

806791

COMMON SYSTEMS
SUBSCRIBER LOOP
BRIDGE LIFTING CIRCUIT

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

This circuit provides a means of electrically reducing transmission losses on bridged subscriber loops when a branch is idle, by insertion of a 1574 Type Inductor.

SECTION II - DETAILED DESCRIPTION

1. GENERAL

A 1574 Type Inductor, to be used as a bridge lifter on a subscribers loop is inserted in a conductor pair with its windings in series with each side of the line. The Inductor will pass ringing and dialing currents with almost negligible distortion. It will work on dial or manual lines where the DC line current is 20 ma. or greater when the most distant telephone set is off-hook and also where the current will not drop below about 12 ma. in any branch when two or more telephone sets are off-hook at one time.

2. NORMAL BRIDGING

2.1 Line Condition With Branch On-Hook

When the telephone on a branch is on-hook, the 1574A Inductors' impedance is very high, as no current is flowing through it. This high impedance adds to the normal impedance of the line, resulting in a low bridging loss.

2.2 Line Condition With Branch Off-Hook

When the telephone on a branch is off-hook, current flows through the Inductor, saturating the molypermalloy tape core. As a result, its inductance and impedance are sharply reduced to values such that the speech frequencies can pass through the coil with little insertion loss. The line remains adequately balanced against longitudinal power currents because of the tight coupling between the two windings even though the leakage current in the tip and ring conductors are not equal.

To be effective, Inductors must be inserted on the customer side of branches or taps at the bridging point.

3. BRIDGING LINES SUBJECT TO INDUCTIVE INTERFERENCE

When it may be necessary to bridge subscriber loops where the possibility exists of inductive pickup from a 60 cycle source, a 1574B Inductor may be used. This Inductor, with a resistor across each winding acts to shift the resonant frequency of the circuit away from 60 cycles, thereby reducing the effect of Inductive pickup at this frequency. It may be inserted in any of the conditions described in item 4, but will result in an added loss of -.3 db over the 1574A Type.

4. BRIDGING REQUIREMENTS

The bridging requirements are as follows:

A. Central Office Bridging

1. Both Lines Non-Loaded

Inductors will normally be inserted in both lines when both exceed 6000 feet, or only in the longest line when only one exceeds 6000 feet.

2. Either or Both Lines Loaded

An Inductor must be placed in the loaded line or lines and also in the non-loaded branch if it exceeds 3000 feet in length.

B. Bridging Remote From Central Office

1. Non-Loaded Lines

Inductors will usually not be needed where the total length of bridge tap does not exceed 6000 feet. Where more than 6000 feet of bridged tap does exist, Inductors should be placed in the longest lines until the equivalent total of all bridged taps with respect to any station is less than 6000 feet. The number of Inductors in tandem between any one subscriber and the central office should not exceed 3.

2. Loaded Lines

It will now be possible to ease restrictions now applicable to bridged taps on loaded lines. Bridging between load coils should generally be avoided.

(a) When it may be necessary, such as on improving party-line fills on long rural lines, an Inductor should be added immediately beyond the tap and also one on the tap if it exceeds 1000 feet in length.

(b) In case of more than one tap in different loading sections, the distortions will add, so that individual taps over 500 feet should be treated as in (a).

(c) The maximum number of Inductors in series between any station and the central office is limited to 3.

C. Secretarial Service

An Inductor will not be needed when the secretarial service (SS) is located close to its home telephone office, as customers served by the same office are generally connected by direct trunks to the SS equipment. Customers served by another office are sometimes connected to the service through individual trunks but often concentrator-identifiers (C-I) are used. Where a C-I is used, Inductors need be added only to the customers' loops and to the SS or interoffice cable pair on the basis as listed under Section A.

D. Telephone Office Cutovers, Area Transfers, or Large PBX Moves

Application of the Inductors to central office cutovers will make it unnecessary to add or remove bridged taps immediately before or after the operation.

Where an office is to be replaced by another located nearby, no Inductors should be required as the relatively short multipled pairs would result in small transmission impairment.

Where the new office is relatively distant, some of the new subsidiary subscriber cables might run close to the new office, others distant. Inductors should be applied to the new cable branch if this is long enough to cause transmission impairment or if the pairs are loaded. Inductors should also be applied to what will be the old branch when the new office is in operation, especially if these pairs are loaded. This will be the only instance where the Inductors are inserted on the office side of a bridged point. When the cutover is completed the bridged taps and Inductors may be removed when convenient.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

None.

2. FUNCTIONS

2.1 Provides a means of reducing transmission losses on bridged subscriber loops by:

(a) Acting as a high impedance when the telephone on a branch is on-hook.

(b) Acting as a low impedance when the telephone on a branch is off-hook, so the speech frequencies can pass through the Inductor with little insertion loss.

3. CONNECTING CIRCUITS

When this circuit is listed on a key-sheet, the connecting information thereon should be followed:

- 3.1 No. 1 Crossbar - Subscriber Line Circuit - SD-25553-01. (Typical)
- 3.2 No. 5 Crossbar - Subscriber Line Circuit - SD-26030-01. (Typical)
- 3.3 Panel - Subscriber Line Circuit - SD-21712-01. (Typical)
- 3.4 Step-By-Step - Subscriber Line Circuit - SD-31531-01. (Typical)
- 3.5 Manual - No. 11 Switchboard - Subscriber Line Circuit - SD-11560-01. (Typical)

- 3.6 Manual - No. 12 Switchboard - Subscriber Line Circuit - SD-15021-01. (Typical)

SECTION IV - REASONS FOR REISSUE

CHANGES

B. CHANGES IN APPARATUS

Added

(B) 1574B Inductor FS-2

D. DESCRIPTION OF CHANGES

- D.1 FS-2 and App. Fig. 2 are added for use as a bridge lifter where 60 cycle inductive interference is present.
- D.2 Notes 102 and 104 are changed to show reference to the above item.
- D.3 CAD Figs. 1 and 2 are rated Mfr. Disc. and CADs 3 and 4 along with Note 401 are changed to reflect the above changes.

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