Fig. 2.

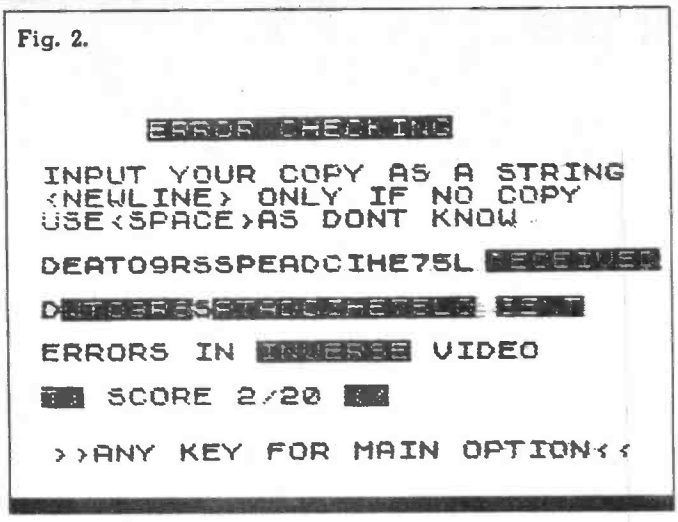
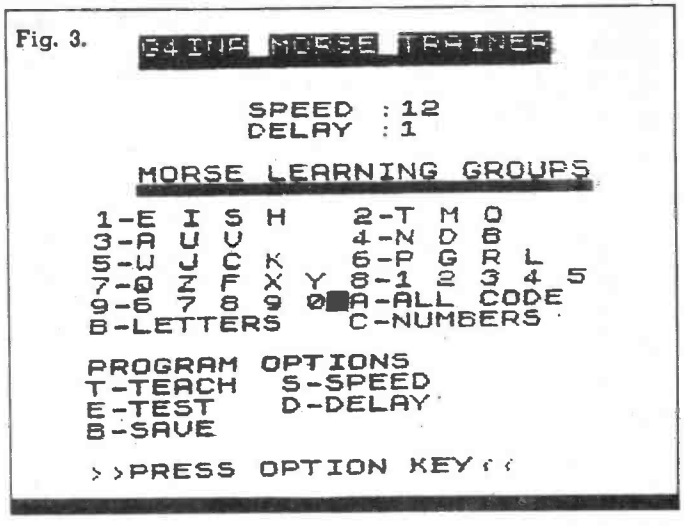


Fig. 3.



loop to give a suitable gap between characters.

line 240 generates a short pause between groups of five characters. It gives a smoother pause than the rather 'jumpy' **PAUSE** in BASIC.

line 1365. This is a table that gives the pointer values for the code data in the **REM.** Don't confuse zero with the letter 'O'.

lines 1390 and 95 calculate the row and column numbers on which to print the black square. Save the program several times before checking.

Program operation

Run the program. The screen should appear as **Fig. 2** — group 1 will be selected with speed 12 delay 1.

Press 'S' - select a new speed which should be printed on screen.

Press 'D' - select a delay between 1 and 9. I prefer to keep a short delay of 1. At any rate a delay of 5 should be long enough even for a rank beginner.

Press 'T' - the prompt will ask you to enter the group you want. The square will reposition accordingly. 'Z' will return you to option level.

The prompt will change and ask you if you want the group demonstrated. After all are demonstrated, or refused, pressing any key except **BREAK** will cause the group to be sent at the chosen speed. If you want the demonstration to be at the selected speed rather than 6 wpm, delete **line 890.**

On-screen checking is done as **Fig. 3.** Enter your copy as a single string with 'space' as 'don't know'. Your score will be displayed with errors in inverse video.

Pressing 'R' here (only in Teach mode) will repeat the lesson. Any other key will go back to main option level.

Press 'E' - program will select a grouping at random and square will reposition. Pressing any key starts the test and screen checking is as before. Any key return the program to option level.

Press 'B' - the program is saved with current options stored and is autorun on loading.

Learning morse

Remembers that morse is best learned in short daily sessions until reading it is instinctive at around 16 wpm. The PO test should then present no problem. Sending is best left until receiving is well instilled since the 'feel' helps sending. I prefer to teach morse at fast speeds (8 to 10 wpm) and vary the gaps between letters.

Notes

This program uses techniques dictated by the limitations of *ZX81 BASIC*. Adaptation to other micros should present no problems provided this is borne in mind.

```
    0 REM C [illegible] 1982 [illegible]
[illegible] THIS LINE PEEK TO TAN [illegible]
[illegible] : 2+$-"[illegible]>.<=; 1YUSK457RLU
EISHTMOAUVNDBWJCKPGRLQZFXY123456
7890£[illegible]
    1 LET M$="
    2 LET B$="
"
    3 LET U$="[illegible]
"
    4 LET T$="64 INS MORSE TRAINER
"
    5 LET S=PEEK 16628
    6 LET D=PEEK 16629
    7 LET F=PEEK 16630
    8 LET LS=PEEK 16631
    9 DIM P(20)
   10 DIM A(20)
   11 LET RET=0
   12 LET Q=PEEK 16632
   13 LET OLDS=S
   14 LET OLDLINE=1
   15 LET OLDCOL=9
   16 GOSUB 1390
   19 GOTO 300
   20 RAND
   25 FAST
   30 FOR X=1 TO 20
   35 LET Q=F+(INT (RND*(LS-F+1)))
   40 LET P(X)=PEEK (16555+Q)
   50 LET A(X)=PEEK (16591+Q)
   55 FAST
   60 NEXT X
   70 LET A=1
   75 LET B=5
   80 FOR C=A TO B
   85 LET E=P(C)
   90 LET E2=INT (E/2)
  100 LET E3=E-(E2*2)
  120 FOR X=1 TO 10+(20*(E3=1))
  130 LET G=USR 16553
  150 NEXT X
  155 FOR X=1 TO INT (120-240*(E<
2))/S
  160 NEXT X
  170 LET E=E2
  180 IF E>1 THEN GOTO 90
  190 IF RET=1 THEN RETURN
  200 FOR X=1 TO 50*D
  210 NEXT X
  220 NEXT C
```

Fig. 1: Program listing

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