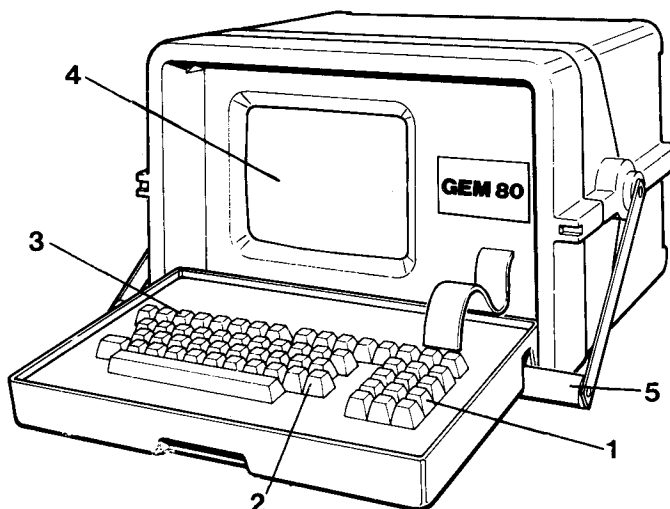


8920 Portable Programmer

1. Numeric keys
2. Alphabetic keys
3. GEM 80 function keys
4. Video display
5. Carrying handle



DESCRIPTION

The 8920 portable programmer is available in English, French and German operating languages. It is designed for connection to GEM 80 controllers and systems including:-

- (1) GEM 80 ladder diagram language controllers
- (2) GEM 80 BASIC language controllers and 8847 programmable serial communications
- (3) GEM 80 video display systems

The unit includes facilities for programming and on-line monitoring. Hard copy print-out is available when a printer is connected. With a cassette recorder connected programs can be stored and recovered from cassette type.

This one unit is designed for use with any controller in the GEM 80 family.

FEATURES

- Low cost
- Conventional typewriter keyboard layout with moving keys
- Key operated switch protects against unauthorised modification
- Lightweight and robust
- It is easy to operate, with "on screen" prompts, audible alarm for incorrect keyboard operations and flexible editing commands
- Diagnosis for cassette faults and errors in communication to GEM 80 controllers
- Cassette tapes interchangeable between programming units

SPECIFICATION

Functions available for GEM 80 ladder diagram language processors, GEM 80 Basic processors and GEM 80 8847 Programmable serial communications	: entering and editing programs. : reading and writing to GEM 80 data tables. : monitoring program and data tables. : entering processor commands (e.g. halt, run, clear, store, etc.) : hard copy print-out of program and GEM 80 data tables. : program and preset data can be loaded from or dumped onto audio cassette tape. : verification of cassette tape.
Function available for GEM 80 video processors	: entering and editing format programs. : video programs can be loaded from, or dumped onto audio cassette tape. : verification of cassette tape. : formats can be output to a printer (at 300 bit/s only) from the video termination panel. This function is controlled by the user through the portable programmer.
Keyboards	: conventional typewriter layout alphabetic keyboard. : separate numeric keyboard. : GEM 80 function keyboard.
Video display	: monochrome video display. : screen size 9" nominal. : displays up to 80 characters per line and 24 lines per screen. : multiple formats for operator guidance and mode selection. : display of program. : display of data tables.
Operator aids	: "on screen" prompts. : audible alarm for incorrect key operation. : flexible editing commands. : for fast programming many programmer functions require only single key commands, e.g. T - for terminate H - for halt R - for run, etc.
Cassette tape recorder times	: Program recording time 21 seconds plus 3 minutes per 1000 instruction or 3.6 seconds per block of 20 preset data table locations for ladder diagram controllers. : 45 sec. per 1k byte of BASIC language program.

Stand alone operations : the only operation allowed in stand alone mode is tape verification for ladder diagram and video format programs. Tape verification for BASIC is not possible in stand alone mode.

Operations in monitor only mode : monitoring.
: ladder diagram program dump.
: write to reserved data tables only.

Note: In monitor only mode it is not possible to alter the program.

Power supply : 103 to 126V or 206 to 252V.
: 50 or 60 Hz +2%.
: 60W maximum.

Temperature : 0 to 40°C operating.
: -20 to 70°C storage.

Humidity : 10 to 90% non-condensing.

Dimensions : 480 x 290 x 345mm.

Weight : 12kg.

REQUIREMENTS FOR CASSETTE TAPE RECORDERS FOR USE WITH PORTABLE PROGRAMMER

Full details of cassette tape recorders for use with GEM 80 are given in "Cassette Recorders" Application Note.

The essential points are:-

- (1) The recorder must be of a type intended for audio use and designed to accept standard audio low noise ferro cassette tapes.
- (2) The recorder must have record, playback, fast forward and fast rewind controls and should also have automatic recording level, for ease of operation.
- (3) The recorder must have sockets for plugging in leads for input and output. These may be 3 or 5 pin 180 degree DIN sockets or they may be earphone output and microphone input jack sockets.
- (4) The external input must be suitable for accepting a signal from GEM 80 system of 100mV peak to peak nominal. The external output must be capable of providing a signal of between 50mV and 1V peak to peak.

REQUIREMENTS FOR PRINTERS FOR USE WITH PORTABLE PROGRAMMERS

Full details of Printers for use with GEM 80 is given in "Printers" Application Note. The essential points are:-

- (1) That the printer should be able to accept a 20mA current loop serial input.
- (2) The printer must be able to accept ASCII character codes.
- (3) The printer must be able to receive signals transmitted at one of the following rates 110, 300, 600 and 1200 bit/s.

NOTE: 300 bit/s only for video program printout.

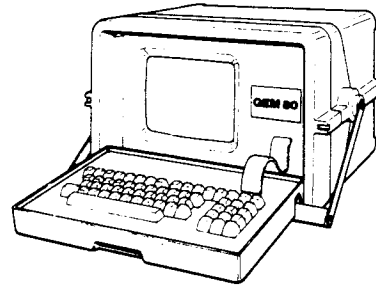
- (4) The 8920 portable programmer is designed to accept handshake signals.
- (5) The printer must be able to accept characters sent as 11 bits, each comprising 1 start bit, 7 code bits in ASCII, 1 even parity bit and 2 stop bits.
- (6) The line length of the printer must be at least 80 characters.
- (7) The 8920 portable programmer is fitted with a 25-way D connector with sockets. So the lead from the printer requires a 25-way D connector with pins (such as ITT Cannon DA25P with shell DA110963-5) for connection at the programmer.

APPLICATION NOTES

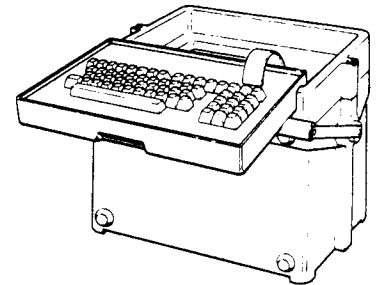
1. OPERATING POSITIONS

Fig. 2 shows the three positions of the operator keyboard for:

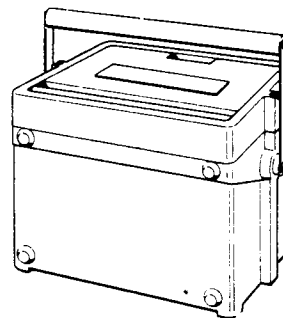
- (a) Table top operation
- (b) Operation standing on floor
- (c) Protection in storage and transport



(a)



(b)



(c)

Figure 1 - Keyboard positions

2. KEYBOARD

For ease of operation the keyboard is divided into three sections:

- (a) Standard alphabetic keyboard including special characters, e.g. @ ? SPACE BAR etc.
- (b) Number pad including digits 0 to 9, minus and decimal point.
- (c) GEM 80 function keys as shown at Figure 2 with alternative characters for use in text mode and programming video formats.



Figure 2 - GEM 80 Function Keys

The alpha-numeric keys are used for selecting the modes of operation of the programming unit (e.g. edit, monitor, print, dump, etc.) and for entering values and data table locations. The special character and GEM 80 function keys are used for constructing program rungs.

3. CRT DISPLAY

The CRT displays valid keyboard entries as they are made. The display also provides a facility for I/O monitoring and forcing. In addition, operator directives, diagnostics and GEM 80 controller status are displayed.

4. PROGRAM ENTRY

The user control program consists of a series of ladder rungs and a table of preset data.

Each element of a ladder rung is entered by pressing the appropriate GEM 80 function key and the alpha-numeric keys for the table location or value. As each valid element is entered, it is added to the displayed rung. A marker on the display indicates where the next entry is to be made. A rung may have up to five parallel branches each of up to nine series elements, plus one output element (one rung is displayed on each screen).

A rung may be inserted or deleted anywhere in the control program within a few seconds. Previously entered rungs may be located and displayed using powerful search commands. Elements of a displayed rung may be deleted or extra elements added without having to reprogram the whole rung.

User program data, e.g. constants for timers, counters, process control functions, etc., may be entered in the preset data table, which can also be used for text messages for print-out.

5. PROGRAMMING EXAMPLE

The relay ladder circuit shown at Figure 3 is to be programmed as the equivalent rung in GEM 80 control language.

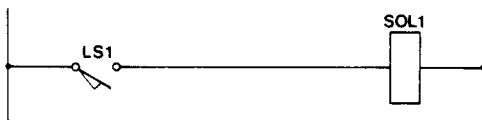


Figure 3 - Relay Circuit Diagram

Let the limit switch contact LS1 be connected to input terminal A2.8 and solenoid coil SOL1 to output terminal B1.13.

Having selected the programming unit into the rung entry mode with a blank rung on the screen, the sequence of key operations will be as follows:-

(a) Press



to enter contact LS1 onto screen.

(b) Press



to enter SOL1 onto screen.

(c) Press  to escape from rung entry mode

(d) Press  to insert displayed rung

into the memory of the GEM 80 controller.

Figure 4 shows the corresponding program rung as it will appear on the CRT screen.

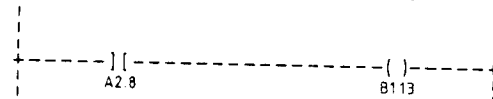


Figure 4 - Display of Program Rung

6. MONITORING AND TROUBLESHOOTING

Any rung may be displayed for monitoring. The state of a contact or coil is indicated symbolically; a data table value is indicated numerically. An alternative tabular display is available for monitoring up to 32 data table locations at the same time, allowing simultaneous observation of up to 512 I/O points.

Step-by-step program verification is facilitated by displaying contacts, coils, timers, counters, etc., and forcing them to test values.

To aid monitoring and troubleshooting the user can issue commands through the programming unit to control the execution of the program in the GEM 80 controller, e.g. HALT, RUN, SINGLE CYCLE, TEST INPUTS, NORMAL INPUTS.

If the programming unit is selected to the monitoring mode the contact and coil states will be displayed as shown at Figure 5.

..] |.. contact open
 --] |-- contact closed
 ..().. coil de-energised
 --()-- coil energised

Figure 5 - Symbols displayed in monitor mode

The full screen display for a typical program rung is shown at Figure 7.

7. PERIPHERAL DEVICES

Standard circuitry is provided within the programming unit to interface it to a cassette tape recorder and printer (or TTY).

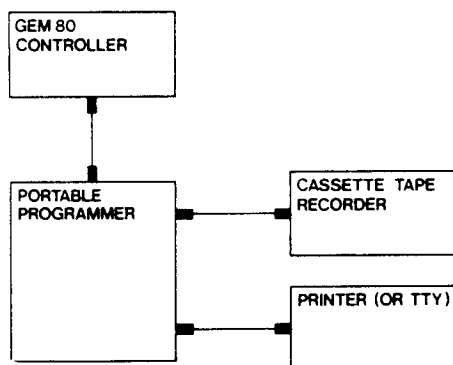


Figure 6 - Connection of Peripheral Devices

8. GEM 80 VIDEO DISPLAY FORMAT

The portable programmer includes an option for operation as a terminal for programming in languages other than the ladder diagram format. For GEM 80 controllers with video output, this provides an interactive facility for programming and editing video formats. It also provides compatibility with future GEM 80 processors which exploit different programming languages.

The same cassette load/dump facilities are used for video format programs as for ladder diagram programs, the video program is equivalent to a control program with no instructions and a large preset data table.

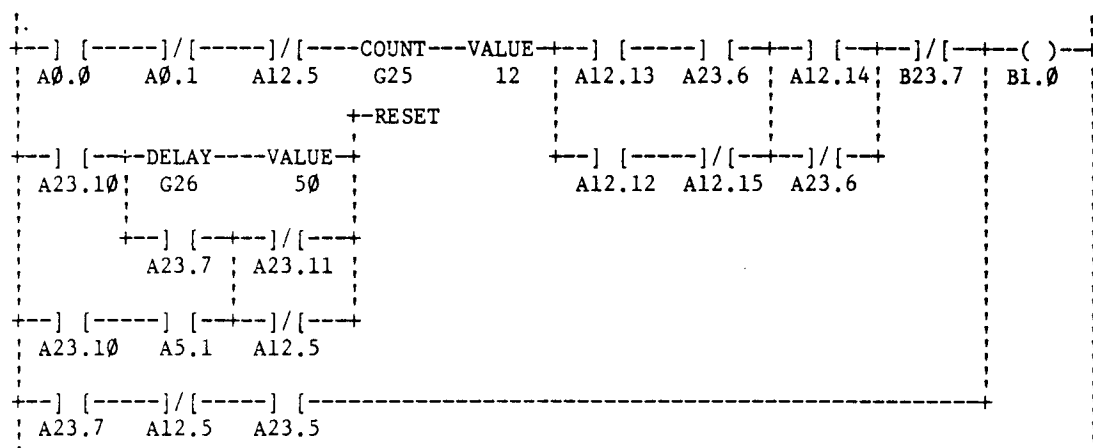
9. FOREIGN LANGUAGES

Potential users of foreign language editions should note the following points:

- (a) Keytop engravings are not translated. The keytops, VDU display and print-out all use the standard function designations SPEC, BLOCK, ADD, SUB, AND, VALUE, OUT, COUNT, DELAY, DEQR., LINK, JOIN, CR, LF, RUBOUT. Other display and print-out designations which will not be translated are RESET, INV., OR, XOR, OBEY. Similarly, the special function mnemonics will be in English.

INSTRUCTIONS END AT 586

DISPLAYED RUNG STORED AS INSTRUCTIONS 25 to 62



COMMAND LEVEL - OPTIONS: S, F, L, N, E, B, D, I, R, C, M, W, T?.

GEM 80 STATUS - RUNNING - NORMAL INPUTS.

[]

Figure 7 - An Example of a Portable Programmer Screen with a Rung of Ladder Diagram Program Displayed

(b) The prompt messages which appear on the programmer screen WITHIN general edit mode (option 7) originate in the processor to which the programmer is connected, i.e. video, BASIC or COMMUNE processor. These will continue to appear in English, because a foreign language would require a different version of the controller software. Thus the prompts which are used for tape load/dump of BASIC and COMMUNE will be in English, and all those associated with actual programming of video formats, logging videos, and BASIC language.

(c) No special characters are available for alphabet differences such as accents.

10. SOFTWARE VERSIONS

On power up display announces it is a portable GEM 80 programmer - version 4.5 for example. The version number refers to the issue of the EPROM's within the unit. All programmers are shipped with the latest software. Earlier versions can be updated on request. Contact GEC for details.

The significant differences are:

version 1 - original issue.

version 2 - additional facilities for programming of GEM 80 video.

version 3 - improved text handling and printout option

version 4 - additional facilities for programming BASIC language or COMMUNE (i.e. programmable serial communications 8847).

version 4.5- additional facilities for use with GEM 80/250 series.

ORDERING CODES

1. Equipment

Portable programmer type 8920 is supplied with:-

- 1 - a.c. supply lead (length 2m).
- 1 - lead complete with connector for plugging into front panel of GEM 80 module (length 3m).
- 2 - keys for enabling program entry/edit.

Language	Mains frequency	Order code
ENGLISH	50 Hz	8920-4001
ENGLISH	60 Hz	8920-4002
FRENCH	50 Hz	8920-4101
FRENCH	60 Hz	8920-4102
GERMAN	50 Hz	8920-4201
GERMAN	60 Hz	8920-4202

All the above units are user selectable for 110V a.c. or 220V a.c. nominal mains supply.

2. Spares

a.c. supply lead (length 2m)	78801/200
lead complete with connector for plugging into front panel of GEM 80 module (length 3m)	40Y3551/01

Note The Company's policy is one of continuous development and improvement and therefore the right is reserved to supply products which may differ in detail from those described and illustrated in this publication. All our products and materials are sold subject to Conditions of Sale available from us on request

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T208 Issue 3 1183

ID0058G/00002G

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Printed in England

