



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**R.77**

**TELEGRAPHY**

**TELEGRAPH TRANSMISSION**

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**USE OF BEARER CIRCUITS  
FOR VOICE - FREQUENCY TELEGRAPHY**

**ITU-T Recommendation R.77**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation R.77 was published in Fascicle VII.1 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

USE OF BEARER CIRCUITS FOR VOICE-FREQUENCY TELEGRAPHY

(former CCIT Recommendation B.39, Brussels, 1948;  
amended at New Delhi, 1960 and Mar del Plata, 1968)

1 Composition and nomenclature

Figure 1/R.77 illustrates the composition of an international voice-frequency telegraph (VFT) system and the nomenclature used.

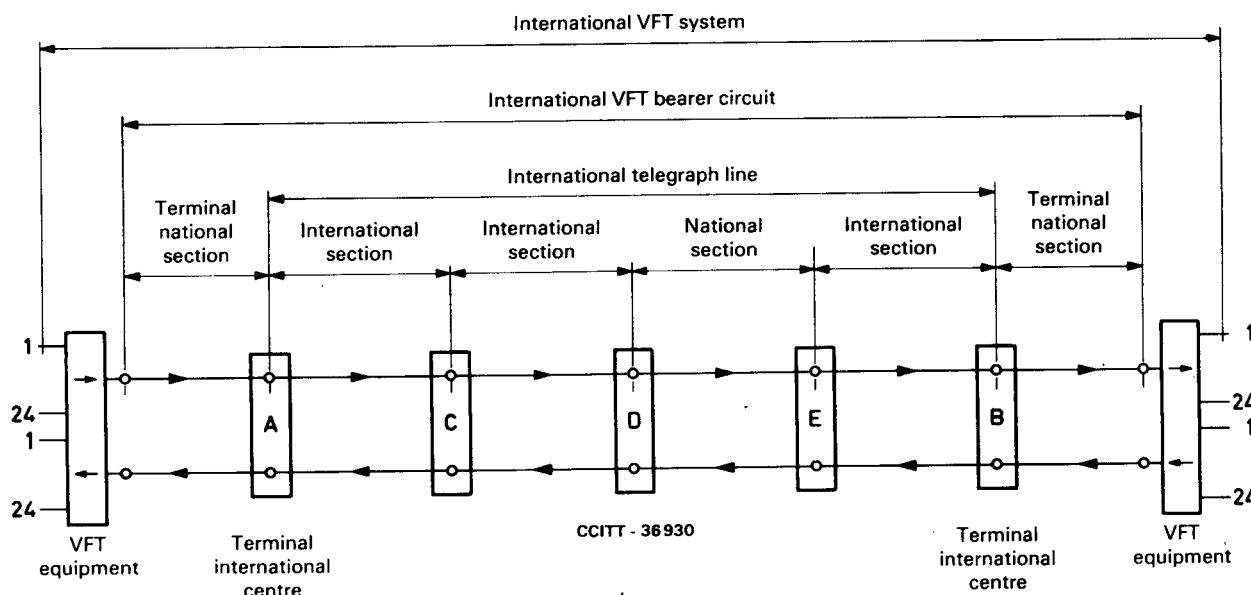
2 The international voice-frequency telegraph system

2.1 This is the whole of the assembly of apparatus and lines, including the terminal VFT equipment. In Figure 1/R.77 the system illustrated provides 24 duplex international telegraph circuits but other numbers of telegraph circuits can be provided.

2.2 The international VFT bearer circuit

2.2.1 Four-wire telephone-type circuits are used as VFT bearer circuits. The circuit comprises two unidirectional transmission paths, one for each direction of transmission, between the terminal VFT equipments.

2.2.2 The VFT bearer circuit consists of an international line together with any terminal national sections connecting the international line to the VFT terminal equipment and may be constituted entirely on carrier channels (on symmetric pair, coaxial pair or radio-relay systems) or an audio-frequency lines or combinations of such lines.



Note — At the intermediate centres C, D and E and at the terminal international centres A and B, the signals transmitted are at audio frequencies. At these points it is possible to make measurements.

FIGURE 1/R.77

The components of an international VFT system

1) See also Recommendation M.800 [1].

2.2.3 VFT bearer circuits have no terminating units, signalling equipment or echo suppressors.

### 2.3 *The international line of a VFT bearer circuit*

2.3.1 The international line of a VFT bearer circuit may be constituted by using a channel in a carrier group or channels in tandem on a number of groups. National and international sections can be interconnected to set up an international line. See Figure 1/R.77 but note that § 2.3.2 below details the preferred method. The international line could equally well be set up between, for example, only A and C or between C and D, in which case A and C, or C and D would be the terminal international centres.

2.3.2 Wherever possible an international line for a VFT bearer circuit should be provided on channels of a single carrier group, thereby avoiding intermediate audio-frequency points. In some cases, such a group may not exist or, for special routing reasons, it may not be possible to set up the international line in the preferred way. In such cases, the international line will consist of channels in tandem on two or more groups with or without audio sections, depending on the line available and the routing requirements.

### 2.4 *Terminal national sections connected to the international line of a VFT bearer circuit*

In many cases the VFT terminal equipment is remote from the terminal international centre of the international line (Figure 1/R.77), and such cases necessitate the provision of terminal national sections in order to establish international VFT bearer circuits. These sections may be in short-distance local audio cables, amplified or unamplified, or may be routed in long-distance carrier groups or amplified audio plant as available.

## **3 Reserve arrangements for international VFT bearer circuits**

### 3.1 *General*

3.1.1 All necessary action should be taken to enable the duration of interruptions on international VFT bearer circuits to be reduced to a minimum and, for this purpose, it is expedient to standardize some of the methods to be adopted for replacing defective portions of the circuit.

3.1.2 Although it does not appear necessary for these methods to be the same in detail in every country, it would be advisable to reach agreement regarding the general directives to be followed.

3.1.3 The make-up of the reserve VFT bearer circuits will in general be similar to that of the normal VFT bearer circuits. However, if the VFT terminal equipment is not located at the terminal international centres, the line portion of an international telephone circuit can be used to replace only the international line of the VFT bearer circuit.

### 3.2 *Reserve international lines*

3.2.1 Wherever possible a reserve international line should be provided between the two terminal international centres by means of the international line of an international telephone circuit (between A and B in Figure 1/R.77).

3.2.2 The telephone circuit used as a reserve should be chosen wherever possible so as to follow a different route from that of the normal international line. Where this cannot be done, as much as possible of the circuit or its sections should be alternatively routed.

3.2.3 If there is a choice, the use of manually-operated circuits as reserve lines for VFT is technically and operationally preferable to the use of automatic circuits. It should be possible after prior agreement between the controlling officers at the international terminal exchanges concerned for an operator to break into a call in progress to advise the correspondents that the circuit is required and that the call should be transferred to another circuit if it lasts longer than six minutes.

3.2.4 If the reserve telephone circuit is automatic or semi-automatic a direct indication should be given at the changeover point. If it is not available when needed the reserve circuit should be blocked against any further call.

### 3.3 *Reserve sections for the sections of the international VFT bearer circuit*

3.3.1 Where it is not possible to provide reserve international circuits either because there are no suitable telephone circuits or because the number of telephone circuits does not permit the release of a circuit for reserve purposes, reserve sections should be provided wherever possible for each of the component sections. For these sections, national or international telephone lines or, where they exist, spare channels, circuits, etc., should be used.

3.4 Reserve arrangements for the terminal national sections connecting the VFT terminal equipment to the international line

3.4.1 Reserve sections should be provided by means of national telephone circuits or by the use of spare channels, particularly in the case of long sections and of sections forming part of a category B VFT bearer circuit (see [2]).

3.5 Changeover arrangements from normal to reserve lines

3.5.1 When an international telephone line (i.e. part of an international telephone circuit) is used to provide a reserve for the international line (or for one of its sections as mentioned in § 3.3 above), there should be changeover arrangements to enable the changeover from the normal line to the reserve line to be made as rapidly as possible. The changeover arrangements (Figure 2/R.77) should be such that on changeover, all signalling equipment, echo suppressors, etc., associated with the telephone circuit that is used as a reserve for the international line, are disconnected on the line side. When the fault is cleared on the normal line, it should be possible to join it to the signalling equipment, echo suppressors, etc., and put it into service as part of the telephone circuit until the agreed time for the restoration of the line to the normal routing. It is desirable to introduce as little disturbance as possible when changing back from reserve to normal. Arrangements of cords and parallel jacks can be devised to achieve this.

3.5.2 The changeover arrangements shown in Figure 2/R.77 could be applied to sections of the international line mentioned under § 3.3 above when it is not possible to obtain an overall reserve for the international line. Normal sections and the corresponding reserve sections should be routed via suitable changeover arrangements at the stations concerned.

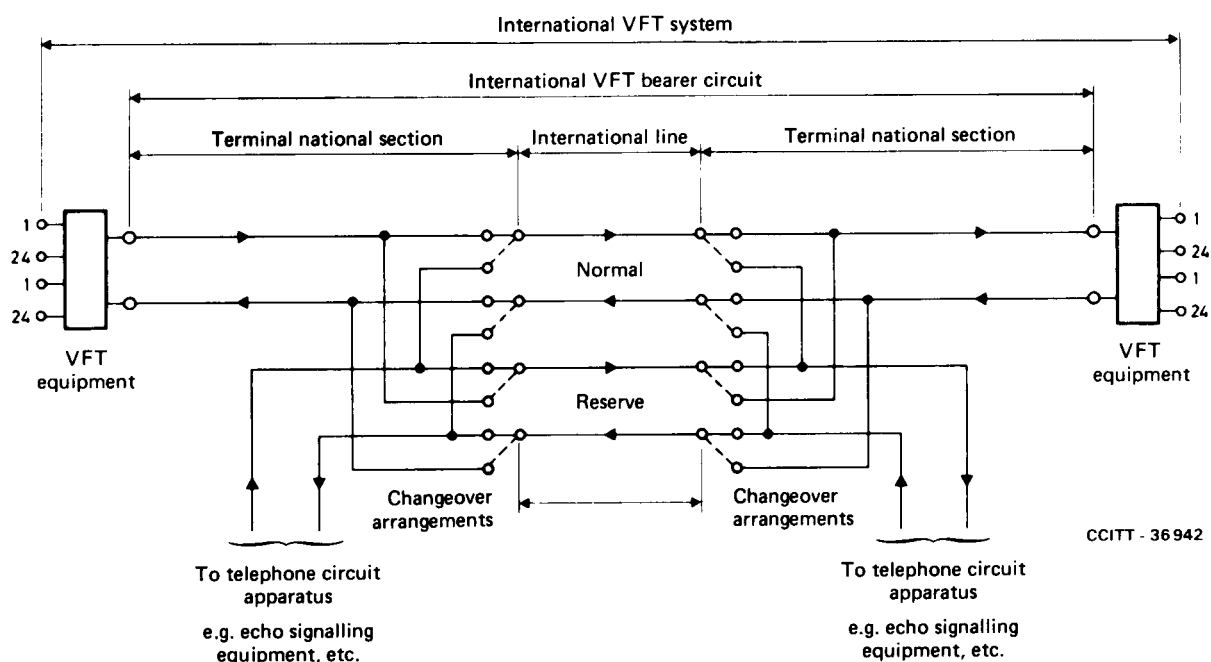


FIGURE 2/R.77

**An example of how an international telephone line can be used as the reserve for the international line of an international VFT bearer circuit**

3.5.3 Should the alarm indicating that the VFT bearer circuit is faulty be received by a station other than the group control station, this other station shall interrupt the return direction of the alarm channel towards the group control station in order to advise the latter to take the necessary action.

3.5.4 Making manual, automatic or semi-automatic international telephone circuits available for reserve circuits for voice-frequency telegraphy should be in accordance with the instructions issued and the arrangements made by the respective Administrations. Should the normal and reserve lines both be faulty, the technical services of the Administration concerned should take immediate joint action to find a temporary remedy.

### 3.6 *Designation and marking*

3.6.1 Normal and reserve circuits, etc., should be clearly distinguishable from other circuits both from the point of view of designation (see Recommendation M.140 [3]) and marking (see Recommendation M.810 [4]).

#### **References**

- [1] CCITT Recommendation *Use of circuits for voice-frequency telegraphy*, Rec. M.800.
- [2] CCITT. White Book, Preface to Vol. IV, ITU, Geneva, 1969.
- [3] CCITT Recommendation *Designation of international circuits, groups, etc.*, Rec. M.140.
- [4] CCITT Recommendation *Setting-up and lining-up an international voice-frequency telegraph link for public telegraph circuits (for 50, 100 and 200 baud modulation rates)*, Rec. M.810.