08 6F 08 6F 00 34 62 49 4E D4 32 2A A8 94 24 15
1460 99 08 D6 34 71 46 52 41 C3 32 2A A8 94 24 16 07
1470 08 D6 32 2A 4D 4F C4 94 88 11 A3 11 E3 17 9F 11
1480 E8 08 D6 11 A3 11 E8 08 D6 32 2A A8 93 D5 32 2A
1490 AC 93 D5 32 2A A9 08 D6 32 58 53 49 5A C5 09 0E
14A0 0E 78 0D D1 32 2A 44 55 4D D0 17 BB 52 4F 0D D1
14B0 0D D1 D6 E4 41 16 E4 5A 15 E0 17 A6 41 D2 D2 02
14C0 17 0F 07 FD A7 08 CB FA 17 3F 08 9C 0D 87 E8 3F
14D0 08 53 E5 0D 14 01 3F 02 B4 1B 71 00 07 EB 18 05
14E0 07 19 1F 0A 12 04 01 CC 07 F4 00 07 F2 0D 07 F3
14F0 0C 07 E8 CD 07 E9 17 07 25 3F 0A 1B BB A5 1B 17
1500 00 07 E8 0D 07 00 C8 FC C9 F7 00 07 E9 0D 07 C1
1510 C8 FC C9 F7 17 3B 69 1F 0A A9 A4 03 A4 01 A4 01
1520 A4 01 A4 01 44 07 CC 07 E3 3F 11 A3 3F 11 DE 0D
1530 07 FD A5 08 C9 FA 07 04 0D 66 9B 18 06 0D 66 9A
1540 18 02 53 53 4B E1 CF 07 F6 1F 08 D6 0B F9 15 3F
1550 11 CC 1F 0D D1 0F 07 F4 1C 0A 10 0F 07 FF E7 20
1560 9E 08 F1 00 07 E8 CF 26 57 00 07 E9 CF 26 57 CB
1570 EB 17 0B E8 93 05 07 2D 1F 0A 12 00 07 F6 98 0B

158G GF 66 57 C8 F5 GF 66 56 C8 DA 17 A7 G2 CB CD 17
159G 3F G8 9C CC G7 E7 1F G8 53 77 G2 GF G7 FD GF 66
15AG 9G 18 G5 A7 G8 1F GA 5A GF 66 91 18 76 E4 G9 15
15BG 5G C2 44 7F 83 C3 F6 8G 98 GE GF 66 93 44 FG CF
15CG 66 93 87 G1 46 7F 86 G1 2G E6 G5 18 G5 CF 26 92
15DG DA 77 75 G2 17 A4 G1 A4 G1 A4 13 DG DG DG GF G7
15EG FD C2 G5 G8 GE 35 EE CF 26 97 F9 78 CB F1 17 GG
15FG G1 GG 31 41 59 26 54 GG G1 GG 1G GG GG GG GG GG
16GG GG^X GG 5G GG GG GG GG GG GF FD C3 84 G8 C2 3B GB
161G CB F6 3F 15 99 3F 11 A3 1F 11 DE G5 G8 GF 26 8F
162G GE 26 8F F9 78 17 G1 82 E4 G1 98 G5 G4 3G 1F G2
163G B4 G2 1C G9 B9 1F G9 AG 33 A9 A4 94 13 32 2A BD
164G 32 2A A4 94 13 17 66 GF G7 FE E7 4C 9E G8 F1 GE
165G G7 FD A6 1G CA FA A6 G9 GE 66 98 CF 26 G7 GG G7
166G E8 CF 26 G7 GG G7 E9 CF 26 G7 G5 1G GE 26 AG CF
167G 26 G7 F9 78 CB D2 17 GB CF GE G7 F6 98 GB GF 65
168G F6 C8 DC GF 65 F7 C8 DD 17 A7 13 1B 67 GD G7 FD
169G GE G7 FE 98 G5 G7 35 1F GA 12 GE 65 F5 ED 66 97
16AG 9C 16 95 CC G7 F6 3F GE BF G7 G8 GA E4 GE 25 FF
16BG CD 26 97 FB 78 C9 D7 3F 11 A3 3F 11 D9 GA E5 G9
16CG CD G7 G8 GD 26 8F CE 26 EF FB 78 GG GG GA C2 CD
16DG G7 FD G7 G8 GE 25 F7 CD 26 8F FB 78 17 3F GE 27
16EG G7 32 GD 87 F2 3F G8 53 E5 FE 98 76 3F GG 97 GD
16FG G7 EB 17 3F GG 4D 3B 65 18 G5 G7 31 1F GA 12 3B
17GG E5 3B E3 GG 87 F2 E4 GD 14 3F G2 B4 1B 73 G7 28
171G G6 GG GD 87 E8 3F G8 53 G1 CE 25 77 E4 GD 1C G9
172G 64 E4 22 98 6D G4 GD CE 65 77 3F 15 GG 3F 16 DD
173G 3F GA E2 3F GG E2 1B F3 3F 15 15 3F GG 4D 1B 6D
174G 3B FA 3B EA 9C 16 FA G7 32 3F G8 53 3B FC GG 87
175G F2 CD 25 77 E4 GD 98 74 3B D1 3B 5F GF G7 F4 15
176G G4 GD CC 87 E8 17 3B D4 3B C1 3B C2 3F 14 EA 3F
177G GG 4D 3F 16 DD 3B 1E 3B 1C 2G CC G7 F6 GD 87 F2
178G ED 87 E8 98 G8 3B GE E5 GD 98 72 C9 EE 3F 15 GG
179G 1F G8 D6 GG GG G7 32 3F G8 53 G7 28 1B FA 17 GG
17AG G7 FD 84 G8 C3 84 G8 C2 3F 16 1B 3F 16 G7 G3 84
17BG G8 CC G7 FD C2 84 G8 C3 1B EF 2G CC G7 F6 17 G8
17CG FB 98 G3 1F GG 8A G4 GD 3F G2^X B4 G5 GG 3F G2 A8
17DG F9 7B 17 77 1G G6 G8 12 1A 7D 3F G2 AD C1 3F 17
17EG F7 3F G2 A8 3B F9 44 8G 51 61 C1 FA 74 3B F3 45
17FG 7F 76 4G G1 75 18 17 12 9A G3 76 4G 17 74 4G 17