In the previous chapter we saw how a program can be saved on the backing store. This is often called on-line storage. There is always a possibility of such a saved program being lost for ever due to some system fault — they do happen! Usually, once a program stored on-line is lost there is little that can be done to revive it and so it is often a good idea to save a copy of the program, once its final version has been decided on, on paper tape. Such storage is called off-line, since it is not dependent on the computer system for its continuing existence. Most teleprinters possess a paper-tape punch and reader and these are illustrated in figure 13.1. The punch and reader are situated on the left-hand side of the teleprinter; the reader is in the front and the punch is behind it.

Figure 13.1
So that a program can be copied on to paper tape it must first be present in the immediate access store. The program is punched on to the tape by the command word

PUNCH

The usual procedure is to type the word PUNCH, then press the ON key on the punch and finally press the RETURN key. The first thing to happen is the issuing of a length of blank leader tape from the punch. This is followed by a listing of the program. Because the punch has been switched on, every character printed at the terminal is simultaneously punched on to the tape according to an international code. When the program listing comes to an end a further length of blank tape is produced and after the punch has stopped the tape can be removed. This is best done by pulling the tape sharply upwards and causing the end of the tape to have a broad vee cut in it, as shown in figure 13.2. This makes sure that the tape has its beginning and end clearly identified. It is very frustrating for the user if the tape is read backwards! When the punching of the tape has been completed, switch off the punch by pressing the OFF button. If this is not done everything else which is printed at the teleprinter is copied on to tape unnecessarily.

To read a tape into the immediate access store first of all make sure that there is no other program present in the store; type NEW just in case. If this is not done the program read in will become mixed up with the current program and the result could be most frustrating. Load the tape into the reader by releasing the plastic cover and engaging the sprocket holes in the tape with the off-centre toothed wheel

![Punch cover and tape示意图](image)