GIER SYSTEM LIBRARY Order no. 18

0.3 Organization

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Operators Instructions for GIER

ABSTRACT: The report includes an instruction for operators concerning GIER STANDARD: Centralunit, power supply, typewriter, paper tape punch. Further more, production and loading testprograms and tapes of HELP is described.

Description of Central Processor

Cabinet

The front of the Central Processor has three sliding panels made of teak which can be opened when the lock situated at the middle of the base is unlocked. The panel in the middle can be pressed in and slid to the left, whereupon a control panel comes into view. Frame B, which comprises six sections of printed circuit cards, is situated underneath the control panel behind a removable cover. The ferrite core store is located behind the control panel, and at the very bottom, behind an air duct, the drum can be found.

When the panel in the middle is held in, the panels on either side can be slid past it. In the left-hand part of the cabinet, behind removable covers, two frames of printed circuit cards are housed: the one above is called Frame A and the one below Frame C.

The right-hand side of the cabinet contains the power supply with the switch board as the only readily accessible part.

The left-hand side door gives access to the control unit containing the microprograms in the form of ferrite cores with laquer insulated windings.

Side and rear doors should only be opened during maintenance. These doors are made entirely of metal, and each is equipped with snap locks.

The cabinet can either be placed directly upon the floor, in which case it stands on four piano wheels (cooling by air from the room), or raised on a base, which is approximately 10 cm. high and stained black (cooling by air from cavity floor).

At the bottom of the cabinet five ventilators are located, which send approximately 1000 m^3 of air/hour through dust filters up through the printed circuit card sections and the power supply to cool the components.

The filters can be easily removed for cleaning and replacement. When GIER is installed the computer supervisor will receive instructions concerning filter inspection.

Temperature Controle

There is built-in temperature controle to prevent damage to components due to failure in cooling. Temperature gauges are located above Frame A, Frame B, and the power supply.

If the surrounding air at any one of these locations rises to a temperature of 34°-36° C, the power to the computer is disconnected without warning, and GIER cannot be started again until the temperature has fallen to permissible limits. (See description of the power supply). Thermometers are situated near the temperature gauges at the top of the cabinet and in the air duct underneath Frame C for the benefit of the operator.

Composition of the Frame

The printed circuit cards containing the registers and logical circuits of the computer are located in three frames, which, as mentioned above, are called Frame A, B, and C. Frame A is situated at the top of the left-hand part of the cabinet, Frame C under A, and Frame B in the middle of the cabinet. Each Frame consists of six sections of cards, each section having a capacity of 25 cards. Each section is numbered from the top down from 1 to 6 within a frame, so that Frame A consists of Section A1 to A6, Frame B of B1 to B6, and Frame C of C1 to C6.

In Frame A and C the circuit card position are numbered from 1 to 25 from left to right. In Frame B, the card positions are numbered 26 to 50 (also from left to right). Thus each of the 450 card positions has an identifier that unequivocally determines its place in a coordinate system.

Example: C5-21 accordingly is position 21 from the left in the next-to-the-bottom row in the left-hand part of the cabinet.

The Control Panel

The control panel contains the following (from left to right):

1. A switch which in the one position inhibits writing on drum tracks 0-31, while in the other permits writing on tracks 1-31; in this position one can input 'HELP Locked Tracks' or 'HP-Oriented ALGOL'.
2. A switch and a red indicator. The former is employed for suppression of the automatic drum parity check, while illumination of the red light indicates when the parity check has been suppressed. The parity check should normally only be suppressed for drum proving.
3. A push-button marked 'Microstop'. Depressing this buttom causes GIER to stop after completion of the current micro-instruction. The buttom should only be used during trouble-shooting.
4. On the right-hand side of the panel is a switch that should be in the 'Normal' position while the computer is running. The other five positions are for built-in test programs and are only employed during trouble-shooting.

Auxiliary Switches

In addition to the push-buttons and switches located on the display panels and control panel, switches are situated in various places directly on the printed circuit cards, and are only used occasionally. Their use is described below.

1. Inhibit of Track 0 C5-21
   An extra built-in inhibit device in the form of a switch which is placed at card position C5-21 to prevent corruption of the permanent contents of track 0. Track 0 can only be overwritten when this switch is in its lower position.
   Normal position: up.
2. Representation of 'Floating Point Zero' C2-21
   As described in A Manual of GIER Programming, Volume 1, page 21, GIER operates with two differing forms of zero in floating point mode. One can choose between these two forms with the switch at card position C2-21. The ALGOL compiler presupposes that this switch is in its upper position, corresponding to the form where both mantissa and exponent must be zero for the floating number to be understood as zero.
   Normal position: up.
3. Inhibit advancement of Control Counter r1 A4-3
   This switch is only of interest during trouble-shooting. Its purpose is to prevent advancing the Control counter, i.e. GIER is made to cycle in one and the same instruction cell.
   Normal position: down.

Power Supply

The power-supply-switch board contains the following indicators and push-buttons:

1 hour counter, which only function when the computer is turned on
1 indicator for the mains voltage
1 indicator for the drum
1 indicator for direction of drum rotation
1 indicator for low-voltage power to the computer
1 indicator for faults (FEJL)
1 voltmeter calibrated in percentages
1 voltage selector with 12 positions
1 voltage selector with 3 positions
1 low-voltage circuit breaker switch
1 push-button marked RESET
1 start-stop switch with key
10 buttons for fine adjustment of voltages

Starting the Computer

The computer is turned on by connecting all the relevant switches on the mains switch board. Normally there are separate switches for the cooling equipment and associated ventilators. The key on the power supply switch board is then turned clockwise. The following now takes place automatically:

As the key is turned the mains are connected to the power supply unit, the console and the fans situated at the base of the main cabinet. All three phases are automatically checked. After approx. 20 seconds (first warm-up period) a control relay is activated, if all regulated voltages are present, and after one additional second (second warm-up period) the low-voltage power is connected to the Central Processor and the circuitry in the display panels. (1-2 seconds later) another relay is activated which connects three delayed voltages, after which the computer is ready to run.

Turning Off the Computer

The computer is shut off by turning the key on the power supply switch board counter-clockwise. The low-voltage power is hereby disconnected first, and a few seconds later the mains are disconnected from the power supply, fans, and console. If one leaves the computer, one must disconnect the mains at the mains-switch board, since there is power in various check circuits as long as the mains are connected.

Drumcontrol

GIER is equiped with an internal current excesss cut out. (for GIER series I, II and III this unit is externally placed.) Power supply to the drummotor is not disconnected by turning the key on the power supply switch board. The drum should run continuosly to prevent warning up errors. As an appendix to this instruction the operation and principles for the drumcontrol are described in GIER SYSTEM LIBRARY.

Low Voltage Checking

The low voltage must be checked by the operator every day with the aid of the voltmeter and the two voltage selectors. Each of the 11 voltages can be connected to the voltmeter with the 12 position selector (the twelfth position being a dummy). In the one outer position of the 3-position selector the voltage are checked after the relay, i.e. directly on the consumption side, and in the other outer position the voltage before the relay are checked. The voltage here should be independent of connection or disconnection of the low voltage power to the computer. Every voltage must be checked before and after the relay, and there should be no deviation in voltmeter deflection. A power drop across the relays can easily give rise to erroreous calculations. The relays must not be cleaned by unqualified persons. The voltages should not vary more than $\pm$ 1/4 percent while running operationally.

Voltage Adjustment

One of the voltages, -16 Volts, can not be regulated, but should not vary more than ± 10 percent. The other voltages can be regulated by the ten fine-adjustmentbuttons marked with respective voltages. The absolute value of the voltage increases or decreases when the appropriate button is turned respectively to the right or to the left.

All the voltages tend to drift slightly after the computer has been turned on, but after about fifteen minutes the components are fully warmed up and the drift should have ceased. Complete adjustment to 100 percent of nominal values should now be made before operational running with the computer.

Low Voltage Power to the Computer

The circuit-breaker normally should be in the down position. If this is not the case the automatic start is discontinual between the first and the second warm-up periods. The circuit-breaker should only be used during troubleshooting and voltage checking.

The FAULT Indicator and RESET Button

('FEJL' means fault)

The FAULT lamp is illuminated whenever the automatic voltage or temperature control circuits disconnect the low voltage power to the computer. The voltage control circuit acts when one or more of the regulated voltages is abnormally high or low (about 10-15 percent), if a low voltage fuse burns out, or if the overload breaker is activated. The temperature control circuits act when the temperature at the top of the main cabinet rises to 34-36° C.

Whenever the FAULT lamps become illuminated the operator should always check temperature and voltages (before the relay) in order to determine the reason for this. If the temperature is too high the low voltage power cannot be reconnected to the computer before the main cabinet is sufficiently cooled. Depressing the RESET button will release this blockage and turn off the FAULT lamp, but if the fault has not been remedied, the FAULT lamp will be relit after a few seconds without connection of low voltage power to the computer.

If the voltages before the relay are abnormal, the percentage variation in each voltage should be read and noted, and an attempt can be made be depressing RESET (which turns off the FAULT lamp). If the low voltage power to the computer still cannot be connected, the FAULT lamp will be relit, and a Fault Report is called for. Note: the RESET button only has effect when the FAULT lamp is lit.

An indicator marked SF is situated on the main display panel in the FEJL group. SF stands for power supply fault, but the purpose of this indicator is described in the chapter on the display panels, refer to 'A Manual of GIER Programming Volume II', page 38 ff.

INPUT/OUTPUT TYPEWRITER

Refer also to A Manual of GIER Programming, Vol. II, p. 17 ff.

Input

The typewriter is selected as input device when by 7, 8, 9 is equal to 0, 0, 1. A subsequent LY instruction causes the green lamp on the typewriter to be lit and places the computer in a microprogram loop. The execution of the LY instruction is completed as soon as one of the keys on the typewriter keyboard is depressed and the bit combination associated with the key is read into the address position of R and to the cell, the address of which is contained in the final address of the LY instruction. Note that the value for Upper Case are read in when the UC key is depressed, and the value for Lower Case are read in when this key is released. The green lamp goes out when the computer has read the character. If the next LY instruction follows immediately, there will not however be time for the green lamp to go out. While depressing of Normal Stop has no apparent effect when computer has been placed in a microprogram loop during the execution of the LY instruction, this activation of Normal Stop is stored so that the computer nevertheless stops immediately before the next instruction as soon as the execution of the LY instruction has been completed.

Output

The typewriter is selected as output device primarily when by: 5 is equal to one. This selection may be altered using the buttons on the Auxiliary Display Panel (refer to Manual of GIER Programming, Vol. II, page 20 ff).

Output on the typewriter takes place at the rate of about 12 characters/second, although case-shifting, carriage return, and tabulating operate somewhat slower than the ordinary type-arms.

The final address of the SY instruction is placed in bs which controls the decoding of the various typewriter operations, of which there are 51.

SY instructions with address-values not corresponding to any typewriter-function are executed with the speed of approx. 25 per second.

When the SY instruction has placed its final address in bs-reg., the computer goes on to the next instruction. The number will remain in bs while output is taking place and the computer cannot alter the contents of bs with a new SY instruction before the foregoing instruction has been completed by the typewriter

Mechanical Operations

Each type-arm and typographical operation device is connected to an electro-magnet activated by impulses from the computer. The anchor of the electro-magnet sets a cam in mesh with a power roll, after which motor power completes the execution of the purely mechanical operation. Each operating device has a set of contacts connected to the Ready Signal circuits in the computer. If the Ready Signal contact is not closed at the completion of a mechanical operation, the computer cannot execute the next SY instruction.

Using the Typewriter

Refer to the figure on page 13

Inserting Paper: When the paper is put down between the rubber platen and the metal paper table (25), the platen knob (24) should be turned until the paper comes out on the front side of the platen. The paper release lever (20) should now be operated so that the paper may be placed in the correct position. The platen may be adjusted to correspond to the number of sheets of paper needed with the multiple copy control (17). Position A corresponds to the thickness of one sheet.

Adjusting the Margin: The margin may be adjusted by sliding the carriage as far as possible to the side where the margin is to be changed by using the right carriage release lever (16). When the carriage is in this position, the margin set key (3) is depressed, and while holding both the key and the carriage release lever down, the carriage is slid to the desired location, whereupon the margin can now be set by simply releasing the key and lever. The margin may be annulled by depressing the margin release (4).

Spacing Between Lines: The line space lever (18) has three fixed positions. When the variable line spacer (15) is depressed, the platen is released from the ratchet and may thereby be set in any position desired between the fixed line positions.

Tabulators: the tabulator set and clear keys (6 and 7) are used respectively for setting and clearing the tabulator stop. Complete clearing of tabulator stops is done as follows: the carriage release lever (16) is operated and the carriage is slid all the way to the left, after which the clear key (7) is held down while the carriage return (8) is operated.

Impression Ligibility: The impression attenuator (2) on the LH side regulates the strength of the printed impression. To prevent unnecessary wear and tear on both the ribbon and the movable parts of the typewriter, the attenuator should not be set for a stronger impression than required for legible writing. Normally positions 4-6.

Disconnecting Power Supply: A switch for the motor is situated underneath the keyboard on the RH side, which normally should only be operated for maintenance purposes.

Cleaning: The types should be cleaned frequently using the typewax found in the operator kit. A stiff brush, possibly soaked with petrol, may be used for more thorough cleaning.

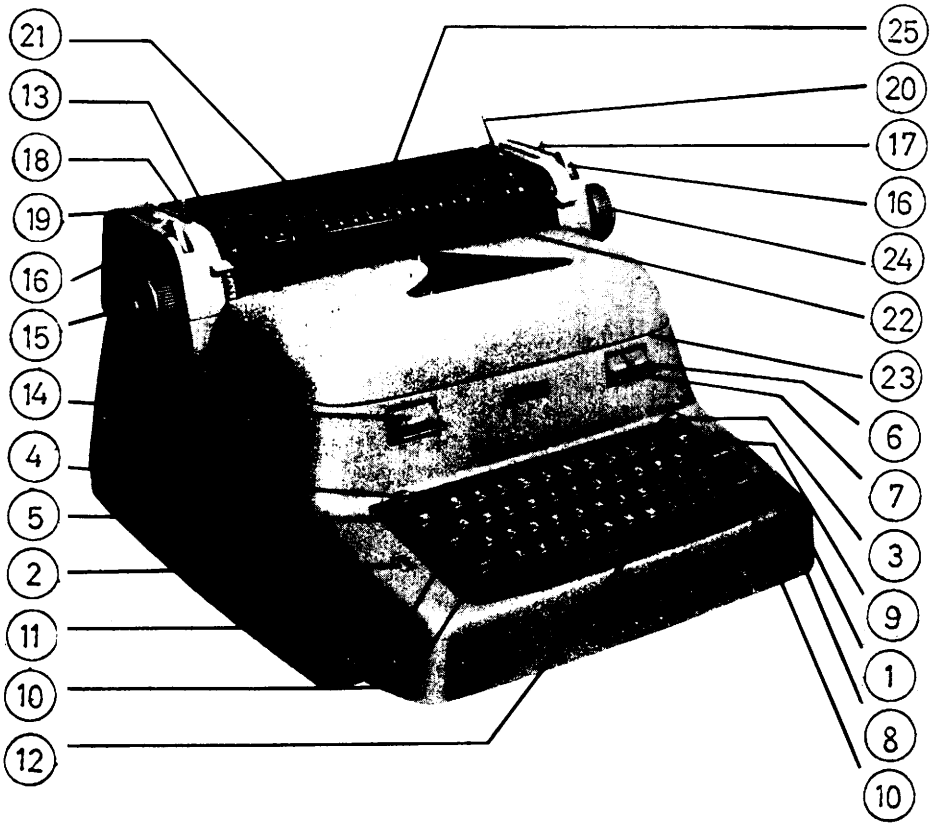
Dust Protection: When not in use, the typewriter should be protected from dust by accompanying plastic cover.

Proving: Proving of output may be easily accomplished by inserting and executing a few simple instructions, e.g. SY t 1, HV r-1.
Test program B9 is employed for proving input.

Fault Reports: If the installation is covered either by a guarantee or a subscription for servicing by Regnecentralen, faults should be reported to RC GIER Service. The technicians from Regnecentralen will make out the fault reports which should be available in the computer room. If necessary, RC GIER Service will require specially trained technicians from the typewriter supplier, in which case the computer supervisor should make out a report and forward it to RC GIER Service. The low voltage power to the computer must be disconnected when the lid of the typewriter is removed.

Typewriter ribbons and their replacement are not included in the guarantee and service contract.

1. Electric switch
2. Impression indicator
3. Margin set key
4. Margin release
5. Tabular key
6. Tabular set key
7. Tabular clear key
8. Carriage return
9. Back spacer
10-11. Right/left shift key
12. Space bar
13. Paper guide
14. 4 position ribbon control
15. Variable line spacer
16. Right carriage release lever
17. Multiple copy control
18. Line space lever
19. Line position reset
20. Paper release lever
21. Copy guide
22. Paper bail
23. Hinged top cover
24. Platen knob
25. Paper table



PAPER TAPE PUNCH

Refer also to A Manual of GIER Programming, Vol. II, p. 13 ff.

The tape punch is selected as output device primarily when by:4 is equal to one. Selection can be altered by using the buttons on the Auxiliary Display Panel.

Effect of an Output Instruction: The final address of the SY instruction is placed in bs which through amplifiers controls the punch knives:

by reg. pos	3	4	5		6	7	8	9
				P				
Paper Tape	0	0	0	0	0	0	0	0
Track Number	8	7	6	5	4	3	2	1
Track Designation	El	X	0	ch	8	4	2	1

Parity: Track number 5, the parity track, is punched automatically by a built-in parity circuit, P, so that the number of holes for a character is always odd. The computer cannot accordingly be programmed to produce either 'all holes' or 'blank tape'.

Blank Tape: When the toggle switch on the punch is operated the tape will appear with only the sprochet holes punched. This switch, when activated, will block all output equipments, so it should only be used when there is no output in progress.

Punching Speed: The paper tape punches tape at the maximum rate of 150 characters/second.

Paper Width: The punch accepts three different paper widths. Refer to the specifications on page 20. Permissible variation for each standard width: $^{+0.00}_{-0.05}$ mm.

Paper Thickness: The punch accepts a paper thickness of from 0.08 to 0.12 mm. It is however impossible to change from one thickness to another without alteration of intercharacter spacing. Lumps and knots in the paper normally give rise to operational difficulties.

ROLLS OF TAPE: A roll of paper tape with an outer diameter of 200 mm contains about 300 meters (1000 feet) of tape, which is wound around a 50 mm cardboard core. The white rolls of tape is colored red toward the end of the roll to warn the operator.

INSERTING ROLLS OF TAPE: A rotating hub, a brake arm, and three plastic rollers are included in the tape support assembly. The roll of tape is placed on the hub so that the loose end of the tape points counter-clockwise when viewed from the insertion side. The outer layers of paper are removed and the end of the tape is cut off in a semicircular fashion. The brake arm is lifted all the way up to a vertical position and the tape is inserted between the three rollers into the tape corridor. The end of the tape is fixed while the brake arm is lowered, thereby making a loop on the tape.

TAPE FEEDING: The punching unit and the tape feed unit are situated in the tape corridor. The latter, which is situated behind the former, can be flipped to one side to allow insertion of paper tapes. The two screws on the tape feed unit are used to adjust intercharacter spacing. The upper part of the tape feed arm, upon which a brake plate is mounted, can be seen in a square opening in the tape corridor just before the tape feed unit. Each time the tape is advanced one space forward, the brake plate is pressed against the paper by a pressure shoe, which is activated by one of the adjustment screws on the tape feed unit.

Between the punching unit and the brake plate is a square guide plate mounted by to unbraco screws. This plate and the tape corridor form a narrow slit for the paper tape.

PUNCHING UNIT: The punching unit should only be removed for repair by trained personnel. The operator, however, should occasionally check to see that the two thin oil pipes are held properly in place by their springs in the holes intended for the purpose at the top of the punching unit.

LUBRICATION: The oil reservoir should at all times be at least half full. A special oil, such as Mobiloil Vacouline 1409, which can be ordered from A/S Regnecentralen, GIER Service, should be used. The oil is intended to lubricate the moving parts in the punching unit and the contact surfaces on the brake plate and the pressure shoe. The three rollers on the tape holder should be given a drop of oil once a month.

LUBRICATION CHECK: The lubrication system should be checked regularly. Each time a roll of tape is changed, the contact surfaces on the brake plate and the pressure shoe should be looked at, there should be a thin film of oil present. While it is difficult to determine whether the punching unit is being lubricated properly, the operator can check to see whether there is any trace of oil on the tape just under the punching unit each time the punch has been idle for some hours. Should the tape be completely dry, even though the punch has not been used for several hours, then the lubrication system should be looked at before the punch is used again.

INTERCHARACTER SPACING: The distance between holes should be checked using the intercharacter spacing gauge supplied with the punch. Spacing should be 0.1 inch. ±1 percent, and should be independent whether 'tape feed' (sy 63) or 'blank tape' (toggle switch) is punched.

CHANGING TAPE: The computer should be stopped and the paper cut off at the loop. The toggle switch is operated so that the punch feeds the tape itself. When the tape stops moving it should be carefully withdrawn with the motor still running. The new roll of tape is inserted as described above, the tape feed unit is flipped to one side, and the tape is pushed in under the brake plate just behind the punching unit. The tape feed unit is snapped into position, the toggle switch is operated, and the punch feeds the tape out by itself. The tape is pulled downward thereby making on arrow-shaped incision, the front end of the tape corridor having two sharp edges.

NOTE The tape should never be pulled outward or upward since this may cause the tape to become stuck in the punching unit.

CLEANING Cleaning knifes, brushes, and petrol should be used for cleaning, in addition to a screwdriver and the 3mm unbraco key.

NOTE

Both cable plugs must be removed before cleaning.

The forwardmost arrow-shaped guide plate and the plate behind the punching unit should be removed. The tape corridor, brake plate and tape feed unit should be cleaned with petrol and carefully dried. No petrol should come in contact with the punching unit.

If there are bits of paper under the punching unit, they should be removed with the saw-toothed cleaning knife.

CHANGING TAPE WIDTH Two extra sets of guide plates are included with the punch as accessories to be used respectively for 5-channel tape (11/16'') and for 6/7 channel tapes (7/8''). At the very rear of the tape corridor is a block that can be positioned to act as a guide for the two above-mentioned tape widths.

The hub on the tape holder must also be changed. When the plastic button on the hub is pushed in, the hub can be moved axially. There are only two positions: one for 5-channel tape and one for 6/7/8-channel tapes.

PAPER OUT The brake arm activates a microswitch about 10° before it assumes its vertical position, thereby inhibiting both punching and tape feed, though the motor continues to run. This device is intended to prevent glue and cardboard from the tape core getting into the punching unit.

If the device has functioned the following should be done:

Normal Stop should be depressed and the tape cut off. The punch will now punch the next character and both the motor and the computer stops. The roll of tape is now changed as described above, and the computer is started again using Normal Start.

NOTE If RESET (micro stop) is used instead of Normal Stop, the punch motor will stop at once, but the tape will miss one character.

SERVICE Punches that are covered by Regnecentralen's guarantee and service subscription will be kept completely adjusted and in full repair by Regnecentralen's technical personnel. No form for adjustment or repair other than what is specified in this manual may be undertaken by other persons, unless appropriate special instructions have been given by GIER Service.

Repair of damage due to locking of lubrication and removal of glue and cardboard in the punching unit is not covered by the guarantee and service subscription, since such failures are ascribable to negligence on the part of the operator.

SPECIFICATIONS

2.1 THE TAPE

Type of tape: Paper, oiled paper, mylar, metallized mylar

Widths of tape: See Fig. 1

5-channel:	11/16 inch	17.5 mm
6-channel:	7/8 inch	22.2 mm
7-channel:	7/8 inch	22.2 mm
8-channel:	1 inch	25.4 mm

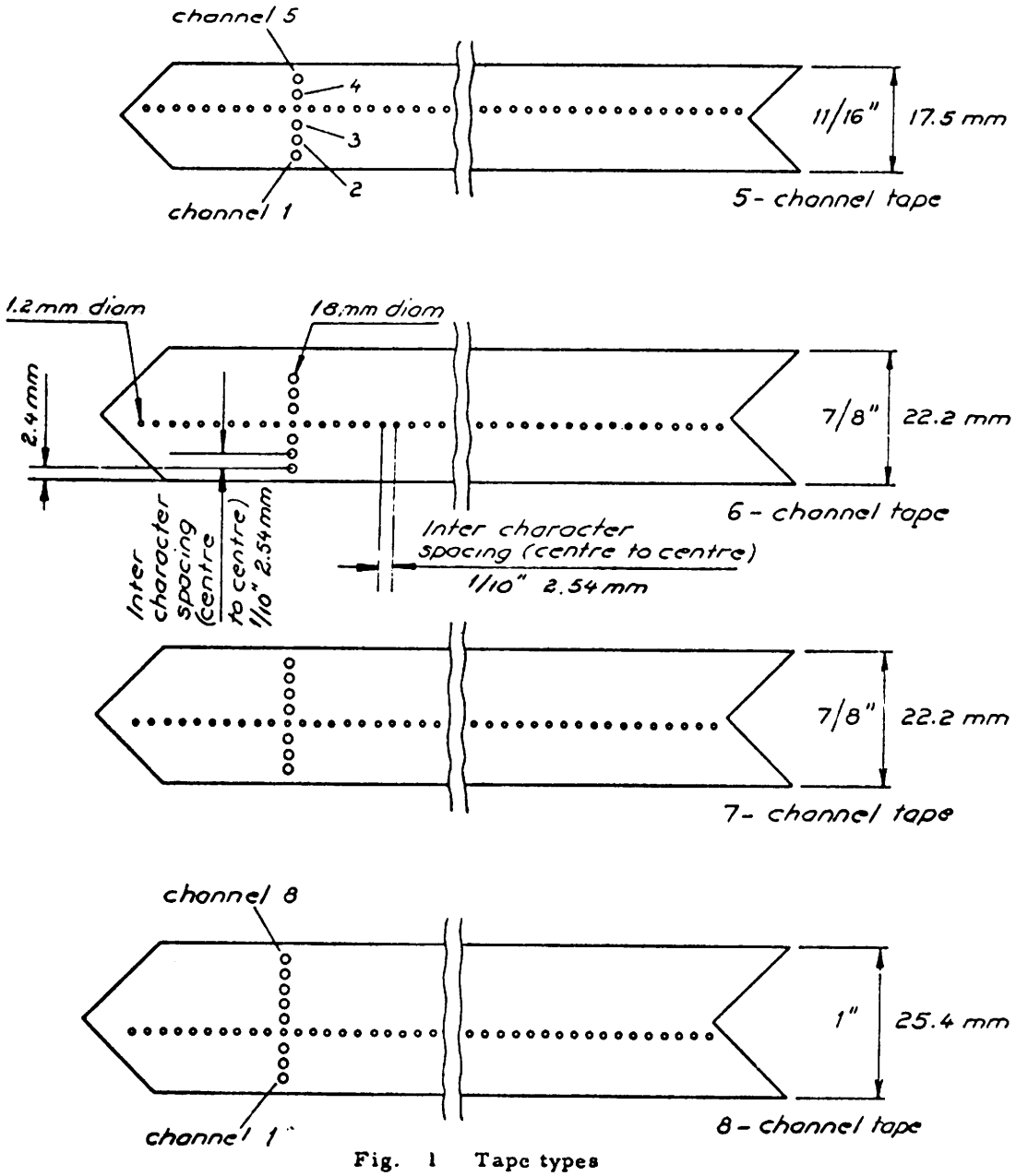


Fig. 1 Tape types

TEST PROGRAMS

Summary

B-Tape is loaded via track 0

A-Tape is loaded via HELP

A-B1	Drum test without flag bits
A-B2	Output of bit pattern
A-B3	Output of track 0 in bit pattern
A-B4	Core store test without flag bits
A-B5	Test of track 0 (with BY0 inhibit)
A-B6	Core store test with flag bits
A-B7	Test of floating point arithmetic
A-B8	Drum transfer time test
A-B9	Test of typewriter input/output
A-B10	Core store test with variables parameters
A-B11	Core store test with variables parameters
A-B12	Indicator test
A-B13	Drum test with flag bits

A 200	Program for punching of B-Tapes
A 201	Perforator test and reader test
A 202	Test of Buffer
A 203	Test of Buffer
A 204	Test of magnetic tape station
A 205	Test of magnetic tape station

Procedure for B-tape production

GIER SYSTEM LIBRARY provides a collection of test programs for proving and faults-diagnosis on GIER. All the programs will be available in SLIP code for input via the HELP system, and known as A-Tapes. A number of these programs, namely A1 to currently A13, can be prepared as B-Tapes, i.e. they can be punched in a condensed form for input by means of the loader on Track 0 (cells 34-39). The programs from A 200 onward are neither intended to nor can be punched as B-Tapes.

The following is required of a program in order for it to be punched as a B-tape:

1. The program must be stored between cell 41 and cell 1016 inclusive.
2. The A-Tape must begin with i = 41, and end with e 41 CR (carriage return), and
3. The instruction in cell 41 must be zq LKB.

When these requirements are met, a B-Tape can be punched as follows: The HP button depressed and KA,KB are set to 0,1. The A-Tape is placed in the reader, and l is typed on the typewriter, whereupon the tape is read in. Four numbers are now written on the typewriter by SLIP for the operator's orientation, the third of which indicates the address of the first cell following the program that has been read in. HELP makes entry to the loaded program, whereupon the computer stops in zq instruction in cell 41.

The paper tape punch is readied for output.

The HP button is pressed once more and the program for 'Punching of B-Tapes' is placed in the reader.

On the typewriter should be typed: i = <address of the first free cell> and l, whereupon the tape is read in.

Since KB still is 1, SLIP gives control information on the typewriter, and after this, the desired B-Tape will be punched. Finally HSF 2 <address> is typed on the typewriter by SLIP which means that GIER is waiting for new input.

Description of Program for Punching of B-Tapes

```
[i] b a3      gr i          MRC        t - 1
              tl 3                                 These 6 cells are placed in con-
              gr 46         MRC        t - 2       tinuation of the program desired
              hv 34                                to be punched. These are instruc-
              gr 42         MRC        t - 1       tions to be used during input.
              hv 34                                (See Start Procedure page 26).
[i+6] a:
   i=10       arm a                    t - 1       The content of the 5 cells fol-
              tk 3     ,    gr (i - 1)             lowing (but not including) a3
              bt 4                      t - 1       are shifted 3 positions to the
              vy 32    ,    hv i - 3               left before punching.
[14] a2:      pmn a         IRC        t - 1
              ar D 256      LRA                    Flag bits are registered and
              ar D 128      LRB                    marked in R-adr.
              xr       ,    tl - 10
[18]          ar D 128
              tl - 7   X    IZA
              gt i     ,    sy                     punch a character
              hv i - 2 X    NZA
              is (a2)  ,    it s 470
              bs 510   ,    hv a2                  if the last word was in cell 41,
[24]          sy,      ,    hsf 2                  punch a SPACE and jump to HELP
                                                   (SLIP)
```

Loading B-programs

As may be seen from the program on page 23 and the start procedure on page 26, the B-Tape program is punched backwards, the highest cell numbers appearing on the tape first and the contents of cell 41 last.

During B-Tape input all words are shifted 3 positions to the left before storage with exception of the 5 cell which were already shifted by the punching program before punching. The last instruction executed by the input program is : gr 41 MRC in cell 40. The next instruction encountered by GIER is accordingly the first instruction of the B-Tape program in cell 41, which should be zq LKB with regard to any settings or corrections required. Input of B-Tapes is based on 7 instructions in core store cells 34-39 and, as mentioned previously, the 6 instructions read in from each B-Tape. The loader is stored permanently on track 0 in cell 34-39, and can be transferred to the core store in the following manner:

The RESET button on the auxiliary display panel is pushed, and Normal Stop is held depressed while the HP button is activated.

The contents of track 0 is now placed in cell 0-39 of the core store.

The contents of the instruction counter should be changed to 34 (bits 4 and 8 in r1) and the by register is cleared.

KA and KB are set to 0 and 1 respectively, and the B-Tape is loaded in the reader.

After this the program is read in by depressing Normal Start.

If HELP is not in the computer, the procedure is made easier by having the typewriter write FEJL after pressing the HP button. If the space bar is depressed now, the tape is read in, but the typewriter remains in upper case and with the red ribbon. Should this not be suitable, one can press RESET, then normal Start, before typing space.

Input Based On 6 Cells

If for some reason it is not possible to use loader program on track 0, the 7 instructions comprising the Rudimentary Loader program, have to be stored manually. Proceed as follows:

1. Place the 7 instructions in cell 34-39
2. Set by = 0 and r1 = 34
3. Place the B-Tape with the test program desired in the reader
4. Depress RESET and Normal Start.

If it is desired to repeat the input, cell 39 must be regenerated, and the procedure is repeated from and including point 2 above.
The bit configurations for input are shown clearly in the diagram on page 27.

Description of Loader Program (see Start Procedure page 26)

(34) pmn 64 XD IZA;	0 ---> M, 1 ---> R:3 and OA
(35) T1 - 7, ly r + 1;	
(36) pi IZA t 508	for OA = 1, two bits of the character read are placed in RC, and OA is cleared
(37) xr X IZB;	for M = 0, OB is set to one
(38) hv 35 IZB;	
(39) gr 41 MRC t - 1;	the first time M = 0, R is stored in the cell, and the flag bits are set = RC

The 5th word loaded is the instruction t1 3, which is placed in cell 39. From and including the 6th word (40 gr i MRC t - 1) all possible bit configurations thereby may appear in R and the cell. (Refer also to page 23)

cell \ Time	Before start	First word read in and stored	Second word read in and stored	Third word read in and stored	Fourth word read in and stored
34	pm n 64 DXIZA	pm n 64 DXIZA	pm n 64 DXIZA	pm n 64 DXIZA	pm n 64 DXIZA
35	tl -7 , ly r+1	tl -7 , ly r+1	tl -7 , ly r+1	tl -7 , ly r+1	tl -7 , ly r+1
36	pi 0 LZA t508	pi 0 LZA t508	pi 0 LZA t508	pi 0 LZA t508	pi 0 LZA t508
37	xr 0 XIZB	xr 0 XIZB	xr 0 XIZB	xr 0 XIZB	xr 0 XIZB
38	hv 35 LZB	hv 35 LZB	hv 35 LZB	hv 35 LZB	hv 35 LZB
39	gr 41 MRC t-1	gr 40 MRC t-1	gr 42 MRC t-1	gr 41 MRC t-1	gr 40 MRC t-1
40		hv 34	hv 34	hv 34	gr 46 MRC t-2
41				hv 34	hv 34
42					
43					
44					
45					
46					

cell \ Time	Fourth word read in and stored	Fifth word read in and stored	Fifth word read in and stored	Sixth word read in and stored	Last word read in and stored
34	pm n 64 DXIZA	pm n 64 DXIZA	pm n 64 DXIZA	pm n 64 DXIZA	
35	tl -7 , ly r+1	tl -7 , ly r+1	tl -7 , ly r+1	tl -7 , ly r+1	
36	pi 0 LZA t508	pi 0 LZA t508	pi 0 LZA t508	pi 0 LZA t508	
37	xr 0 XIZB	xr 0 XIZB	xr 0 XIZB	xr 0 XIZB	
38	hv 35 LZB	hv 35 LZB	hv 35 LZB	hv 35 LZB	
39	gr 40 MRC t-1	tl 3	tl 3	tl 3	
40	gr 44 MRC t-2	gr 44 MRC t-2	gr 42 MRC t-2	gr 1 MRC t-1	gr 41 MRC t-1
41	hv 34	hv 34	hv 34	hv 34	
42			tl 3	tl 3	
43					
44	gr 46 MRC t-2	gr 46 MRC t-2	gr 46 MRC t-2	gr 46 MRC t-2	
45					
46					Program read in

Start-procedure for loading B-tapes.

Bit Pattern for Cells 34-39 in 'HELP' TRACK 0

pos / celle	0 2 4 6 8	10 12 14 16 18	20 22 24	26 28	30 32 34	36 38	40	SLIP
34								pmn 64 XDIZA
35								tl -7, ly r1
36								pi 0 LZAt 503
37								xr 0 X IZB
38								hv 35 LZB
39								gr 41 MRC t-1

Bit Pattern for Cells 1-3 During Rudimentary Loading of the tape 'HELP track 0'

pos / celle	0 2 4 6 8	10 12 14 16 18	20 22 24	26 28	30 32 34	36 38	40	SLIP
1								ly 0, tl-6
2								ca 0, hv 1
3								gm 5 M t-1

Loading 'HELP track 0'

It is necessary only to place 5 instructions in cells 1-3 manually in order to input this tape. The bitkonfigurations are shown clearly in the diagram on page 27.

1. On the control panel the switch is turned to position 'permit writing'
2. On printed cirquit card C5-21 the switch is put into low position
3. Place manually the following 5 instructions in cell 1-3:
   (1) ly 0, t1-6
   (2) ca 0, hv 1
   (3) gm 5 M t - 1
4. Set by = 0 and r1 = 1 (bit 9 = 1)
5. Place the 'HELP track 0' tape in the reader
6. Press RESET and Normal Start, whereupon the tape is read in.
7. Turn the switches mentioned in (1) and (2) to normal position

Display of Track 0 in the HELP System.

```
[ 0] qq
[ 1] it   1      ,pa   10       store h-bit
[ 2] gk   1      ,vy   r-497    bits 20-39 are used as check constant
                                  store tk and by
                                  inhibit hp button (inhp)
                                  select typewriter input/output
[ 3] gi   2         IPC         store in, register A and B marking
[ 4] gm   3         MPC         store M, A and B
[ 5] vk   32        IOB t-1     vk is irrelevant, register overflow
[ 6] gr   4         MOB         store R and R[00]
[ 7] tl   -39    ,pm   24       2×R[00]+R[0]->R[39],M[0-19]=1
[ 8] gr   7      ,tln  -19      store R[00],R[0],2↑(-19)-2↑(-39)->M
[ 9] arn  2      ,cm   -1       R:=check constant, compare cell -1
                                  with R
[10] pmfn r         IRB         R:=0, RB=h, M irrelevant
[11] pi   66        IZA t-511   in= -,hp,0,0,1,0,0,0,0,1,h
[12] hh   17        NZA         jump if inhp
[13] gp   8      ,pp   38       store p, p:=38
[14] vk   319          t-1      )
[15] sk   -24          t-40     ) store cells 40-959 on tracks 295-318
[16] bt   23           t-1      )
[17] hv   14     ,pp   294      if inhp then p:=294
[18] gs   6      ,gin  9        store s and in, r:=0
[19] vk   25     ,lk   -64      read track 25
[20] vk   p      ,lk   -73      read track containing original
                                  contents of cell 0-39
[21] vk  (5)     ,lk   -124     )
[22] ps   41     ,ud   5        )
[23] ps   s-1    ,ar   s-125    ) Check sum of tracks 0-31
[24] bs   s-1    ,hv   r-1      )
[25] bs  (5)        IOB t-1     )
[26] pp  ()      ,hv   21       ) p=start address
[27] sy   64     V  NZ          CR if FEJL (error)
[28] arn  -25    ,hv   -29      fetch a constant, jump to HJÆLP (HELP)
[29] sy   29     ,sy   60       )
[30] sy   54     ,sy   53       ) type: FEJL
[31] sy   33     ,sy   35       )
[32] gr   -512      MOB         store sum of tracks 0-31 in cell 512
                                  register overflow in B
[33] ly   33     ,vy   -496     wait for typechar, select paper-tape unit
[34] pmn  64     XD IZA         )
[35] tl   -7     ,ly   r1       )
[36] pi             LZA t508    ) primitive loader
[37] xr          X  IZB         )
[38] hv   35        LZB         )
[39] gr   41        MRC t-1     )
```

The above is valid for standard GIER with HB button inhibited when by0=1.

If HP button inhibited when by3=1 then

```
[ 2] gk   1      ,vy   r79
[33] ly   33     ,vy   80
```

The HELP Parent program (, ego ,) SLIP Program

ABSTRACT

The program incorporates a copy of the whole HELP system and can be used for punching copies of all or part of the routines in the system. It is possible to produce amended versions of HELP routines with correct check totals. The program must be run in conjunction with an existing HELP system in GIER.

1. Structure of the program

The parent program embodies a complete copy of HELP which is loaded to tracks 100-157, and an administrative routine which is loaded partly to the core store cells 500 onwards and partly to tracks 97-99.
The program is designed to operate in conjunction with the permanent part of an existing HELP system which has been loaded to tracks 1-37 on the drum, and, in addition to this, the routine h kompud.

The administrative routine includes automatic regeneration of check totals for the whole system so that if amendments are made to the HELP System Image (on tracks 100-157) new tapes can be produced with correct check totals.
Entry to the program is made at cell 500 which may at all times be used as a restart point.

2. Operation

The program is read into GIER by typing l after HELP/SLIP has been called. When the program is ready to start making punched output the message:

Hul(meaning ,punch, is typed.

If however the message

slet KA og KB

meaning ,reset KA and KB, is typed one should reset KA or KB as appropriate and the message ,Hul(, will then by typed automatically afterwards.

One may type a space or one of the letters given in the table below after which the message indicated is typed. (A space always indicates the next letter in the list, beginning with 0 if nothing else has been typed).

Letter	Message	Meaning
0 ,zero,	) kanal 0	track 0
h	) HJÆLP	HELP
u	) HJÆLP uaflaasede	HELP (unlocked tracks)
a	) HJÆLP uaflaasede udenom ALGOL	HELP (unlocked tracks co-existent with ALGOL)
t	) h tryk og h sam	
k	) h kompud	
l	) h læs hp	
g	) h gem og h hent	HELP ROUTINES
i	) h hp ind og h hp ud	
r	) h ret	
e	) ego	The Parent tape itself (see footnote)

If a space is now typed, the tape indicated is punched

If n is typed it is made to spell nej (,no,) and the program begins. again (at cell 500).

NB. For computers with other than 320 tracks, there are two versions of ego - the standard version for use with the computer itself and a special version for use on a 320-track GIER. The latter is obtained by typing 1 instead of space after the message ego.

The RC-code for marking of HELP punched tapes

The HELP-tapes are at present marked No. 146. Further a code of 2 or 3 characters is employed.
The first character is A, B, or C for 1, 2 or 3 drums, respectively
The second character is 0 or 3 for inhibit with BY0 or BY3 respectively
The third character is P for a possible printer.