



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

**M.1055**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**MAINTENANCE:**

**INTERNATIONAL LEASED CIRCUITS**

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**LINING UP AN INTERNATIONAL  
MULTITERMINAL LEASED CIRCUIT**

**ITU-T Recommendation M.1055**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation M.1055 was published in Fascicle IV.2 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.

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**Recommendation M.1055**

**LINING UP AN INTERNATIONAL MULTITERMINAL LEASED CIRCUIT**

These circuits are usually arranged in one of the following ways:

*Unidirectional*

One station may transmit to every other and receive from every other, but the other stations have no communication among themselves. That is, the circuit is in effect a combination of a distribution network and a contribution network. This arrangement is used to interconnect, for example, a computer centre with outlying user stations.

*Conference*

Any station may have two-way transmission with any other. This usually implies that any station may in principle have two-way transmission with every other station simultaneously, and for telephony, some sort of selective signalling is employed. An example of this arrangement is the multiterminal speaker facilities provided for stations on important submarine cable schemes.

A systematic procedure is needed to line up this class of circuit if needless readjustment of interdependent apparatus is to be avoided.

**1 Multiterminal unidirectional circuits**

**1.1 Distribution network**

The explanation of the principle is given in terms of Figure 1/M.1055 which illustrates part of the distribution network (i.e. the sending direction of transmission) emanating from station A. (There may be similar networks also emanating from station A, but these can be treated as this one, thus there is no loss of generality in assuming that station A is at one end of the network.)

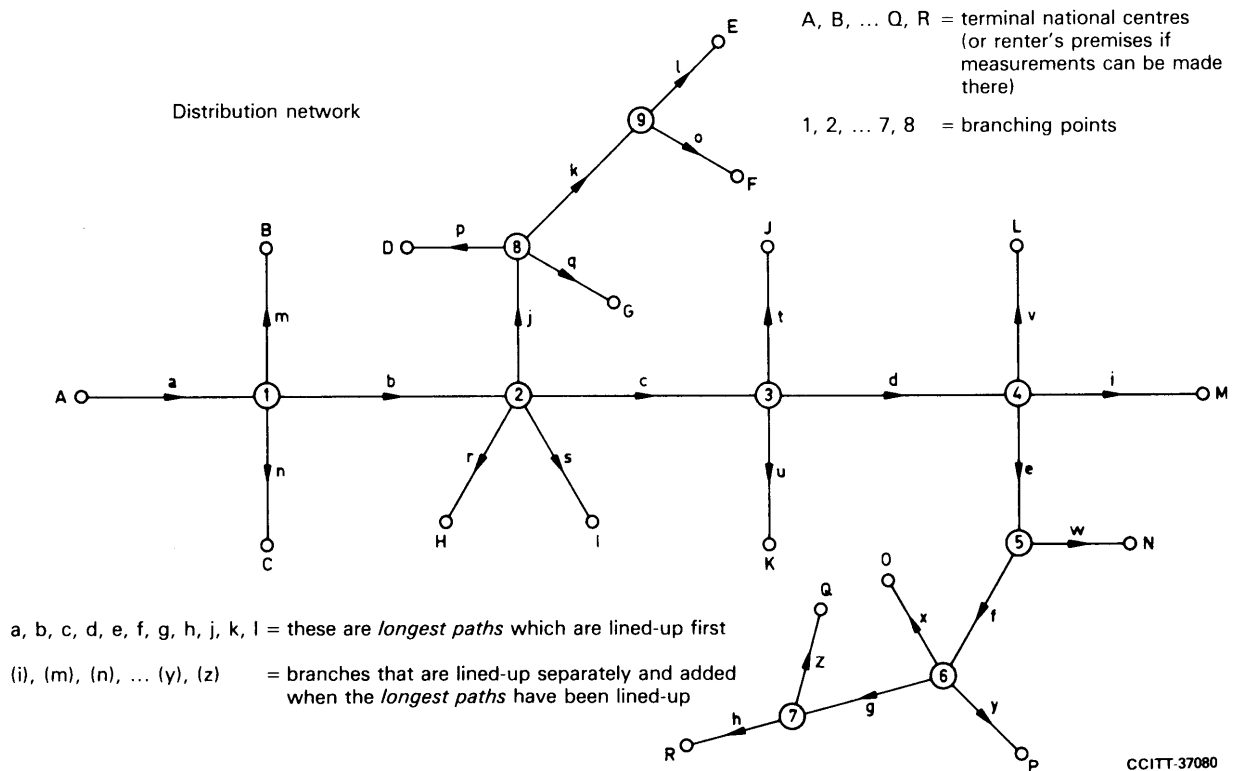


FIGURE 1/M.1055  
To illustrate the lining-up of a multiterminal unidirectional circuit

d01-sc

The sections a to z are point-to-point circuits or circuit sections, each of which may be composed of national or international sections.

The order in which the distribution network is lined up and connected together is as follows:

- a) Identify the path with the greatest number of sections: in the example, this is a-b-c-d-e-f-g-h.  
*(Note – A-M may be longer geographically, but has only 5 sections, whereas A-R has 8 sections.)*
- b) Identify the next longest path remaining (i.e. imagine the path A-R to be removed with its branching points. This is taken to be j-k-l (the distance 2-E is assumed to be greater than the distance 2-F though both of them have three sections).
- c) Identify the remaining paths in order of length. In the example, these are all the single sections i, m, n, . . . y, z.
- d) When the network is separated in this fashion, the paths

a-b-c-d-e-f-g-h,

j-k-l,

i,

m,

n,

.

.

.

y,

z

may all be lined up concurrently according to the principle of Recommendation M.1050.

- e) With a measurement-tone at a suitable level connected to A, add on the following branches (concurrently, if possible):
  - at 1 the branches m and n;
  - at 2 the branches j-k-l, r and s;
  - at 3 the branches t and u;
  - at 4 the branches v and i;making any necessary adjustments.
- f) Stations 8 and 9 now add on branches p, q, and o, adjustments being made if necessary.

## 1.2 *Contribution network*

This is much more difficult to organize because the outstations may only send one at a time. The problem is eased if the network is divided into more manageable portions. A possible scheme related to Figure 1/M.1055 (with all the arrows assumed to be reversed) would be as follows:

- a) The longest paths h-g-f-e-d-c-b-a and o-k-j are lined up concurrently as before.
- b) Keeping e disconnected at 4, stations N, O, P and Q send to 4 in turn, stations 5, 6 and 7 making any necessary adjustments to branches w, x, y and z.

- c) Concurrently with b) above, stations D, G and E send to 2 in turn (j disconnected) with 8 and 9 making any necessary adjustments to sections p, q and l.
- d) Concurrently with b) and c) above, stations M, L, J and K send to station 3 (c disconnected) with stations 3 and 4 making any necessary adjustments to sections i, v, t and u.
- e) Concurrently with b), c) and d), stations B, C, H and I send in turn to station A with stations 1 and 2 making any necessary adjustment to sections m, n, r and s.

1.3 It is recommended that the Administration of the country in which the focal station is situated should be responsible for drawing up the schedule showing the order in which the various circuit sections should be lined up.

1.4 If the circuit requires to be equalized then a very precise order in which the sections are to be equalized and connected together will be necessary if needless readjustment is to be avoided.

1.5 In order to apply the principles of equalizing outlined in Recommendation M.1050 it will be necessary to identify paths in the circuit connecting the focal station to each of the outstations and to treat each path as a point-to-point circuit bearing in mind § 1.4 above.

## **2 Multiterminal conference circuits**

2.1 These are usually provided by means of bidirectional branching units which are inserted into the two directions of transmission of a 4-wire circuit and derive a send and receive pair.

2.2 It is recommended that the branching units are designed to enable a branch to be added without affecting the levels of the main circuit.

2.3 The line-up should be organized so as to avoid needless readjustment of circuit sections. This principle outlined for multiterminal unidirectional circuits gives guidance in this matter.

2.4 Four-wire telephones should be used whenever possible to avoid instability problems.

There should be some limit to the number of locations joined together (for example: 12).