SPECIFICATION

GIER ELECTRONICS

SOFTWARE

GIER ALGOL COMPILER

<basic symbol> ::= <letter> | <digit> | <logical value> | <delimiter>

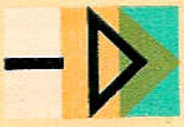
<letter> ::= a | b | c | d | e | f | g | h | i | j | k | l | m | n | o | p | q | r | s | t | u | v | w | x | y | z
A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z

<digit> ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9

<logical value> ::= true | false

<delimiter> ::= + | − | × | / | : | ↑
< | ≤ | = | ≥ | > | ≠
= | => | ∨ | ∧ | ¬ ,
go to | if | then | else | for | do
, | . | 10 | : | ; | := | _ | step | until | while | comment
(|) | [|] | ≮ | ≯ | begin | end
own | Boolean | integer | real | array | switch | procedure
string | label | value

abs
arctan
char
cos
drum place
entier
exp
from drum
gier
gierdrum
gierproc
inchar
inone
input
kbon
ln
lyn
outchar
outclear
outcopy
outcr
output
outsp
outsum
outtext
pack
setchar
sign
sin
split
sqrt
todrum
typechar
typein
write
writechar
writecopy
writecr
writetext



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Adhering faithfully to ALGOL 60, the unusually capable GIER ALGOL Compiler is an outstanding aspect of the GIER Computer and reflects the advanced techniques developed by our associate compiler group.

ALGOL 60 (**algo**rithmic **l**anguage) is an international programming language, i.e. a language that can be translated by means of an electronic computer into the language of the computer itself, the so-called machine code. Programming in ALGOL has several advantages over programming in machine code.

1. ALGOL is problem-oriented – programming is therefore easier and less time-consuming, especially as regards the corrections that usually have to be made during preparation and revision of programs.
2. An ALGOL program is an English-language description as well as a program; thus it can be directly understood by others including non-programmers.
3. Since ALGOL 60 is independent of the computer, ALGOL programs may be employed in electronic computers of various types and makes.

ALGOL has been constructed with the description of numerical and logical processes in mind; thus an ALGOL program consists of a number of statements and expressions describing both the calculations and the sequence in which they are to be executed.

The procedure, a special ALGOL concept that consists of a program-independent algorithm, has proved extremely useful, and forms the basis of the GIER System Library (see Specification). Examples of such library procedures are matrix arithmetic, the solution of linear equations, least squares, approximation of data, integration, and special functions.

The GIER ALGOL Compiler accepts the entire ALGOL 60 language except **own array.** Programming possibilities are very extensive, a large variety of input and output procedures in included, and ample provision has been made for using machine code.

ALGOL programs for the GIER Computer are punched on 8-track paper tape, which is then translated by means of the GIER ALGOL Compiler. During compilation – performed at a speed equivalent to the generation of about 2300 machine instructions per minute – the program is tested for errors in syntax, and relevant error messages are output on the Monitor Typewriter. The object programs generated by the Compiler are almost as effective as "hand-made" programs, due in part to the Compiler's dynamic, fully automatic administration of the immediate access and secondary stores.

If a syntactical error is detected during translation, the Compiler does not stop; after informing the operator of the error, the erroneous instruction is erased from the program, after which the Compiler continues to check for further errors. One test run may therefore often suffice to find all syntactical errors in a program.

Compilation time is exceptionally fast: from 4 to 180 seconds per program. The Compiler occupies about 6000 words of the secondary store, according to mode of use; a special transient edition for compilation of very large programs, however, is available. This two-phase version occupies only 2680 words of the drum store, the second phase being read in from paper tape during compilation.

The new, forthcoming version of the GIER ALGOL Compiler, GIER ALGOL IV, is expected to include certain extensions of the ALGOL language and facilities for handling magnetic tape and using disk files.

Not only does the GIER ALGOL Compiler facilitate the writing of programs, but within the abundant storage space provided by the Disk File and with the specially adapted service routines furnished by the GIER System Library, up-dating of programs can be carried out without recourse to paper tape. Programs can accordingly be compiled from any specified area of the Disk File, while compiled programs can be stored in other selected areas ready for use, so that paper tape copies of such programs are only needed for documentation and similar purposes.

Attention is called to the table entitled Selected Execution Times in GIER ALGOL, which appears on a separate Specification.

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