Programming
Languages
for the
Commodore 64

gooCom

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Speaker Bio

- a.k.a. "Cenbe"
- collector of programming languages and operating systems for the Commodore 64
- GEOS user (continuously!) since 1987
- several released GEOS applications including geoLink, geoSnap, ulecSwitch, geoGopher
- author of the infamous "Shadow Virus"
- Commodore 64 pages at lyonlabs.org

geoCom (a BASIC compiler for GEOS)

There were few high-level languages for GEOS:

- a couple of Forth interpreters
- BeckerBasic (kind of strange…)
- geoBasic (Danger, Will Robinson!)

Imagine if there had been something like
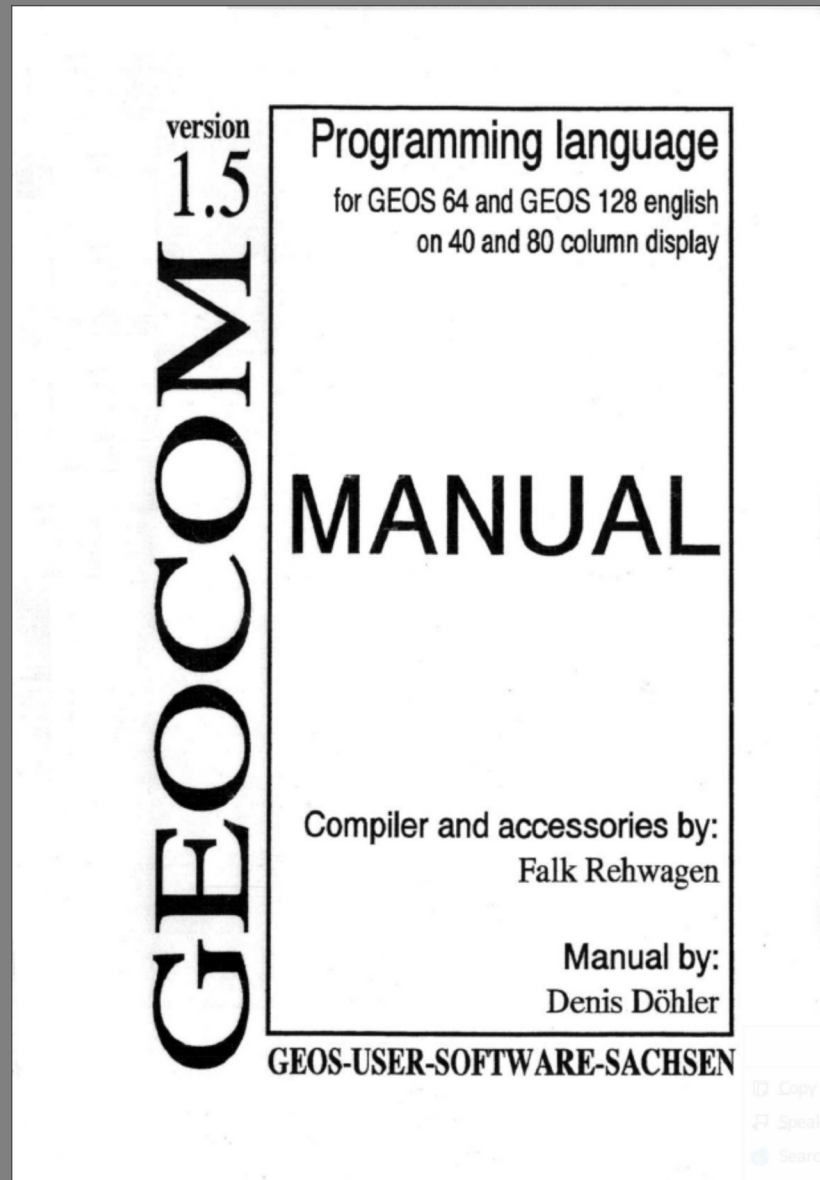Visual Basic for GEOS…

the geoCom saga

- demo version was always easy to find, complete version not so much (it was a commercial product)
- original version was in German, later released in English
- found the complete version, but what about the docs?
- Thanks, Bo!

the geoCom docs

CATS: ALL YOUR BASE ARE BELONG TO US.

no, wait… *these* are the geoCom docs

version 1.5

Programming language
for GEOS 64 and GEOS 128 english
on 40 and 80 column display

GEOCOM

MANUAL

Compiler and accessories by:
Falk Rehwagen

Manual by:
Denis Döhler

GEOS-USER-SOFTWARE-SACHSEN

program organization

At the beginning of a program, some commands must be grouped together:
- definition section (program name, permanent name string, author)
- declaration section (variable declarations, label definitions, object references)
- command section (code)

Sound familiar?

```
000100    IDENTIFICATION DIVISION.
000200    PROGRAM-ID. RELIO.
000300    AUTHOR. CENBE.
000400    INSTALLATION. LYONLABS.
000500    DATE-WRITTEN. SEPTEMBER 2018.
000600    SECURITY. NONE.
000700
000800    ENVIRONMENT DIVISION.
000900    CONFIGURATION SECTION.
001000    SOURCE-COMPUTER. C64.
001100    OBJECT-COMPUTER. C64.
001200
001300    INPUT-OUTPUT SECTION.
001400    FILE-CONTROL.
001500        SELECT RELFILE ASSIGN DISK-15
41 DRIVE-8
001600        ORGANIZATION RELATIVE
001700        ACCESS RANDOM
001800        RELATIVE KEY IS RKEY
001900        FILE STATUS IS FS.
002000
002100    DATA DIVISION.
```

language characteristics

- no line numbers, backquote is comment
- keywords in upper-case, variables lower-case
- must declare variables and labels
- subroutines: no parameter passing/return, no local variables, just GOSUB
- REPEAT...UNTIL, WHILE...DO...LOOP (but no FOR...NEXT)
- limited support for assembly-language modules

syntax idiosyncrasies

- expressions must be in parentheses,
  e.g. `d6=(65520/6)`
- arrays: `ROW 6 INTVAR i`
  6-element int array: `(i<0>)` to `(i<5>)`
- strings (null-terminated) are declared with
  their maximum length:
  `STRVAR 64; status`
- printing (proportional fonts) can include style
  escapes:
  `PRINT "/BSelect race:/P"`

tooling

- source code entered in geoWrite
- "Object Editor" is used to create menus, dialog boxes, fonts, arrays of constants, &c. (but no way to preview or print summary)
- DA to switch to compiler or object editor directly without exiting to the deskTop
- *note: compiler does not work with uIEC!*
- no debugger or xref, but the compiler does produce an error listing…

sample compile error

```
Error #1:
 Text: cnc_com        Page: 4
 Commands: 9          Chars: 206
 Error $08:  Syntax unknown
 Hint:   integer
```

To find the error, count BASIC command words from the top of the page, not including labels.

Object Editor

Positions: X1: [0] ⬍   Y1: [0] ⬍
                 X2: [48] ⬍   Y2: [14] ⬍

Display: [horizontal] ⬍   **Limitation:** [not limited] ⬍

Number menu items: [2] ⬍

Current menu item: [0] ⬍

Text of menu item:

["geos"]

Type of action: [submenu] ⬍

Call up routine/menu: [geos_menu]

menu   Name: [main_menu]   3 of 5 ⬍

GEOS support

- most GEOS APIs supported with keywords
- `CALL` and `CALLSYS` to call APIs directly
- many GEOS variables exposed, although some require an include file
- `ADR` and `VAR AT` for "peek/poke"
- supports VLIR programs, VLIR file handling
- supports processes
- support for graphics printing

memory map

runtime:	$0400-$2800	(9K)
code:	$2800-$4000	(6K)
constants:	$4000-$5000	(4K)
variables:	$5000-$6000	(4K)

Address ranges are configurable.

Background screen buffer at $6000 is used. ~14K available for compiled programs, but overlays can be used.

demo program memory usage

Please select option:

←	Other source file	🖉	Without text to geoWrite
🔒	Save program	🖹	With text to geoWrite
🔑	Run program	▢	Without object to ObjectEdit
▣	To deskTop	🖹	With object to ObjectEdit

Source: cnc_com   Page: 12   Cmds: 75   Errors: 0
Objectfile: cnc_obj   Mod.: 1   Obj.-code: *keiner*

Code area: $2800 – $3d1b   (max. $4000)
Constants area: $4000 – $4760   (max. $5000)
Variables area: $5000 – $54fd   (max. $6000)