

# ELLIOTT

# 9000

Volume 3: OPERATING INSTRUCTIONS

Part 2: PROGRAM OPERATING INSTRUCTIONS

Section 4: OPERATING PROCEDURES FOR FORTRAN PROGRAMS

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## Chapter 1: INTRODUCTION

### 1. 1 General

Fortran programs are translated and run in two stages. In the first stage, one or more programs are checked for syntactic errors and translated to S. I. R. code on paper tape.

In the second stage, the translated programs are loaded and run.

The original Fortran text is referred to as "SOURCE CODE". The output from the Translator is "OBJECT CODE".

### 1. 2 Notes to Programmers

To save time, whenever a program has been newly punched or is suspected to contain a syntactic error, it is recommended to check it in "REPORT MODE" before attempting to translate.

The programmer should mention whether 8K system tapes or 16K FORTRAN compiler are to be used.

When running programs the first piece of object code to be loaded must be the main program of the Fortran to be run.

For computers with the basic 8192 word store the normal method for running Fortran programs of up to 120 statements is specified by the commands

- (1) CHECK IN REPORT MODE FORTRAN (2. 5) (Optional)
- (2) TRANSLATE FORTRAN (2. 4)
- (3) RUN IN BATCH MODE (2. 7)

If the program is bigger than 120 statements or if a previous run in Batch Mode has resulted in a store overflow message the following commands should be used:

- (1) CHECK IN REPORT MODE FORTRAN (2. 5) (Optional)
- (2) TRANSLATE FORTRAN (2. 4)
- (3) RUN IN RELOCATABLE MODE (2. 10)

### 1. 2. 1 Store Maps

When running in Batch Mode a detailed store map may be obtained (2. 8) giving the position of statement numbers and variables. Statement number  $n$  is indicated by  $Q_n$  (e. g.  $Q_{20}$ ) followed by an absolute address. The store map is used when run-time errors occur, to match the address printed out in the error message with the position in the source code.

When running in relocatable mode a sparse store map, giving the position of each program unit, is given automatically. If it is essential to obtain a detailed store map, the relative positions of all labels may be found by assembling the SIR object code with an ordinary SIR Assembler tape and OPTION 23 (see Vol. 3, Part 2, Section 2, Chap. 2. 2).

### 1. 2. 2 User's Library

Where a 903 Fortran user has one or more commonly used subprograms these may be kept as sets of pre-translated relocatable binary (R. L. B.) tapes.

The individual subprograms should be translated initially (by commands 2. 6 and 2. 9). Whenever a program requires one or more of these subprograms commands 2. 11 or 2. 12 should be used in place of 2. 7 or 2. 10 respectively.

### 1. 3 Notes to Operators

When possible, programs should be translated, and run in batches to save repeated re-inputting of the FORTRAN TAPES 1 and 2.

The operator must not attempt to run any program where the object code ends with a legible X.

It is important when running a program, that tapes are read in, in the order set down by the programmer.

If E12 is output, it will be necessary to re-input the Fortran tapes, and restart operation.

If E5 is output when running in Batch Mode, unless programmers forbid it, "RUN in RELOCATABLE MODE".

The three switches controlling levels 1, 2 and 3 on the control panel, should be set to the Manual (down) position unless a different setting is requested by the programmer.

## Chapter 2: COMMANDS

### 2.1 "SET UP FORTRAN TRANSLATOR (TAPE 1)"

If tape 1 is already in store and there is no evidence of it being corrupted, ignore

otherwise

"LOAD FORTRAN (TAPE 1) UNDER INITIAL INSTRUCTIONS"

### 2.2 "SET UP FORTRAN (TAPE 2)"

If tape 2 is already in store and there is no evidence of it being corrupted, ignore

otherwise

"LOAD FORTRAN (TAPE 2) UNDER INITIAL INSTRUCTIONS"

### 2.3 "SET UP FORTRAN COMPILER 16K"

If the compiler is in store, and there is no evidence of it being corrupted, ignore

otherwise

"LOAD 'FORTRAN COMPILER 16K' UNDER I.I. "

### 2.4 "TRANSLATE (FORTRAN)" Name 1, Name 2

Step 1 Make sure punch is loaded.

Step 2 For 8K system, "SET UP FORTRAN TRANSLATOR TAPE 1" (see 2. 1).

Step 3 "LOAD Name 1 at 8"  
If Name 1 contains a halt code  
"CONTINUE at 9"

Step 4 If program is continued on further tapes.  
e. g. Name 2 etc.  
"LOAD Name 2 at 9" where Name 2 refers to all subsequent tapes of the same program.

ERRORS: During translation, source code is translated to object code. If an error is detected, no more object code is produced, but the rest of the program is checked as for 'REPORT MODE'. A legible X is punched at the end of every program unit containing an error.

2. 5 "CHECK IN REPORT MODE (FORTRAN)" Name 1, Name 2

Step 1 For 8K system - "SET UP FORTRAN TRANSLATOR (TAPE 1) (See 2. 2.)

or

For 16K system - "SET UP FORTRAN COMPILER" (See 2. 3).

Step 2 "LOAD Name 1 at 16"  
If Name 1 contains a halt code, or after a legible X has been output  
"CONTINUE at 9"

Step 3 If program is continued on further tapes.  
i. e. Name 2 etc.,  
"LOAD Name 2 at 9"  
Where Name 2 refers to all subsequent tapes.

Note: For Report Mode, the program is checked for errors, and no object code is produced.

2. 6 "TRANSLATE INDEPENDENTLY (FORTRAN)" Name 1, Name 2

Step 1 Make sure punch is loaded.

Step 2 For 8K system "SET UP FORTRAN TRANSLATOR (TAPE 1)" (See 2. 1).

or

For 16K system "SET UP FORTRAN COMPILER" (See 2. 3).

Step 3 "LOAD Name 1 at 8"

Step 4 If Halt code on Name 1 "CONTINUE at 9"

Run out some blanks, tear off tape and label clearly.

For second and subsequent programs (see Name 2 etc.) press 'RESET' button and return to step 3.

ERRORS: If the translator (for 8K) or the compiler (for 16K) has been corrupted, it will be necessary to return to Step 1.

### 2.7 "RUN IN BATCH MODE" Name 1 (Name 2)

For 8K system "SET UP FORTRAN (TAPE 2)" (See 2. 2) or  
For 16K system "SET UP FORTRAN COMPILER" (See 2. 3)

Step 1 "LOAD Name 1 at 8"  
Where name 1 refers to the first object code tape.

Step 2 If Name 1 contains a halt code  
"CONTINUE at 9"

Step 3 If program is continued on further tapes (e. g.  
Name 2)  
"LOAD Name 2 at 9"  
Where Name 2 refers to all subsequent tapes.

Step 4 "ENTER at 10"  
This indicates the program is complete.  
If error displayed. (See Note 1).

Step 5 If data tape is provided.  
"LOAD DATA Tape at 11"  
Otherwise "ENTER at 11"  
If error displayed return to Step 1.

Step 6 To continue after a pause, halt code on data tape or  
run-time error  
"CONTINUE at 9"

Note 1 An error indication is displayed if the program has  
not been compiled correctly. Return to Step 1.

### 2.8 "RUN IN BATCH MODE WITH STORE MAP" Name 1, Name 2

For 8K system, "SET UP FORTRAN TAPE 2". (See 2. 2)  
For 16K system, "SET UP FORTRAN COMPILER" (See 2. 3)

Step 1 "LOAD Name 1 at 12"  
Where Name 1 refers to the first object code program.  
Continue at "Step 2 of RUN IN BATCH MODE" (See 2. 7)

### 2.9 "PRODUCE RELOCATABLE OBJECT CODE" Name 1, Name 2

Step 1 Make sure punch is loaded.

- Step 2 For 8K system "SET UP FORTRAN TAPE 2" (See 2. 2)  
For 16K system "SET UP FORTRAN COMPILER"  
(See 2. 3)
- Step 3 Run out some blanks on punch  
"LOAD Name 1 at 13"  
If Name 1 contains a halt code  
"CONTINUE at 9"
- Step 4 If the program is continued on further tapes.  
"LOAD Name 2 at 9"  
Where Name 2 refers to all subsequent tapes.
- Step 5 "ENTER at 10". To indicate program is complete.
- Step 6 Run out some blanks, tear off tape and label clearly.

2. 10 "RUN IN RELOCATABLE MODE" Name 1, Name 2

- Step 1 "PRODUCE RELOCATABLE OBJECT CODE"  
Name 1, Name 2 (See 2. 9)
- Step 2 "LOAD RELOCATABLE OBJECT CODE at 14"
- Step 3 If data tape provided.  
"LOAD DATA TAPE at 11"  
Otherwise "ENTER at 11".
- Step 4 To continue after a wait - due to a PAUSE or Halt  
Code on data tape, or run-time error.  
"CONTINUE at 9"

2. 11 "RUN IN BATCH MODE Name 1, Name 2, WITH  
PRE-TRANSLATED R. L. B. tapes Name 3, Name 4"

- Step 1 For 8K system "SET UP FORTRAN TAPE 2" (See 2. 2)  
or  
For 16K system "SET UP FORTRAN COMPILER"  
(See 2. 3)
- Step 2 "LOAD Name 1 at 8"
- Step 3 If Name 1 contains a halt code  
"CONTINUE at 9"



- Step 4 If program is continued on further tapes e. g. Name 2.  
(Other than pre-translated R. L. B. tapes)  
"LOAD Name 2 at 9"
- Step 5 "ENTER at 10"
- Step 6 "LOAD Name 3 at 15"  
Where Name 3 refers to all pre-translated R. L. B.  
tapes.
- Step 7 If data tape provided  
"LOAD Data tape at 11"  
Otherwise "ENTER at 11"

2. 12 "RUN IN RELOCATABLE MODE Name 1, Name 2 WITH  
PRE-TRANSLATED R. L. B. TAPES Name 3, Name 4"

- Step 1 "PRODUCE RELOCATABLE OBJECT CODE"  
Name 1, Name 2 (See 2. 9)
- Step 2 "LOAD THE RELOCATABLE OBJECT CODE at 14"
- Step 3 "LOAD Name 3 at 15"  
Where Name 3 refers to the PRE-T ranslated  
R. L. B. tape.  
(and all subsequent tapes)
- Step 4 If data tape is provided.  
"LOAD DATA TAPE at 11"  
Otherwise "ENTER at 11"
- Step 5 To continue after a wait due to a halt-code, a pause  
on data tape, or run-time error.  
"CONTINUE at 9".