

INSTRUCTIONS TO

OPERATORS

ELLIOTT 803 COMPUTER

COMPUTATION LABORATORY,

July, 1963.

K E Y B O A R D

WORD GENERATOR

The buttons on the left-hand side form the word generator.

STEP BY STEP BUTTONS

This is the description of the three buttons, READ, NORMAL, and OBEY.

When the NORMAL button is depressed and the operate bar has been depressed, the machine is obeying instructions at full speed. To stop the machine depress either the READ or the OBEY button. If the OBEY button is depressed, the instructions in the machine are obeyed one at a time every time the operate bar is depressed. The effect of depressing the READ button and then the operate bar is that the next instruction due to be obeyed is replaced by the instruction whose coded form (in T.I.Code) was set up on the word generator.

Note: Apart from the fact that the READ and OBEY buttons stop the machine, the function of the STEP by STEP buttons is to dictate the effect of depressing the operate bar.

LIGHTS

PARITY

If the computer stops and this light is on, start again at Section A6 (i.e. Clear Store). If it occurs again, report this to one of the Computation Staff.

BLOCK TRANSFER

This light can be ignored.

BUSY

This light comes on if the computer wishes to use the paper tape station, but cannot do so because either (a) the last print or read instruction is still being carried out (in this case the light will be extinguished as soon as the station is clear), or (b) there is something wrong on the paper tape station (in this case the light stays on, so also does the HOLD UP light on the paper tape station). Check that the reader has been loaded and selected and is switched on, and that the punch selected has sufficient tape (if a punch is running low the corresponding run-out button is illuminated) and that it, too, is switched on. Check that the MANUAL button is not depressed.

LIGHTS continued

FLOATING POINT OVERFLOW

This is lit up and the computer stops if the result of a floating point operation is so great that it cannot be represented (e.g. division by zero). The computer can be restarted by depressing the operate bar. The result actually generated will be spurious. The programme is the probable cause of this trouble, though a data tape may have been misread.

STEP BY STEP

This is lit if either the READ or the OBEY button are depressed.

OVERFLOW

This can be ignored.

RESET BUTTON

If attempts to start and restart the computer fail, this can be tried. It clears hold up and overflow stops.

MANUAL DATA BUTTON AND SELECTED STOP BUTTON

Can be ignored in most cases. Both buttons should be up.

P A P E R T A P E S T A T I O N

READERS

The lower reader is READER 1; the upper reader is Reader 2. If the SELECT READER button is not depressed and is not illuminated, the currently used reader is READER 1. If the SELECT READER button is depressed and illuminated, the currently used reader is READER 2.

A reader is 'Loaded' by placing the leading end of the tape in the reader. Many tapes have 'legibly punched' labels at their leading end. DO NOT ATTEMPT TO READ IN THIS LEGIBLE TAPE. Depress the black bar with both thumbs and slide the tape between the rollers and the brake pads with the forefingers. The wider (3 channel) side of the tape should be at the back. Release the black bar. The corresponding reader button will now be illuminated. Depress this button, when the light will be extinguished if the reader is correctly loaded.

To release tape from the reader reverse the process described above.

The button on the front of the readers is the 'run-out' button.

PAPER TAPE STATION continued

PUNCHES

The outer, or right-hand, punch is PUNCH 1, the inner punch is PUNCH 2. The punches are selected in the same way as the readers, using the SELECT PUNCH button.

The 'run-out' buttons are used to run out blank tape from the corresponding punch. They are normally not illuminated. If the currently used punch runs low on tape the corresponding 'run-out' button is illuminated, a 'busy' or 'Hold-up' is created, and the computer waits for action to be taken. The MANUAL button should be depressed, and either (i) the punch reloaded with tape, or (ii) the other punch selected. The MANUAL button should now be released when the computer will carry on from the point where the 'busy' was created.

MANUAL BUTTON

When depressed and illuminated this creates an artificial 'busy' on the paper tape station. The computer will wait when it next requires to use the paper tape station. It can be used as an emergency button - if anything goes wrong on the paper tape station, e.g. a knot in the tape being read, depression of the MANUAL button will stop the use of the station. The trouble can be cleared, and the machine restarted by clearing the MANUAL button. No information is lost while the MANUAL button is depressed.

OPERATING INSTRUCTIONS

For further details see 'Guide to Programming the 803' Chapter 6, Autocode Manual pages 38-48, 'General Operation of the 803' (copy in the computer desk).

A. Switching on etc.

If computer is already on see 7.

To switch on computer.

1. Switch mains isolater, near door, to ON.
2. Switch battery ON (depress ON button).
3. Switch computer ON (depress ON button).
4. If Paper Tape Station is off; depress MANUAL, depress ON, release MANUAL.
5. Check that tape readers (switch on front) and punches (switch on side) are on.
6. Clear store:
 - Depress "CLEAR STORE" button.
 - Depress "NORMAL" button.
 - Depress operate bar.
 - Wait at least 10 seconds.
 - Depress READ button.
 - Release "CLEAR STORE" button.
7. Enter details in Log Book.
8. Clear Keyboard word.
 - Check that "SELECTED STOP" button is not depressed.
 - If "BUSY" or "HOLD-UP" lamp is lit, depress RESET button.

Throughout these instructions the phrase "ENTER 40 n" means

- (i) set F1 = 40 and N1 = n on word generator.
- (ii) depress READ button, if not already depressed.
- (iii) depress operate bar once.
- (iv) depress NORMAL button.
- (v) depress operate bar once.

NOTE: Do not read in LEGIBLE TAPE. All A103 tapes stop on the last non-blank character. If one of these tapes is read 'off the end' it is probable that the legible tape has been read in. Output of continuous "spaces" indicates a sumcheck failure. In either case start again at Section B(b) or D(b).

If at any stage, a tape is accidentally read in with a wrong keyboard setting, it is necessary to start again at Section B(b) or D(b).

9. For 'Load and Go', see Section B. For translation on to tape see Section D.

B. LOAD AND GO.

- (a) If the Autocode A103 L/G Tape is still in the machine, see Section C.
- (b) To read in A103 L/G enter 40 0. See Section C.

- C. (a) To read in a mnemonic or autocode tape and compile into the store.
Set B = 1 if "checks" required, B = 0 otherwise.
Set F2 = 40 if "trace" required, F2 = 00 otherwise.
Set F2 = 01 if "verify" required, F2 = 00 otherwise,
("trace" and "verify" can be used simultaneously).
Enter 40 7.

If the tape is not read and the computer comes to a stop, start at Section B(b). If some tape is read and the tape then stops see Section F.

- (b) When the translation is complete, four numbers are output on the selected punch. These are the limits of the programme. See Section H.

D. TRANSLATION ON TO TAPE.

- (a) If the Autocode Translator, A103 Tape 1, is still in the machine and if it was used for the same purpose by the last user, see Section E.
- (b) To read in A103 Tape 1 enter 40 0. If "verify" is required, read in A103 Tape 4 on 40 0. See Section E.

- E. (a) To read in a mnemonic or autocode tape and translate onto tape.
Set B = 1 if "checks" required, B = 0 otherwise.
Set F2 = 40 if "trace" required, F2 = 00 otherwise.
Set F2 = 01 if "verify" required, F2 = 00 otherwise.
("trace" and "verify" can be used simultaneously).
Enter 40 5.

If the tape is not read and the computer comes to a stop, start at Section D(b). If some tape is read and the tape then stops, see Section F.

- (b) When the translation is complete four numbers are output at the end of the translated tape. See Section C.
- F. (a) If translation stops (other than at cr lf sp cr lf, which marks the end of a part of a mnemonic tape - see (b)) then either the mnemonic tape contains an error, or the store is full, see (c).

continued

F. (a) continued.

A list of more common errors is given on Page 8. Mark the stop with pencil and cause the translator to 'read over' the rest of the tape by setting F2 = 04 and changing F1 from 40 to 00 or vice versa (this is called 'changing the sign of the keyboard word').

Repeat the process at each mistake found. It is, of course, unnecessary to reset F2 = 04. If changing the sign of the keyboard word does not cause the next instruction to be read in, the mistake is probably in the setting instructions and the tape must be corrected.

- (b) If the translation stops at sp cr lf, the next part of the tape is read by changing the sign of the keyboard word.
- (c) If, on LOAD AND GO, translation stops and a) is punched, then the store is full. The programme will have to be translated on to tape. The rest of the tape may be read over as in Section F(a).

G. To read in translated tape, enter 40 0.

To read in A103, Tape 2, enter 40 0 (Tape 2 must be read in after each translated tape). See Section H.

H. To commence calculation at the instruction specified in the START instruction, enter 40 16, with B = 1 if "checks" are required, F2 = 40 if "trace" required, and F2 = 01 if "verify" is required. To commence at the instruction with reference number n, enter 40 16 with N2 = n.

If the computer stops examine the keyboard lamps and see Section on "Keyboard" (Page 1).

For further details see the Autocode Manual.

I. At the conclusion of time on the machine:

- (a) Enter time and details in log book.
- (b) In the event of a fault or suspected fault, make a brief note in the 'Remarks' column on the log sheet, and then give as full a description as possible on a 'Faults' sheet.
- (c) Roll up and put away all Library tapes used. Take away with you any of your own tapes which you wish to keep, and put all 'rubbish' in waste paper sack. Tapes, other than Library tapes, left in the computer room will be destroyed.
- (d) If there is no-one else using the machine after you, the computer should be switched off and a note made in the log book.

I. continued.

To switch off carry out the following operations in this order :

- (i) Depress MANUAL button on paper tape station.
- (ii) Switch Reproducer OFF
- (iii) Depress computer OFF button on keyboard.
- (iv) Depress battery OFF button on keyboard.
- (v) Switch mains isolater to OFF.

The air conditioning equipment should be left on.

(5) If it is after 5.30 p.m. :

- (i) Switch off the air conditioning units, the switches are high on the wall and near each unit.
- (ii) Place covers on computer Keyboard, and readers.
- (iii) Release catch on Yale lock of Computer room.
- (iv) See that electric heaters and reproducers in Tape Preparation Room and the kitchen are off.
- (v) Lock front door using key which hangs on the back of the Office door, and post key through letter box.

COMMON AUTOCODE ERRORS CAUSING A STOP ON TRANSLATION

This list is not exhaustive.

1. Same variable set twice, this causes a stop in the setting instructions.
2. Variable used but not set.
3. Function used but not set.
4. Reference number used but not set, or same reference number used more than once.
5. "Spelling" mistake, "shift" omitted, "space" omitted or redundant.
6. Loops not nested, i.e. "REPEAT" instructions in wrong order.
7. Illegitimate mixture of floating point and integer quantities in an instruction.
8. "sp" omitted after "TITLE", or corresponding blanks omitted.
9. Printing mode illegitimate.

VERIFY

Use of "VERIFY" facility:

If the F2 = O1 button is depressed during translation, and during running, then every time the instruction "VERIFY" is reached, the computer will read a control tape from the non-selected reader. This control tape carries a list of the variables whose current values are required in the following form:

A-2=
B0-4=
X5-7=
K3=
V=
*

The current values of A, A1, A2, B, B1, B2, B3, B4, X5, X6, X7, K3 and V will be punched each on a new line on the non-selected punch if LOAD and GO is being used, and on the selected punch if programme has been translated onto tape. On reading the asterisk * control is restored to the programme. If the * is replaced by a), the computer waits until any button on the keyboard word is altered when a further control tape will be read in.

To avoid errors which arise, at present, due to control tapes being accidentally read off the end, it is advisable to put an additional "close bracket" on the end of the control tape.

The "VERIFY" procedure may be entered manually off the keyboard, as a post mortem.