

L3 CARRIER — DELAY DISTORTION EQUALIZATION OF AN L3 UNIT
ADJUSTMENT AT SWITCHING MAIN AND TERMINAL REPEATERS
SLOPE EQ (226L) ADJUSTMENT

This section replaces Section E34.090.11 Issue 1 and has been renumbered to allow the re-issuing of Section E34.090.11 to cover Delay Equalization of a Six Pilot system.

The Delay Buildout equalizer (DEL BO) in an L-unit is adjusted on a sectional basis with a Cosine Adjustment Receiver connected to TV test points in the line connecting equipment. If the line is being used for combined telephone and TV service, the TV service will have to be removed, but the telephone service remains on the line during the period of these adjustments. The switching circuit must be in the normal or nonoperative condition to adjust the equalizer in a regular line, so that it will be connected to its line connecting equipment. To prevent unnecessary switches due to hits, the switching circuit is disabled. In order that the television circuit function normally when a stand-by line is switched into service, the stand-by line's equalizer must be adjusted after making a manual switch so that test signals will flow through the stand-by line. Note the "*caution*" immediately below. For adjustment of a stand-by line which is equipped for television, this line must be taken out of telephone service, and its normal TV circuit be set up.

Caution: *To avoid disturbance to telephone channels on a combined system, do not change the transmitter of the cosine equalizer adjustment set from gain to delay (or vice versa) or operate the TRS switch to TP while the set is transmitting and connected to the line.*

APPARATUS

J68837C Cosine Equalizer Adjustment Set at each end of the L-unit and at TV dropping locations

STEP	PROCEDURE
TRANSMITTING END	
1	Arrange the cosine set for transmission of a delay signal in the TV band.
2	Before patching to the line, check the transmitted signal to verify that the set is not sweeping below 3.75 mc thus avoiding disturbance to telephone channels on a combined system.
3	(a) Terminal Repeater: Patch from the TR jack to the BEF IN jack, and from the BEF OUT jack on the cosine set to the TV LINE IN jack associated with the L-unit to be adjusted.

STEP	PROCEDURE
	(b) Switching Main Repeater: Patch from the TR jack to the BEF IN jack, and from the BEF OUT jack of the cosine set to the TV REC HY 1 NET jack in the line connecting equipment associated with the L-unit to be adjusted. (See Figs. attached) RECEIVING END
4	For Tests on a Regular Line, operate the LINE DISC switch to DISC on the Regular Line Initiator associated with the line under test. For Tests on a Stand-by Line, manually switch the stand-by line to the line connecting equipment which will be used to observe the adjustment. At Switching Main Repeaters only, at the Transmitting Switch Control Panel associated with the succeeding switching section operate the DISC switch to DISC. (This will prevent unnecessary switches in the following section due to pilot hits caused by DEL BO adjustment.) At All Receiving Points, patch from the REC jack of the cosine set to the TV TST jack of the line to be measured. Note: The step above has removed protection from message service on the line. The various controls used to disable the switching circuit should be left operated only long enough to make the adjustments of Step 6.
5	If a TV EQ A (336A) is located in the through branch of the receiving location's line connecting equipment, record the positions of both gain and delay terms 1 through 5, and the positions of the two delay range-extending keys which are designated "—2, —1, 0, +1, +2." Set the term knobs to "5" and the delay range-extending keys to "0." Operate the cosine receiver GAIN-DELAY key to DELAY. Set the ATT on the cosine set to 0 db and locate the received signal by means of the ZERO Control on the cosine set. Note: If delay distortion is correctly equalized, the trace of the oscilloscope will show deviations about a horizontal axis. Since the trace shows the characteristic of BOTH an upward and a downward sweep, one following the other, the desired characteristic can be described as a straight line. If the received trace slopes downward toward the high-frequency portion of the trace, the line is over equalized. Turning sections of DEL BO "IN" will add additional delay distortion and the high-frequency portion of the trace will rise. The setting of the DEL BO is given by adding the designation numbers of the switches which are in the "IN" position. Increasing the numbers of sections "IN" will cause the trace to slant upward from the low-frequency portion to the high-frequency portion. Similarly reducing the equalizer setting will cause the trace to slant downward.
6	Adjust the DEL BO switches until the portion of the received trace between the high and low-frequency markers changes from a downward to an upward slope when one-fourth of a section is added or subtracted.
7	Leave the switches in the positions which make the received trace as nearly horizontal as possible (after meeting the requirements of Step 6).

STEP	PROCEDURE
8	The SLOPE EQ (226L) should be adjusted on a monthly basis. If the SLOPE EQ is to be adjusted at this time, operate the receiver's GAIN-DELAY key to GAIN. Center the trace with the CR CENTER control. The trace on the oscilloscope will have the thickness characteristic of delay test transmissions observed for gain characteristic, but can be easily used for the adjustment of the SLOPE EQ. Adjust SLOPE EQ (226L) for maximum flatness, or minimum deviation about the horizontal axis.
9	Remove all test connections and restore the L-units to normal. Restore the controls of TV EQ A (336A) to the positions recorded in Step 5. <i>Note:</i> When more than one line is equipped for TV, the DEL BO on the stand-by line should be adjusted to an average of the delay of the lines used for TV. If it is desirable to have the best transmission over one of the regular lines, the stand-by line should be adjusted to look like the priority line.

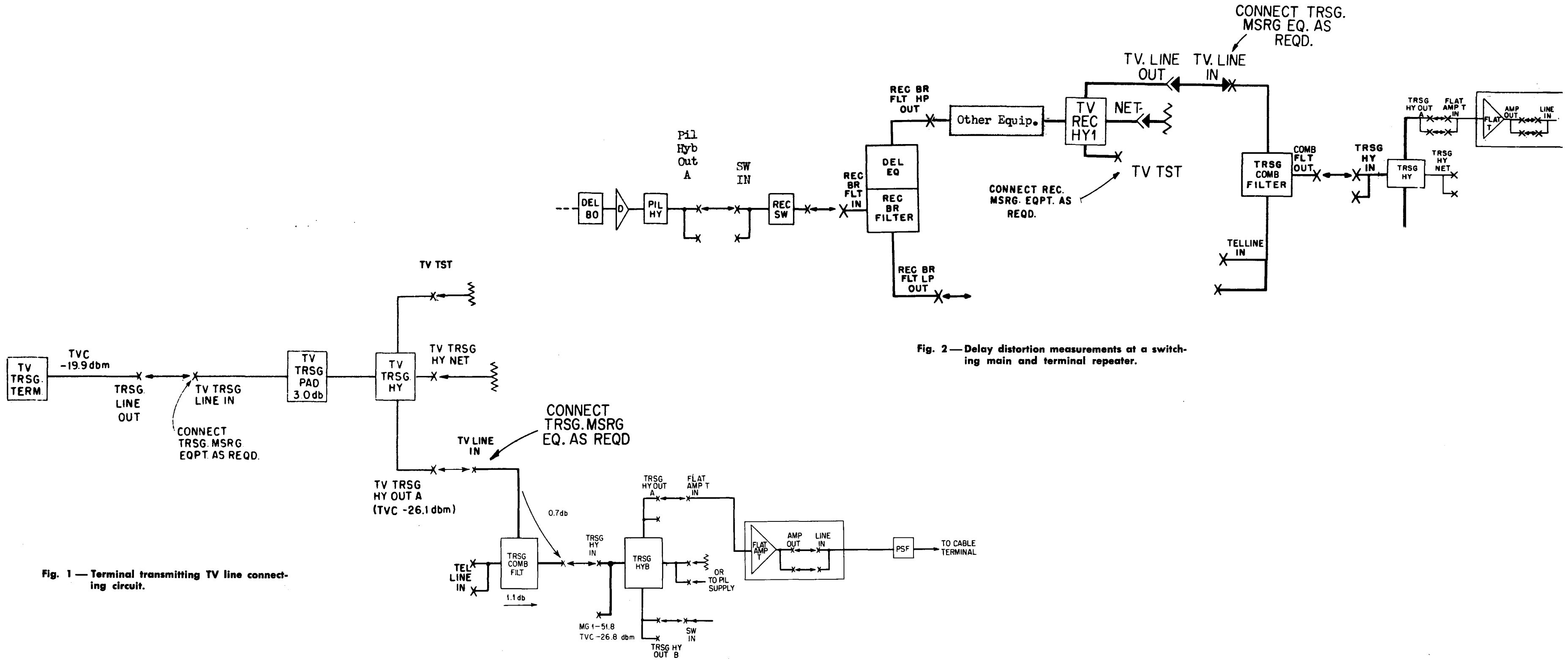


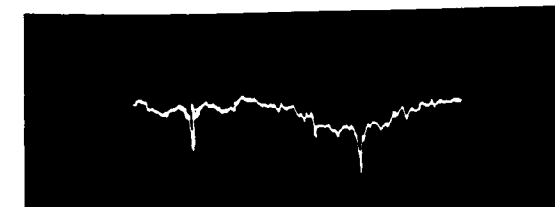
Fig. 1 — Terminal transmitting TV line connecting circuit.

Fig. 2 — Delay distortion measurements at a switching main and terminal repeater.

Note: In the following pictures the low frequencies are at the left except as noted.



NORMAL DELAY EQUALIZATION PATTERN



DELAY EQUALIZATION - OVER-EQUALIZED



DELAY EQUALIZATION - UNDER-EQUALIZED

UNDER-EQUALIZED
(low frequencies at the right)

Fig. 3 — Typical oscilloscope patterns of delay equalization on a 400-mile line.