AUTOMATIC INTERCEPT SYSTEM
TRANSMISSION CONSIDERATIONS

1. GENERAL

1.001 This addendum supplements Section 852-405-100, Issue 1.

1.002 This addendum is issued to add a 5-millisecond round-trip delay limit to the trunking makeup between the intercepting end office and the Automatic Intercept System (AIS) operators.

3. TRANSMISSION DESIGN REQUIREMENTS

The following change applies to Part 3 of this section:

Part D—paragraphs 3.11 through 3.15, added.

D. Round-Trip Delay Requirement

3.11 The layout of an AIS should limit the round-trip delay of the trunk makeup between the intercepting end office and the AIS operator to less than 5 milliseconds. This delay limit satisfactorily controls operator talker echo performance in the operator sidetone path.

3.12 Absolute delay is defined as the time a signal frequency is delayed by all the circuit elements from the transmitting end to the receiving end. Round-trip delay is twice the absolute delay.

3.13 Absolute-delay characteristics of voice-frequency trunks on metallic cable or carrier channels will vary with circuit components and circuit length. A 26-gauge H88-loaded exchange cable has an absolute-delay characteristic of approximately 80 microseconds per circuit mile, whereas the voice-frequency channel units on a T1 Digital Transmission System have a total 300-microsecond delay for the two channel banks and 8 microseconds delay per mile of T1 repeatered line. Circuit calculations are made using the absolute-delay characteristics shown in Tables A through F in BSP Section AB27.401.2, which covers metallic and carrier facilities.

3.14 The trunking makeup between the intercepting end offices and the AIS operator may be composed of either metallic facilities or carrier facilities or a combination of both. As an example: The round-trip delay of a trunk composed of 15 miles of H88-loaded cable and one 44V4-type repeater would be calculated as follows:

(a) 44V4 repeater with 359-type equalizer (Table E) = 138 μs

(b) 15 miles 26-GA H88 cable, 80 μs/mi (Table B) = 1200 μs

(c) Total absolute delay (138 + 1200) = 1338 μs

(d) Total round-trip delay (2 $\times$ 1338 μs) = 2.7 milliseconds

The round-trip delay of a 50-mile trunk composed of D1 channel banks and a T1 line would be calculated as follows:

(a) D1 channel bank (2 $\times$ 150 μs) (Table D) = 300 μs

(b) T1 line (50 $\times$ 8 μs/mi) (Table D) = 400 μs

(c) Total absolute delay (300 + 400) = 700 μs

(d) Total round-trip delay (2 $\times$ 700 μs) = 1.4 milliseconds

If the 15-mile cable and 50-mile T1 system are combined into an integrated trunk, the round-trip delay is calculated as follows:

(a) Cable round-trip delay = 2.7 milliseconds

(b) T1 system round-trip delay = 1.4 milliseconds

(c) Total round-trip delay (2.7 + 1.4) = 4.1 milliseconds

This integrated trunk is satisfactory, since the delay is less than 5 milliseconds.

3.15 Regardless of the composition of the trunking between the intercepting end office and the AIS operator, the total round-trip delay should not exceed the 5-millisecond limit.