

OPERATING INSTRUCTIONS FOR THE
 DIGITAL ACCESS LINE PROTECTION ARRANGEMENT (DALPA)

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1.01 The purpose of this instruction is to explain the operation of the Digital Access Line Protection Arrangement for use on the Dataphone Digital Service. Dataphone Digital Service has been equipped with special maintenance features to provide rapid trouble isolation. The DALPA arrangement requires that some trouble location tests be performed utilizing maintenance arrangements associated with only the regular serving links. Accordingly, this arrangement requires that the customer cooperate by:

- (1) Reporting all suspected outages on the spare link to the Telephone Company.
- (2) Releasing the circuit and switching back to the regular link for short periods as requested by the Telephone Company.

1.02 The Digital Access Line Protection Arrangement (DALPA) is an arrangement providing customer control of the switching of the baseband (metallic) portion of the digital access. The arrangement permits "making good" any one of up to four working baseband access lines which extend from a central office to a station location (on a customers premises).

1.03 The customer controls the switch from the location on his premises with lighted designations indicating to the customer the status of the switch. Prior to the switch, a status lamp indicates that the idle spare is successfully carrying test tones in both directions. This indicates that a switch to or a restore from the spare may be made. An audible alarm sounds if the spare (protection) access line (when idle) is unable to carry a signal.

1.04 No alarm or indication is given of a service failure or the failure of any working access line. The user is required to recognize the need for a switch and to manually control the switch. The pushbutton for controlling this arrangement and status lights are located on the customers premises in a small box called a control unit.

Operating Instructions for the
 Digital Access Line Protection Arrangement
 (DALPA)

1. GENERAL
A. Introduction

B. Control Unit

1.05 The control unit should be located so that accidental operation of the pushbuttons is impossible. The control unit contains a group of six pushbuttons with indicator lamps that control the switching arrangement. These pushbuttons are non-locking and do not stay depressed. Depressing the spare (LTS) pushbutton lights all six of the lamps. This is to determine if any lamp is burned out. Two pushbuttons must be depressed at the same time to switch access lines. This makes it unlikely that a switch will be made accidentally.

C. Switching a Service to the Protection (spare) Access Line

1.06 Determine that the MSTR pushbutton is lighted indicating that the protection line is apparently good. Determine the pushbutton associated with the line in trouble. Depress both of the pushbuttons at the same time, then release them. Observe that the pushbutton associated with the line in trouble lights. This indicates which line is switched to the protection line.

1.07 The spare (LTS) pushbutton lights could indicate that the protection line is in use. The MSPR pushbutton will light when the light in trouble successfully carries test tones in both directions. This switch must be restored to regular before another service can be switched to protection.

D. Restoring the Working Circuit to Its Regular Access Line

1.08 There are two reasons for restoring the service to normal;

(1) Another circuit on the DALPA cannot be switched to protection until the first has switched to its regular line.

(2) A power failure at either end will switch that end of the DALPA to regular. This would cause a service interruption. Determine that the MSPR pushbutton is lighted indicating that the regular access line is apparently good. Depress the lighted pushbutton associated with the working line and the MSPR pushbutton at the same time.

The pushbutton for the working line and the spare (LTS) pushbutton will go dark when the service is restored to normal. The MSPR will go dark, and then relight if the protection line is apparently good.

E. Caution

1.09 Control tones are always carried on the currently idle access line. If for any reason the customer's end is switched to an access line that is different from that switched in the center office, a mismatch occurs. The circuit is open and no control tones can get through. This condition can be corrected by the user alternately making a switch to regular and making a switch to protection. The customer's end will follow the switch changes even if the central office does not receive a tone. When both ends are on the same idle line, the central office end will start following the customer's end. If this fails, the Telephone Company may be requested to manually restore the central office equipment to the idle state.

F. Alarms

1.10 If, during normal operations, the spare access line fails to carry the continuity tone, an alarm will be given at the customer's location. This alarm consists of a bell or buzzer that sounds and the MSPR lamp that goes out. An auxiliary lamp is also available that is lighted while the idle access line is apparently good. The audible alarm works only in the normal or released condition.

1.11 The MSPR lamp indicates the status of the spare channel and also following the switch, it indicates the status of the access line that was in trouble, lighting when the line successfully carries the test tones.

2. INSTALLATION OF THE DIGITAL ACCESS LINE PROTECTION ARRANGEMENT

A. Introduction

2.01 The Digital Access Line Protection Arrangement (DALPA) is arranged to allow the customer to transfer one of his access lines onto a spare or protection access line. It may be connected from any one of 1, 2, 3, or 4 working circuits into 1 spare. Each of the circuits is 4-wire. The customer controls the transfer from pushbuttons located on his premises. A switched line must be restored to regular before another line may be transferred to the spare.

2.02 The customer's pushbuttons automatically sent touch tones over the idle circuit to a touch tone receiver in the central office to cause that end to transfer. Continuity check tones are sent over the idle circuit. These tones (the touch tone digit number) originate at the customer's end. Receipt of these tones in the central office holds an alarm lamp off. Relay contacts for an office alarm are provided. The continuity check tones are looped back to the customer's end. At the customer's end a BRAMCO single digit touch tone receiver controls an indicator lamp. Connections for a second continuity indicator lamp, and an optional audible alarm, are provided. No cut off for the audible alarm is provided.

A description of how the equipment works is given in drawing and circuit description MA13674.

B. Central Office Equipment

2.03 Equipment in the central office consists of:

- (1) Touch Tone Receiver J-58844B, BSP 809-140-152.
- (2) 4" x 19" Equipment Panel, MA13674-ED FIG1.
- (3) Frame Block Connections.
- (4) 48V Battery connections.

2.04 The touch receiver occupies 2" of 23" relay rack space. It may be miscellaneous mounted a reasonable distance from the equipment panel. It does not require easy access.

2.05 The equipment panel occupies 4" of 19" relay rack space. It may be mounted in a 23" relay rack with the P41K139 PLPs provided. The panel has an idle channel failure lamp, alarm cut-off key and release key; therefore it should be mounted within reach. See the CAUTION under Central Office Connections. All connections to it are wire-wrapped on to D5A terminal strips.

C. Central Office Connections

2.06 All connections to the touch tone receiver are through a cable to the equipment panel. This local cable is terminated in a KS14672, L2 connector which mates with the connector on the touch tone receiver. The other end of this cable is wire-wrap connected to D5A terminal strips on the equipment panel. Connect per MA13674-T sheet 1 Fig. 1 and MA13674-SD CAD1 and 2. Connections to the equipment panel are given on MA13674-T Fig. 1 and MA13674-SD CADS1, 2, 3, and 4.

Five sets of connections are made to the equipment panel:

- (1) Cable from the touch tone receiver.
- (2) Battery and ground from a 1 1/3 ampere fuse on the office -48V fuse panel.
- (3) Connections to office alarm are as specified.
- (4) Connections to the local cable access lines to the customer's location. These may be a minimum of two 4-wire circuits to a maximum of five 4-wire circuits. One of these is always a spare (the protection) access line.
- (5) Connections to the office channel unit for the working circuits. This may be a minimum of one 4-wire circuit to a maximum of four 4-wire circuits.

NOTE: Typically all 4-wire circuits will be cabled to a frame block by the installer. Typical frame block designations are shown on sketch A of MA13674-SD sheet 5.

CAUTION: Wiring between this panel and the office channel units is not protected by this arrangement and should be the minimum that is practical. The engineer shall determine if this equipment location should be practical. The engineer shall determine if this equipment should be connected to the office alarm or other channel fail indicator and, if so, provide cable or wire as required see FS-2 of MA13674-SD.

D. Customer Location Equipment

2.07 The equipment at the customer's location consists of:

- (1) 6050B control key.
- (2) Equipment panel per MA13674-ED Fig. 2.
- (3) 48V power supply, if not already available, to supply one ampere.
- (4) Remote Continuity Check Indicator Lamp.
- (5) Remote 7S Buzzer or 7F Bell.
- (6) Frame block connections.

2.08 The 6050B control key is covered in BSP 512-210-103. This control unit contains a group of six pushbuttons with indicator lamps. Four of these are associated with the customer's working and access lines. They should be designated so the customer can easily determine which of his access lines is related to each pushbutton. One, two, three, or four circuits may be equipped. They must be equipped in order, with the end pushbutton last. Pushbuttons not used must be blocked with P12A858 blocking rings. Three are supplied. Store unused blocking rings inside the key. Blocked pushbuttons will be adjacent. The end pushbutton is blocked unless all four circuits are equipped. See Fig. 3, MA13674-ED for designations. All buttons shall be made non-locking and equipped with 51A lamps. The other two pushbuttons shall be labeled MSTR and SPARE (LTS). Inadvertent operation of more than one pushbutton can cause a break in service. Locate the 6050B control key accessible for the user but as protected as possible.

2.09 The equipment panel per MA13674-ED Fig. 2 occupies 4" of 19" relay rack space. It may be mounted in a 23" relay rack with P-41K139 place.

The panel has nothing that has to be accessed by the user and should be mounted out of the way.

2.10 A 48V power supply fused for one ampere or 1 1/3 ampere is required but not specified. The local telephone company may use what might be on hand.

2.11 A separate lamp is provided to indicate that the idle line has continuity. This may be located to suit the user. It operates in parallel with the MSPR lamp.

2.12 An audible alarm may be provided to indicate a failure of continuity check tones on the protection access line when it is idle. This will be a 7F buzzer if MA13674-ED group 5 is ordered or a 7F bell if group 6 is ordered. The buzzer or bell may be mounted to suit the customer. There is no cut-off provided for the audible alarm. Typically all of the access lines may be cabled to a frame block. These connections and labeling for the frame block are shown on MA13674-T Fig. 11 and Sketch B.

E. Customer's Location Connection

2.13 The connections to the 6050B key are shown on MA13674-T Fig. 7. Connections to this unit are through a D50P cord. A strap must be placed inside the key. D50P cord must be extended to the equipment panel.

2.14 This may be by an A25B cable or by other cable equipped with the supplied KS16690-L1 50-pin connector. The other end of this cable is wire-wrapped on to D5A terminal strip B on equipment panel as shown in Fig. 4 of MA13674-T.

2.15 The equipment panel is wired per Fig. 4 of MA13674-T. Connections from a fuse panel are per Fig. H2 or from a power supply per Fig. H3 of MA13674-T. Connections to an alarm bell are in Fig. 10. Connections to an alarm buzzer are in Fig. 9. Connections to an idle channel check indicator are shown in Fig. 8.

2.16 Frame block connections are shown in Fig. 11 and sketch B. Connections to access lines are shown to be made through this frame block. The 4-wire spare access line is labeled PT (protection trunk) on the frame block. The 4-wire access line to the central office are shown "TO CO". These same access lines are shown as "LOCAL" to the Data Service Units or other customer equipment. The first access line to be equipped is shown as "TRK1". "TRK4" would be in use only if there were 4 working lines on this arrangement.

F. Limits

2.17 The central office end of this DALPA is controlled by touch tone over the idle line. The length of the cable is limited by the mileage over which the touch tone will work. The limit for this J-58844B receiver is a four Db difference in loss between the frequencies 697 and 1477 Hertz (the restore-to-normal tones). Because non-loaded cable must be used for digital access lines, this limit could be reached. The distance would depend on cable makeup and terminating impedance. The correction would be to add equalization in the input to the touch tone receivers.

2.18 This DALPA will not work over access lines with digital repeaters, although it would transfer the access lines. The correction would be to provide a separate pair for the touch tones from the customer's equipment panel to the central office equipment panel.

G. Test

2.19 When both ends are installed and the spare access line is connected (without the working lines being cut-through this arrangement):

- (1) Block the relay ALM unoperated and apply power to both ends.
- (2) Connect a 600 ohm power meter to the jack labeled TRMT on the central office equipment panel and adjust amplifier RCV for a level of approximately 2 DBm.
- (3) After the above, connect a 600 ohm meter to the jack labeled RCV on the customer's equipment panel and adjust amplifier CA for a level of -13 DBm. If that cannot be reached a level as high as -3 DBm may be used. This is a touch tone signal that is generated in the customer's equipment, sent through the central office, through that amplifier and back to the customer's amplifier CA.
- (4) Verified that the MSTR lamp on the control key as lighted.
- (5) Verified that the auxilliary lamp is lighted. These lamps are lit by the continuity check tones looped through the outer access line.
- (6) Unblock the relay ALM in the central office. Insert a dummy plug in the customer's jack labeled TRMT and verify that this lights the alarm lamp on the central office equipment panel. After four seconds the central office alarm should sound. Verify it may be silenced with the ACO key. Verify that the MSTR lamp goes out while the dummy plug is inserted and lights when the plug is removed.
- (7) Connect the bell or buzzer, if any, and verify then inserting a dummy plug in jack RCV will sound the audible alarm and turn out the MSTR lamp.
- (8) At the central office end verify that the RST is locked in the NORM position with a 10A guard. This key is to be used only if the central office end is transferred to a bad or non-equipped line, and cannot be restored to regular by the user.
- (9) Simultaneously depress the key MSTR and the first working circuit key. Verify that the MSTR lamp goes out while the SPARE (LTS) and its adjacent key light.
- (10) Verify that in the central office relays C1 and TR are operated.
- (11) In the C.O. momentarily unlock and operate the restored key to release relays C1 and TR.
- (12) Simultaneously depress the keys MSTR and the first working circuit key. Verify that the lamp SPARE (LTS) and its adjacent lamp go dark. Lamp MSTR should light.
- (13) If the second access line is to be protected repeat above steps 9) thru 12) substituting the second working key and relay C2 for the key adjacent to SPARE (LTS) and relay C1 respectively.
- (14) If a third line is to be protected, repeat above steps 9) thru 12) substituting the third circuit key and relay C3.
- (15) If a fourth line is to be protected, repeat above steps 9) thru 12) substituting the end key and relay C4.
- (16) Operate the SPARE (LTS) key and observe that all six keys light.

(17) Make sure that all keys for working circuits not used are blocked unoperated.

(18) Make sure that the strap for option W in the C.O. is open if a fourth working line is not used. Make sure the strap for option V in the C.O. is open if a third working line is not used. Make sure the strap for option T in the C.O. is open if a second working line is not used.

(19) This pre-check is complete and the working circuits may be cut-through. They may be cut-through this equipment at either end with the power off. The regular working circuits will work through either end of this equipment with or without the other end, and with or without power. Power is needed only to transfer a working access line to the spare (protection). After both ends are fully wired, the working circuits are cut-through and power is applied, verify that the working circuits are working satisfactorily.

2.20 Request the user go through his manual how to operate the "Digital Access Line Protection Arrangement". He should transfer each line and turn to the spare and verify that it works.

2.21 Inform the user, if the audible alarm is provided that he has no cut off on this alarm and should call the responsible telephone company if it sounds. He may silence the alarm by transferring a working circuit to the spare but it probably will not work on the spare (customer's end will transfer and cancel the alarm even though C.O. does not transfer).

3. MAINTENANCE OF THE DIGITAL ACCESS LINE PROTECTION ARRANGEMENT (DALPA)

A. STC Maintenance Procedure

3.01 The DALPA will protect the local loops of up to four working DDS circuits operating at the same transmission speed. The customer will have to recognize a failure and initiate a manual switch.

Touch Tone Receiver J58844B, SD67027-01
35L3A Touch Tone Dial
6050B Key
Circuit Description
Schematic
Panel Wiring
Interconnections

3.02 Upon receipt of a trouble report, the the STC must verify the fact that a trouble does in fact exist. Even if a customer has already switched over to the Spare DALPA loop, he must release it in order for the STC to perform the appropriate digital loopback tests. Customer failure to promptly release his circuit will result in an Information trouble report (with no rebate) until such time that the Customer does release his circuit. If after following the Standard Dataphone Digital Maintenance Plan, a trouble is found to occur on the 4-W local loop, the Customer should be allowed to switch to the Spare DALPA and STC initiate local loop maintenance correction.

3.03 Upon correction of the local loop trouble, the STC shall notify the Customer that a release is necessary to verify that the trouble has been corrected. Customer failure to promptly release his circuit will result in the trouble ticket being closed out, with a notation that the regular circuit has been switched to the DALPA and that it requires future normaling and verification. The Customer must then be advised that any rebate ends until the circuit is released for verification.

B. Station Maintenance

3.04 The only routine maintenance for this equipment is to replace the 51A lamps in the 6050 B key which is the user's control unit. One of the six lamps labeled NSTR is normally lighted. Lamp voltage is reduced giving 8.6 to 9.6 volts DC to extend lamp life.

3.05 The control unit (6050 B key BSP 512-210-103) is wired with a lamp test pushbutton labeled SPARE (LTS). The customer may report to the Telephone Co. when he detects a burned out lamp. All other maintenance will be on a trouble basis.

3.06 If difficulty is encountered, standard maintenance is guided by the following applicable references.

BSP 809-140-152
BSP 501-164-115
BSP 512-210-103
MA 13674-CD
MA 13674-SD
MA 13674-SWT
MA 13674-T