DIAL TONE SPEED

NETWORK OPERATIONS—COMMON METHODS

NO. 3 ELECTRONIC SWITCHING SYSTEM

1. GENERAL

1.01 This section describes the dial tone speed (DTS) test and the network administrators responsibilities of DTS for the No. 3 Electronic Switching System (ESS).

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The title for each figure includes a number(s) in parentheses which identifies the paragraph(s) in which the figure is referenced.

DIAL TONE SPEED TEST DESCRIPTION

1.04 Dial tone speed tests are made in switching systems to measure the grade of dial tone service received by customers. Previously, these tests consisted of several measurements which were made on system-generated calls, customer-generated calls, or test calls initiated by measurement devices. No. 3 ESS, however, has the capability to conveniently measure the length of time required to give dial tone to actual customer-originated calls. *In No. 3 ESS, a dial*

tone speed test is performed on every originating call. This method provides more accurate and realistic data on dial tone speed and delay. Previous electronic and electomechanical systems generated a standard 900 hourly attempts, whereas No. 3 ESS relies strictly on actual attempts. If the schedule printout (H or C) reflects 624 originations, then there were 624 dial tone "tests", not the previously generated 900 tests.

1.05 When a line goes off-hook and is first recognized by the line scanning subroutine, a service request entry is placed in the input hopper and the call is time stamped (time of origination is noted). On the next base level loop, the line is rescanned. If it is no longer off-hook, it is considered a hit, is removed from the hopper, and is not counted in any dial tone speed measurements. If it is not a hit, the call is assigned to a transient call record (TCR) and a customer digit receiver (CDR).

1.06 A path to the CDR is established. Before dial tone is issued, however, a continuity test is performed to find if the line has abandoned. If this line has abandoned, the dial tone speed test ends. If the line has not abandoned, the dial tone speed test ends one base level loop after the order is given to issue dial tone.

1.07 Dial tone delay is calculated to be the time of the end of the dial tone speed test minus the time of the original time stamp plus a *line scanning delay factor.* The line scanning delay factor is used to account for service request entries placed in the input hopper sometime after the line went off-hook. Every time the line scanning subroutine begins scanning at the top of scanner number 1, the delay factor is recalculated. The delay factor is equal to one-half the length of time from the beginning of the line scanning period to the beginning of the next one.

1.08 The *Dial Tone Blockage* count is pegged once when a path between an originating line and a CDR cannot be found on the *second* attempt. Once a TCR has been selected for a service request entry in the input hopper, a CDR is selected and a path from the line to the CDR is reserved. If the path hunt fails, a new CDR is selected and a second attempt is made to reserve a path. If the second path hunt fails, this count is pegged and the identification of the line is placed in the dial tone blockage and matching loss report.

This report appears on the Network Maintenance TTY.

1.09 The procedure for a service request at this point is to idle the CDR, move the entry into the TCR, and time the entry for three seconds. During this timing period, the ESS does not recognize an abandon by the originating line. After the elapse of three seconds, the line origination program adds three seconds to the total dial tone delay measurement, increments the dial tone blockage (OFT74) once again, and increments the number of dial pulse dial tone delays over three seconds count (OFT04) or the number of TOUCH-TONE® dial tone delays over three seconds count (OFT08).

1.10 The service request entry is then placed back into the input hopper and the line origination program again attempts to obtain a CDR and a path to it. The ESS continues to repeat the procedure of making two attempts to find a path to a CDR, removing and timing for three seconds, and incrementing appropriate counts until either the originating line abandons or receives dial tone.

DTS RESPONSIBILITIES OF THE NETWORK ADMINISTRATOR

1.11 The No. 3 ESS, used as a community dial office (CDO), provides the network administrator more extensive control and more measurements than any previous CDO. The No. 3 ESS is a common-controlled system that uses its "intelligent" capabilities to provide a constant flow of data. These data aid the network administrator in properly administering the office with on-going records. These additional records will permit the No. 3 ESS administrator the opportunity to perform analysis tasks which could not have been performed previously with the electromechanical CDO systems.

1.12 The network administrator's responsibilities associated with DTS are as follows:

• Busy hour determination

• Data collection

• Daily review

• Trouble analysis

• Result reporting.

2. BUSY HOUR DETERMINATION

2.01 A busy hour is determined independently for the DTS component. This may not be an easy task since DTS is not considered to be a problem in the No. 3 ESS. However, according to theory, the abrupt and rapid increase in dial tone delay will be an inherent property of the No. 3 ESS during heavy overloads. This is discussed further in Part 5.

2.02 Dial tone delay data must be acquired during the actual busy hour to measure dial service quality. The Network Administration group must determine that the busy hour has been correctly established. It must also be alert for shifts in the busy hour due to changes in calling characteristics.

2.03 For purposes of computing the indexed DTS component, the *busy hour* is defined as that time-consistent hour having the greatest average business day percentage dial tone delay over 3 seconds. The busy hour may start on the hour or half hour, (eg, 10 a.m. to 11 a.m., 10:30 a.m. to 11:30 a.m.).

2.04 Each year, prior to the busy season period, the busy hour is selected from DTS data obtained during the previous busy season period. The busy hour selected from these data is retained for the duration of the current busy season period unless results show another time-consistent clock hour having an average business day percentage dial tone delay over 3 seconds that exceeds the designated busy hour results by at least 0.5 percent for each of two consecutive service observing months. If this occurs, the hour with the higher percentage dial tone delay over 3 seconds is designated as the new busy hour commencing no later than the second month; it is generally retained for the remainder of that busy season period.

Example:

Dial Tone Delay Over 3 Seconds

	December	January
9 a.m. to 10 a.m. (Previously designated BH)	1.1%	2.0%
7:30 p.m. to 8:30 p.m.	1.6%	2.7%
Difference	0.5%	0.7%

(Starting in January, report 7:30 p.m. to 8:30 p.m.)

(a) Whenever the busy hour is not readily apparent or a shift in busy hour is expected, data for the 2 or 3 busiest or pertinent hours should be accumulated each day during the current busy season to accurately forecast the hour to be used for the next busy season. A study of half hours for one or two representative weeks should be made to determine these 2 or 3 hours. Ordinarily the study would be made early in the busy season period.

(1) When a pronounced busy hour is indicated and data are accumulated for a single hour, a second study is made during a later month when traffic loads normally are higher. If at that time several hours are close, studies need to be continued for a longer period, as in the preceding paragraph.

(b) A record should be made by the following notations on Form E-4372 when a service observing busy hour is changed:

(1) Show the clock period and service results for the previously designated busy hour.

(2) Indicate dates of verification studies.

(c) It is highly important that official DTS measurement results not be shifted to a new hour without appropriate *validated* data.

(1) Recognition should be given to maintenance outages, abnormal equipment operating conditions affecting service results; to area transfers, new tariff offerings, or other factors affecting traffic characteristics; and to pertinent customer trouble reports.

(2) When the hour of highest dial tone delay does not substantially coincide with the hour of maximum CCS usage for that type of equipment, the reason(s) should be investigated and documented.

2.05 In a No. 3 ESS office, which is 100 percent dial pulse or 100 percent TOUCH-TONE receivers, the DTS busy hour is selected for the entity as a whole. A No. 3 ESS office with both dial pulse and TOUCH-TONE receivers may have a separate DTS busy hour for each. Also, since DTS busy hour(s) may, in all probability, occur outside the office busy hour (since DTS is a result of attempts, not network load), the network administrator is *cautioned* not to assume that DTS and office busy hour coincide.

3. DATA COLLECTION

A. Traffic Measurement Schedules

3.01 Network Administration and Network Maintenance measurements in the No. 3 ESS can be assigned to five different measurement schedules. A specific measurement can be assigned to only one schedule at a time. The schedules are the quarter-hour (Q), the busy-hour (H), the continuous nonbusy-hours (C), the daily (D), and the weekly (W). The following describes each schedule.

3.02 *Quarter-Hour Schedule (Q Schedule):* The measurements assigned to the Q schedule represent data for a 15-minute period. If the Network Administration teletypewriter is defined in the dedicated mode, or the partially dedicated autoconnect mode, the network administrator may elect to have Q-schedule reports automatically generated every 15 minutes on the Network Administration teletypewriter. If the teletypewriter is nondedicated autoconnect, the reports cannot be generated automatically; however, the Q registers will be updated to the OFT registers. In either case, the network administrator can manually request a printout of Q-schedule reports at any time. If a printout is requested, the totals since the last 15-minute collection period and the totals for the previous three 15-minute collection periods are reported. For example, if a Q-schedule printout is requested at 4:21 p.m., the ESS will print the Q-schedule totals for 3:30 to 3:45 p.m., 3:45 to 4:00 p.m., 4:00 to 4:15 p.m., and 4:15 to 4:21 p.m. Q-schedule data are normally printed every 15

minutes on the maintenance teletypewriter, but the maintenance force may inhibit this printout by the use of teletypewriter input message **RC:QH.** A Q-Schedule Format is shown in Fig. 1. A Q-Schedule Sample is shown in Fig. 2.

3.03 *Busy-Hour Schedule (H Schedule):* The measurements assigned to the H schedule represent data for a one-hour period. At the beginning of an H-schedule collection period, all registers assigned to the H schedule are cleared. If the Network Administration teletypewriter is defined as dedicated or partially dedicated autoconnect, registers are read and printed at the end of the collection period. If the teletypewriter is nondedicated autoconnect, registers are read and readings are transferred to magnetic tape at the No. 3 ESS. The nondedicated autoconnect feature allows the No. 3 ESS to call the Network Administration teletypewriter at a scheduled time and to print from magnetic tape all H-schedule data collected during the previous collection interval. All H-schedule data collected on magnetic tape will be printed beginning at the time specified as the end of the D-schedule collection period (see paragraph 3.05). The network administrator may schedule up to 23 one-hour collection periods for H-schedule data; however, if the nondedicated autoconnect method is employed, the network administrator may limit data collection to a maximum of three collection periods a day to avoid excessive wear on the magnetic tape cartridge which stores the data. Each collection period may be consecutive, but should not overlap with another H-schedule collection period. See Fig. 3 for an H-Schedule Format and Fig. 4 for an H-Schedule Sample.

3.04 *Continuous Nonbusy-Hours Schedule (C Schedule):* The measurements assigned to the C schedule represent data which can be collected for one or more hours. This schedule should be used for measurements required outside of normal H-schedule collection periods. At the beginning of the C-schedule collection period, all registers assigned to the C schedule are cleared. At the end of the collection period, the registers are read and the data are printed on the Network Administration teletypewriter. *The C schedule is available only when the dedicated or partially dedicated autoconnect Network Administration teletypewriter is used.* If a nondedicated autoconnect arrangement is used, measurements which are normally assigned to the C schedule must be assigned to other schedules.

See Section 233-020-254 for additional information on teletype arrangements.

3.05 *Daily Schedule (D Schedule):* The measurements assigned to the D schedule represent data collected for 24 hours. The network administrator may begin one collection period and end another at any time between 10 p.m. and 6 a.m. If the nondedicated autoconnect teletypewriter arrangement is used, the ESS will call the Network Administration teletypewriter and print the D-schedule report upon the completion of thè scheduled collection period. During this connection, all data stored on magnetic tape will also be printed. The operation of the D-schedule routine is the same for dedicated and the two autoconnect teletypewriter arrangements.

3.06 *Weekly Schedule (W Schedule):* The measurements assigned to the W schedule represent data collected for any number of half-hour periods per day. The network administrator assigns the half-hour periods collected. The periods must be the same for each day of the week. The registers on the W schedule are read, printed on the Network Administration teletypewriter, and cleared once a week on Sunday night. Each night the W-schedule registers are read and printed. This printout represents totals from the last Sunday night to the day of the printout. The operation of the W-schedule routine is the same for dedicated and the two autoconnect teletypewriter arrangements.

3.07 Data on the H, C, and W schedules can be collected beginning on any clock hour or half-hour. For example, a collection could begin at 4:00 p.m. or 4:30 p.m., but could not begin at any time in between.

3.08 As mentioned in paragraph 3.02, Q-schedule reports can be requested by the network administrator at any time, whether they have been scheduled to print automatically or not. However, *no other reports can be requested by the network administrator.* The other reports are printed *only* at their scheduled times.

B. Measurement Report Format

3.09 Data on each schedule (Q, H, C, D, and W) are printed on the Network Administration teletypewriter with a heading of the same format. The format is shown in Fig. 1 and 3.

3.10 *REPT TRF* identifies the printout as a traffic report. *Date* and *Time* represent the date and time of the completion of the collection period of the schedule. *Office Identification* is the numeric designation assigned to the No. 3 ESS office from which the schedule was taken. *Schedule Identification* is the identification of the schedule itself (Q, H, C, D, or W).

3.11 The *EA Counter* is a counter which keeps a record of emergency actions (EAs) (system initializations) which occur during the measurement period of the schedule. The counter contains the identity of the level of emergency action which occurred during the measurement period and the time at which it occurred. The EA counter is further discussed in paragraphs 5.02 through 5.05.

C. Measurements—Office Totals (OFT)

3.12 Office total measurements can be assigned to either the H schedule or the C schedule. It is recommended that these measurements be primarily assigned to the H schedule. The first 16 measurements (OFT01 through OFT16) also appear on the Q schedule where they represent 15 minutes of data collection. These registers on the H schedule represent the sum or an average of the Q-schedule collections for the period of the H schedule. Listed below are the data of interest for DTS testing.

OFT01—Average Dial Pulse Dial Tone Delay

3.13 This count is a computation of the total dial tone delay for dial pulse originations divided by total dial pulse originations and expressed in units of seconds times ten. Total dial tone delay for dial pulse originations is a sum of the dial tone delay for each attempt originated from a dial pulse line. *In No. 3 ESS, a dial tone speed test is performed on every originating call.*

OFT02—Percentage of Dial Pulse Dial Tone Delays Over Three Seconds

3.14 This count represents the percentage of originations from dial pulse lines which experience a dial tone delay greater than three seconds. This count is calculated by dividing the number of dial pulse dial tone delays over three seconds (OFT04) by the total number of originations from dial pulse lines (OFT03).

OFT03—Dial Pulse Originations

3.15 This count is pegged each time a dial pulse line goes off-hook, remains off-hook for two consecutive line scans, and is assigned to a TCR and a CDR-DP. Hits (lines off-hook for only one line scan) are not included.

OFT04—Number of Dial Pulse Dial Tone Delays Over Three Seconds

3.16 This count is pegged each time a dial tone speed test for a dial pulse line exceeds three seconds.

OFT05—Average TOUCH-TONE Dial Tone Delay

3.17 This count is the same as OFT01, except that delay for TOUCH-TONE lines is calculated.

OFT06—Percentage of TOUCH-TONE Dial Tone Delays Over Three Seconds

3.18 This count is the same as OFT02 except that delay for TOUCH-TONE lines is calculated.

OFT07—TOUCH-TONE Originations

3.19 This count is the same as OFT03, except that it represents TOUCH-TONE originations.

OFT08—Number of TOUCH-TONE Dial Tone Delays Over Three Seconds

3.20 This count is pegged each time a dial tone speed test for a TOUCH-TONE line exceeds three seconds.

OFT16—Dynamic Service Protection Usage

3.21 This count is pegged once each 100 seconds when conditions are such that dynamic service protection would deny service. *This count is made whether or not dynamic service protection is in the allowed mode.* See Part 5.

OFT74—Dial Tone Blockage

3.22 This count is pegged as described in paragraphs 1.08 through 1.10.

D. DTS Measurement—Days

Days to be Included

3.23 Valid DTS data for five business days each week (generally Monday through Friday) should be included in the DTS component of the Dial Line Index. In some locations, Saturday may be one of the busy days. Saturday may be used in place of a normal business day provided it is consistently one of the five high days.

3.24 All business days of the month are to be reported and included in the Dial Line Index, regardless of the service conditions. Such conditions may exist due to civil disturbances, curfews, storms, floods, impaired dial facilities, Western Electric installation activities, etc. These are indications of the type of service the customers are receiving from the system.

Days to be Excluded

3.25 Holidays celebrated on a nationwide basis, in general, do not carry traffic representative of the average business day and may be excluded from the Dial Line Index. For example, Christmas Eve evening data are highly unrepresentative and would not be included. Special days proclaimed as a holiday may be excluded only if they are observed as a holiday on a nationwide basis. Some holidays (such as Lincoln's Birthday, Veteran's Day, Columbus Day, and Good Friday) may well be equal to or greater than a representative business day. If one of these holidays falls on a weekday or is celebrated on a Monday or Friday, these days may be included in the Dial Line Index, if locally desired. Refer to Traffic Service Observing Practices, Division F, Section 2B for more information.

4. DAILY REVIEW

4.01 The network administrator should review the DTS service indicator daily. A first-hand knowledge of subscriber service is required to indicate when corrective action is necessary. It also acts as an indicator as to how well the office is functioning during an overload. Close analysis of the traffic schedules with DTS will enable the network administrator to closely monitor dial tone service results. Since there are differences in the TTY arrangements, the daily review may be an *after-the-fact* happening for nondedicated

autoconect. The maintenance Q schedule or customer reports may be DTS indicators.

5. TROUBLE ANALYSIS

5.01 Trouble analysis will involve two areas: trouble with the data (*invalid* data) or trouble with performance (poor dial tone speed results). Either trouble condition must be analyzed and corrective action taken, if necessary.

A. Invalid Data

5.02 The network administrator is notified of possible invalid data due to an emergency action (EA) (system initialization). This notification is by an EA counter that will appear in the heading of a measurement schedule. The EA counter is a counter that keeps a record of EAs that occur during the measurement period of the schedule. The counter contains the identity of the level of EA and the time it occurred during the measurement period.

5.04 The EA counter will identify only one level of EA occurring during the measurement period. If more than one level takes place during the measurement period, the ESS will use the following procedure to determine which level is reported.

- If the level of action *does not clear measurement registers* and is equal to or greater than any previously occurring level, then it is reported on the EA counter (highest level to occur is reported).

- If the level of action *clears measurement registers,* it is reported on the EA counter whether or not it is the highest level to occur (most recent level to occur is reported).

5.05 The network administrator, in association with the network design engineer, should suspect any busy hour data if the level of action clears the measurement registers. If the cycle count is less than 36, and if the EA is 5, then the measurement registers were cleared. Data for this period should be used only if possible high-day, or ten-high-day use and if local policies warrant. For further information pertaining to the effects of EAs, see Section 233-020-252, System Initialization Procedures.

5.06 When dynamic service protection (DSP) is in effect (see Section 233-020-250), two Network Administration measurements become ineffective: *total dial tone delay* and *dial tone blockage peg count.*

5.07 These two measurements should be discarded if collected during a period in which DSP is in effect.

5.08 DSP is to be used only under conditions established by local operating company policy. The network administrator, following company policy, is jointly responsible with the maintenance force for determining if DSP should be allowed. In normal operation, it is recommended that DSP be left in the inhibited (disallowed) state.

B. Poor DTS Results

5.09 When dial central office equipment is properly provided, dial tone delay generally does not constitute a problem. However, there may be times, such as mentioned in paragraph 5.06, when unusual circumstances cause a serious deterioration of dial tone speed. This may occur other than during the usual busy hour of a business day and does require the immediate attention of the network administrator. These occurrences may not be seen if the Traffic Schedule Block is not defined to collect print either to TTY or to tape.

5.10 Dial tone is considered to be delayed when it is not returned within 3 seconds after the customer goes off-hook. This component is expressed in terms of percentage of calls delayed over 3 seconds (% over 3 seconds) for which there are the following engineering service objectives for No. 3 ESS offices:

DIAL TONE SPEED OVER 3 SECONDS	BUSY HOUR SERVICE OBJECTIVE
Average Busy Season	Not over 1.5%
Highest Annually Recurring Day	Not over 20.0%

5.11 When the above mentioned service objective has not been met, the network administrator should first determine if equipment is properly provided. This can be done by reviewing past

records. See Section 233-020-230, Machine Capacity Management. Factors that may affect DTS are line load balance, CDR capacity and balance, trunk balance, and class-of-service (ie, numerical spread of lines, trunks, and service circuits across a switch) balance. Serious network imbalance may cause DTS delays that will require corrective action.

5.12 Another source to help the network administrator clear trouble is the Dial Tone Blockage report. The No. 3 ESS provides the identification of office equipment numbers affected by dial tone blockage. A 2-word block is set aside in memory for use in identifying blockage. If a line fails to receive dial tone after two attempts due to no network path being available, the office equipment number (OE) of the line is placed in one word of the block along with a code which identifies the entry as a dial tone blockage. If two office equipment numbers cannot be connected together due to no network path being available, both office equipment numbers are placed in the other word of the block along with a code which identifies the entries as a network matching loss.

5.13 The block is scanned by the program every 30 seconds. If an entry is found, it is printed on the Network Maintenance teletypewriter and the block is cleared. A maximum of one dial tone block and one matching loss can be stored in the block at one time.

5.14 The output message on the maintenance teletypewriter is as follows:

tt REPT AAA aaaaaa bbbbbb

where **tt** = the minutes past the clock hour of the time of the printing.

AAA = DTB for a dial tone block.

= IML for a matching loss.

aaaaaa = The OE of a dial tone block or one of the OEs of a matching loss.

bbbbbb = The second OE of a matching loss.

5.15 The purpose of the report is not to identify every blocked office equipment number, but rather to aid administration and maintenance personnel in identifying the source of blockage.

5.16 The Network Maintenance force may use the report to help locate faulty network hardware. Network Administration may use the report to locate potential load imbalance. The network administrator should ask Network Maintenance to provide all dial tone blockage and matching loss reports on a regular basis.

6. RESULT REPORTING

6.01 Once a month each operating telephone company is required to submit data to AT&T which includes busy hour dial tone speed delays. The following paragraphs discuss result reporting.

A. Method of Obtaining Daily Weighted Percentage DTS for an Entity

6.02 The weighting factors developed each day for computing the daily weighted DTS results are based on originating calls taken during the busy hour.

6.03 Separate DTS results are to be obtained by the type of customer digit receiver, and results are weighted daily. If an office is arranged by CDR group as 100 percent TOUCH-TONE or dial pulse service, weighting is not required.

> *Note:* If only TT-CDRs are defined (SVC064), then originations will not be observed on OFT03. All originations, DP and TT, will occur on OFT07.

(a) *Weighting Factors:* The weight assigned to dial pulse and TOUCH-TONE service is based on the total receiver peg count. It is the percentage of each type of the total receiver peg count of the entity being weighted.

(b) *Example Calculations:* (No. 3 Entity-Dial Pulse and TOUCH-TONE Receiver):

(1) Determine the weighting factors as follows:

Type of CDR	DTS Busy Hour		% of Total (Shown as Factor)
	Time	Peg Count	
DP	9:30 a.m. — 10:30 a.m.	359	0.573
TT	10:30 a.m. — 11:30 a.m.	267	0.427
Total		626	1.000

(2) Calculate the weighted percentage DTS by the type of receiver as follows:

Type of CDR	No. of Studies (DTS Busy Hour)	(1) % DTS Over 3 Seconds (Receiver Busy Hour)	(2) Factor	(1X2) Weighted % DTS
DP	359	1.3	0.573	0.74
TT	267	0.9	0.427	0.38
Total	626		1.000	1.12

B. Computing DTS Results at Entity Level

6.04 *For 22 Business Days Measured in Observing Month:*

Step 1: Separately, for each business day measured, read the entity weighted busy hour percentage dial tone delay over 3 seconds directly into the Dial Tone Speed—BH Index Table (Fig. 5) to determine the dial tone speed index points earned for each day. Express the result to two decimal places.

Step 2: Total the daily index points earned (as obtained in Step 1) for the 22 days measured. Express the result to one decimal place. The sum of the daily points earned is to be used in computing the entity Dial Line Index.

6.05 *For 15 through 21, 23, or 24 Business Days Measured in Observing Month:*
The Dial Tone Speed Index Table is based on daily points obtainable for a 22-business-day month. This means that if DTS results are available for 15 through 21 days, the points obtainable for the month will be something less than the points allocated to the DTS component. Conversely, if 23 or 24 days are measured, the points obtainable would exceed the points allotted. In these cases,

a DTS adjustment factor is applied to the sum of the daily points earned for the measured days to increase (or decrease) the total points earned to the equivalent of the maximum monthly points possible.

Step 1: Determine the sum of the daily points earned for the number of days measured, reported to two decimal places.

Step 2: Multiply the sum of the total points earned by the appropriate DTS adjustment factor. Express the result as a percentage, rounded to one decimal place.

Note: The earned points reported should never exceed the maximum points allocated to the DTS component.

6.06 *For Less Than 15 Days Measured in Observing Month:* If less than 15 days are measured in any month, the DTS component is to be omitted from the Dial Line Index, and official dial line results.

6.07 *Dial Tone Speed Component Index:*
The Dial Tone Speed Component Index is obtained by dividing the total points earned for the month by the maximum points available and multiplying the result by 100.

C. Preparation of Form E-4372—BUSY HOUR DIAL TONE SPEED

General

6.08 Form E-4372, *BUSY HOUR DIAL TONE SPEED,* is provided for computing daily busy hour DTS results for an entity (Fig. 6). For local reproduction purposes, a full size form is provided at the end of this section.

6.09 The preparation of Form E-4372 will generally be the responsibility of the Network Administration group. A duplicate copy shall be forwarded to the service observing group or as local practices dictate.

6.10 The term *item* as used in the subsequent instructions refers to the column number, or block number, of the corresponding item on the *Busy Hour Dial Tone Speed* Form E-4372.

Only items which relate to the No. 3 ESS will be discussed herein.

Instructions for Use of Form E-4372

6.11 *Items—Top of Form E-4372:* Space has been provided for entering the following information:

    (a) *Report Month:* Enter the service observing month and year for which the DTS data is reported.

    (b) *Page — of —:* Enter the page number and the total number of pages for the office.

    (c) *Entity:* Identify the entity for which DTS data is reported.

    (d) *Type of Central Office Equipment:* Enter the type of dial central office equipment provided the entity. For No. 3 ESS, the term *DTST Program* will suffice.

6.12 *Item 1—Date Business Days:* Enter the date of each business day. Days on which DTS measurements are to be included in the Dial Line Index are covered in paragraphs 3.23 and 3.24; days to be excluded are covered in paragraph 3.25.

6.13 *Items 2 through 9:* Form E-4372 is designed for entering DTS data for a single entity. The form provides for reporting a maximum of four separately measured classes of service. However, for the No. 3 ESS, only two types of service (DP and TT) are available.

    (a) *Class and Type:* Space is provided for identifying each measured class and type.

    (b) *Time:* Enter the DTS busy hour for each type, whether the selected busy hour is the same or a different hour for each type. Rules for determining the DTS busy hour for each type of dial central office equipment are outlined in Part 2.

    (c) *Factor:* Leave blank, since the factor must be computed *daily* for each type as determined in paragraph 6.03.

6.14 *Items 2 and 6—Number of Tests:*

    (a) Enter the number of DTS tests obtained during the DTS busy hour separately for each type. This is the number of OFT03 or OFT07 from the traffic schedule.

    (b) Enter the code NA in this item whenever number of tests are not available.

6.15 *Items 3 and 7—Number Over 3 Seconds:*

    (a) Enter for each day the number of delays registered during the DTS busy hour separately for each type. This is the number from OFT04 or OFT08 of the traffic schedule.

    (b) Enter the code NA in this item whenever DTS delays are not available.

6.16 *Items 4 and 8—Percentage Over 3 Seconds:* For each type, enter OFT02 or OFT06.

    (a) Enter the code NA in this item whenever a code NA has been entered under *No. Tests* and/or *No. Over 3 Seconds* for a particular type.

    (b) Line Designated *Total:* Total the percentage figures separately for each type for the month.

    (c) Line Designated *Average:* Divide the *Total* as determined in (b) by the number of days used in arriving at the total.

6.17 *Items 5 and 9—Weighted Percentage Over 3 Seconds:* Enter for each day the weighted percentage DTS over 3 seconds for each type. Multiply the % *Over 3 Seconds* in items 4 and 8 by the corresponding daily calculated weighting factors. Express the result to one decimal place.

    (a) Enter the code NA in this item whenever the code NA has been entered in the item % *Over 3 Seconds* for a particular type.

    (b) Enter the code NA in this item whenever a check mark (✓) has been entered in item 19.

6.18 *Item 18—Number of Tests—Total Class Busy Hours:*

(a) Enter for each day the total number of DTS tests. This is the sum of entries recorded in items 2 and 6.

(b) Enter the code NA in item 18 whenever DTS results are not available for one (or more) type, as indicated by the code NA in any of items 2 through 9.

6.19 *Item 20—Daily Weighted Percentage Over 3 Seconds—Total Class Busy Hours:*

(a) Enter for each day, the daily weighted percentage DTS for the entire entity. Report the result to one decimal place. This is the sum of entries recorded in items 5 and 9.

(b) Enter the code NA in item 20 whenever a check mark (✔) has been entered in item 19.

6.20 *Item 21—Accumulated Weighted Percentage Over 3 Seconds—Total Class Busy Hours:* For each day, enter the accumulated weighted percentage DTS over 3 seconds. Add the *Daily Wtd. % Over 3 Seconds* in item 20 to the previous day's accumulated weighted percentage over 3 seconds.

(a) Line Designated *Total:* Enter the same figures as shown for the last day reported in item 21.

(b) Line Designated *Average:* Divide the *Total* as determined in (a) by the number of days used in arriving at the total.

6.21 *Items 22 and 23—Points Earned—Total Class Busy Hours:* Items 22 and 23 are used for entering *daily* and *accumulated daily* index points earned for the DTS component of the Dial Line Index. These items are used for ESS, crossbar and panel entities, and the TOUCH-TONE portion of step-by-step entities partially equipped with common equipment.

(a) *Item 22—Points Earned—Daily:* For each measured day, read the *Daily WTD. % Over 3 Seconds* in item 20 directly in the *Performance* column of the "Dial Tone Speed—BH" table (labeled Crossbar— ESS—Panel SXS TT) of the Dial Line Index Table (Fig. 5). Enter the corresponding points earned in item 22. Report the result to two decimal places.

(b) *Item 23—Points Earned—Cumulative:* For each measured day, enter the accumulated DTS index points earned. Add the *daily points earned* in item 22 to the previous day's accumulated DTS points earned. Express the result to two decimal places.

(1) Line Designated *Total:* Enter the accumulated index points earned for all days reported in the total month. This is the same figure as shown for the last day, reported in item 23. Report the result to two decimal places. Enter the code NA whenever less than 15 days are measured in the observing month.

6.22 *Item 24—Weighting Factors:* This item not applicable to No. 3 ESS, since the weighting must be calculated daily. See paragraph 6.03.

6.23 *Item 25—Calculated Dial Tone Speed Test:* This item not applicable to No. 3 ESS.

6.24 *Item 26—Adjustment Factor—Total Month:* Enter the *Adjustment Factor* corresponding to the total number of days that DTS data are reported and indexed for the total service observing month. This factor is obtained from the Dial Line Index Table.

6.25 *Item 27—Total Adjusted Index Points Earned—Total Month:* Multiply the *Points Earned Cumulative* in item 23, line designated *Total,* by the conversion factor in item 26. Enter the result in item 27, reported to one decimal place.

6.26 *Item 28—Component Index—Total Month:* Divide the *Total Adjusted Index Points Earned* reported in item 27 by the maximum DTS points attainable. Express the result as a whole number.

Note: Round the component index to the next higher number whenever the fraction is 0.5 or larger. For example, 97.49 is to be reported 97; 97.50 is to be reported 98.

6.27 *Item 29 Weakspot (✔)—Total Month:*
Enter a check mark (✔) in item 29 whenever the Dial Tone Speed Component Index for the Entity, as reported in item 28, is 89 or lower.

6.28 *Item 31—Notes:* Space is provided at the bottom of the form for entering a written explanation of any pertinent service item or unusual occurrence.

7. SUPPLEMENTARY INFORMATION

7.01 Additional information on the No. 3 ESS DTS can be found in the following documents:

(a) No. 3 ESS Translation Guide, TG-3, Division 8

(b) Input Manual, IM-3H300-01

(c) Output Manual, OM-3H300-01

(d) Traffic Service Observing Practices, Division F, Section 2B

(e) Bell System Practices:

Section 233-020-010, Administration Responsibilities

Section 233-020-020, Measurements

Section 233-020-230, Machine Capacity Management

Section 233-020-250, Dynamic Service Protection

Section 233-020-252, Initialization

Section 233-020-254, Teletypewriter Arrangements

REPT TRF		Date	Time		Office Identification		Q	EA Counter		
QH	Q01	Q02	Q03	Q04	Q05	Q06	Q07	Q08	Q09	Q10
	Q11	Q12	Q13	Q14	Q15	Q16				

Note: Q01 through Q16 and OFT01 through OFT16 are synonymous.

Fig. 1—Q Schedule Format (3.02) (3.09)

44	REPT	TRF	05/06/77	15:44:37	412528	Q	0	00:00		
QH		7	0	299	0	7	0	41	0	1	0
		102	0	11	0	0	0			

END OF REPORT

Fig. 2—Q Schedule Sample (3.02)

REPT TRF		Date		Time		Office Identification	H		EA Counter	

CYC CYC01

OFT	OFT01	OFT02	OFT03	OFT04	OFT05	OFT06	OFT07	OFT08	OFT09	OFT10
	OFT11	OFT12	OFT13	OFT14	OFT15	OFT16	OFT17	OFT18	OFT19	OFT20
	OFT21	OFT22	OFT23	OFT24	OFT25	OFT26	OFT27	OFT28	OFT29	OFT30
	OFT31	OFT32	OFT33	OFT34	OFT35	OFT36	OFT37	OFT38	OFT39	OFT40
	OFT41	OFT42	OFT43	OFT44	OFT45	OFT46	OFT47	OFT48	OFT49	OFT50
	OFT51	OFT52	OFT53	OFT54	OFT55	OFT56	OFT57	OFT58	OFT59	OFT60
	OFT61	OFT62	OFT63	OFT64	OFT65	OFT66	OFT67	OFT68	OFT69	OFT70
	OFT71	OFT72	OFT73	OFT74						

*TRK	TRK01	TRK02	TRK03	TRK04	TRK05	TRK01	TRK02	TRK03	TRK04	TRK05
	TRK01	TRK02	TRK03	TRK04	TRK05	TRK01	TRK02	TRK03	TRK04	TRK05
	TRK01	TRK02	TRK03	TRK04	TRK05	TRK01	TRK02	TRK03	TRK04	TRK05
	TRK01	TRK02	TRK03	TRK04	TRK05					

*SVC	SVC01	SVC02	SVC03	SVC04	SVC05	SVC01	SVC02	SVC03	SVC04	SVC05
	SVC01	SVC02	SVC03	SVC04	SVC05	SVC01	SVC02	SVC03	SVC04	SVC05
	SVC01	SVC02	SVC03	SVC04	SVC05					

*MLH	MLH01	MLH02	MLH03	MLH04	MLH05	MLH01	MLH02	MLH03	MLH04	MLH05
	MLH01	MLH02	MLH03	MLH04	MLH05	MLH01	MLH02	MLH03	MLH04	MLH05

PRE	PRE01	PRE02	PRE03	PRE04						

*ALK	ALK01	ALK02	ALK03	ALK04	ALK05	ALK06	ALK07	ALK08	ALK09	ALK10
	ALK11	ALK12	ALK13	ALK14	ALK15	ALK16	ALK17	ALK18	ALK19	ALK20
	ALK21	ALK22	ALK23	ALK24	ALK25	ALK26	ALK27	ALK28	ALK29	ALK30
	ALK31									
BLK	BLK01	BLK02	BLK03							

TLU	TLU01	TLU02	TLU03	TLU04	TLU05	TLU06	TLU07	TLU08	TLU09	TLU10
	TLU11	TLU12	TLU13	TLU14	TLU15	TLU16				

* The size of this field will vary, depending on the number of groups assigned to the schedule. In addition, these fields could be on various schedules depending on flexibility of the measurement.

Fig. 3—H Schedule Format (3.03) (3.09)

```
59  REPT  TRF  11/15/77  18:59:54  901987        H  0  00:00

      CYC    36

      OFT     8      0    385      3      7      0     62      0      1      0
             34      0     10      0      0      0    383      0      0      7
              3     62     32    342    208     69    223     75      0      0
              0    146      0    152      8     11    119     33      0      0
              0     10    511      1      0      0      0      0     37      1
              0      0      0      0      0      0      0      0      0      0
              0      0      0      0      1      0      0      9     47      0
             10     21      2      0      0      0      0      0      0      0
              0      0      0      0      0      0

      TRK   129    126    258      0      2    130      0      0      0      0
            131      2     37      0      1    132      3     39      0      1
            133     20     36      0      0    134     35     88      0      0
            135      0      0      0      0    136    119    230      0      0
            137      0      0      0      0    138      0      0      0      0
            139      0      0      0      0      0      0      0      0      0

      SVC    64     68     61      0      0     65    409    819      5      0
             66     32     11      0      1     67     24     10      0      0
             68    129    110      0      0     69    211    266      0      0
             71      0      0      0      0     74     13     65      0      0
             76      4      5      0      1     77      0      0      0      0
             78     10     14      0      0     79      0      0      0      0
             82      4     13      0      1     83    119     72      0      0
             84      0      0      0      0     85      0      0      0      0
             86      0      0      0      0     87      0    371      0      0

      PRE     0      0      0      0

      CLS     0      0      0      0      0

      ALK     0    714    507    651    420      0      0      0      0      0
              0      0      0      0      0      0      0      0      0      0
              0      0      0      0      0      0      0      0      0      0

      BLK     2   1273      0

      TLU     0      0      0      0      0      0      0      0      0      0
              0      0      0      0      0      0

END OF REPORT
```

Fig. 4—H Schedule Sample (3.03)

DIAL LINE INDEX TABLE

Comp. Index	Equipment Irregularities				NC or Reorder				Dial Tone Speed – BH				Incoming Match. Loss – BH		Comp. Index
	Crossbar ESS		Step-by-Step Panel		Crossbar ESS		Step-by-Step Panel		Crossbar – ESS Panel – SxS (TT)		Step-by-Step Dial Pulse		Crossbar ESS		
	Perf.	Points	Perf.	Points	Perf.	Points	Perf.	Points	Perf.	Points	Perf.	Points	Perf.	Points	
100	.0	25.0	.0	30.0	.0– .2	25.0	.0– .3	35.0	.0–1.1	1.59	.0– 1.2	35.0	.0– 1.7	15.0	100
99	.1	24.8	.1	29.7	.3– .4	24.8	.4– .5	34.7	1.2–1.4	1.57	1.3– 1.4	34.7	1.8– 1.9	14.9	99
98	.2	24.5	.2	29.4	.5– .6	24.5	.6	34.3	1.5–1.6	1.56	1.5– 1.6	34.3	2.0– 2.1	14.7	98
97	.3	24.3	.3	29.1	.7	24.3	.7	34.0	1.7–1.8	1.54	1.7	34.0	2.2	14.6	97
96	.4	24.0	.4	28.8	.8	24.0	.8	33.6	1.9–2.0	1.53	1.8	33.6	2.3	14.4	96
95	.5	23.8	.5	28.5	.9	23.8	.9	33.3	2.1	1.51	1.9	33.3	2.4	14.3	95
94	.6	23.5	.6	28.2	1.0	23.5	1.0	32.9	2.2	1.49	2.0	32.9	2.5	14.1	94
93	.7	23.3	.7	27.9	–	–	–	–	2.3	1.48	2.1	32.6	2.6	14.0	93
92	–	–	–	–	1.1	23.0	1.1	32.2	2.4	1.46	2.2	32.2	2.7	13.8	92
91	.8	22.8	.8	27.3	–	–	–	–	2.5	1.45	–	–	–	–	91
90	.9	22.5	.9	27.0	1.2	22.5	1.2	31.5	2.6	1.43	2.3	31.5	2.8	13.5	90
88	1.0	22.0	1.0	26.4	1.3	22.0	1.3	30.8	2.7–3.0	1.40	2.4– 2.5	30.8	2.9– 3.0	13.2	88
85	1.1	21.3	1.1	25.5	1.4	21.3	1.4	29.8	3.1–3.4	1.35	2.6– 2.7	29.8	3.1– 3.2	12.8	85
82	1.2	20.5	1.2	24.6	1.5–1.6	20.5	1.5–1.6	28.7	3.5–3.8	1.30	2.8– 2.9	28.7	3.3– 3.4	12.3	82
78	1.3	19.5	1.3	23.4	1.7	19.5	1.7	27.3	3.9–4.2	1.24	3.0– 3.2	27.3	3.5– 3.6	11.7	78
74	1.4	18.5	1.4	22.2	1.8	18.5	1.8	25.9	4.3–4.7	1.18	3.3– 3.6	25.9	3.7– 3.8	11.1	74
70	1.5	17.5	1.5	21.0	1.9	17.5	1.9	24.5	4.8–5.2	1.11	3.7– 4.0	24.5	3.9– 4.0	10.5	70
65	1.6	16.3	1.6	19.5	2.0	16.3	2.0	22.8	5.3–5.7	1.03	4.1– 4.5	22.8	4.1– 4.2	9.8	65
60	1.7	15.0	1.7	18.0	2.1	15.0	2.1	21.0	5.8–6.2	.95	4.6– 5.0	21.0	4.3– 4.5	9.0	60
55	1.8	13.8	1.8	16.5	2.2	13.8	2.2	19.3	6.3–6.8	.87	5.1– 6.0	19.3	4.6– 5.0	8.3	55
50	1.9	12.5	1.9	15.0	2.3–2.4	12.5	2.3–2.4	17.5	6.9–7.5	.80	6.1– 7.0	17.5	5.1– 6.0	7.5	50
40	2.0	10.0	2.0	12.0	2.5–2.6	10.0	2.5–2.6	14.0	7.6–8.4	.64	7.1– 9.0	14.0	6.1– 7.0	6.0	40
30	2.1–2.2	7.5	2.1–2.2	9.0	2.7–2.8	7.5	2.7–2.8	10.5	8.5–9.4	.48	9.1–12.0	10.5	7.1– 8.0	4.5	30
20	2.3–2.4	5.5	2.3–2.4	6.0	2.9–3.3	5.5	2.9–3.2	7.0	9.5–10.5	.32	12.1–16.0	7.0	8.1–10.0	3.0	20
10	2.5–3.4	2.5	2.5–3.4	3.0	3.4–4.1	3.5	3.3–4.1	3.5	10.6–15.0	.16	16.1–20.0	3.5	10.1–12.0	1.5	10
0	Over 3.4	0.0	Over 3.4	0.0	Over 4.1	0.0	Over 4.1	0.0	Over 15.0	.00	Over 20.0	0.0	Over 12.0	0.0	0

Index Conversion Factors

Max. Points Possible For Items Indexed	Conversion Factor
85	1.176
65	1.538
50	2.000

24 DA.- .917
23 DA.- .957
22 DA.-1.000
21 DA.-1.048
20 DA.-1.100

Dial Tone Speed-C.I. Crossbar-ESS-Panel

To determine the Dial Tone Speed component index for the month, divide the points earned by 35.0 and multiply by 100.

Crossbar-ESS-Panel-SXS TT DTS Adjustment Factors

24 DA.- .917	19 DA.-1.158
23 DA.- .957	18 DA.-1.222
22 DA.-1.000	17 DA.-1.294
21 DA.-1.048	16 DA.-1.375
20 DA.-1.100	15 DA.-1.467

Fig. 5—Dial Line Index Table (6.04) (6.21)

Form E-4372 (5-73)
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DP   TT

REPORT MONTH_____ 19_____   **BUSY HOUR DIAL TONE SPEED**   PAGE_____ OF_____

ENTITY_____ TYPE OF C.O. EQUIPMENT_____ TYPE OF DTS EQUIPMENT _____

CLASS AND TYPE	TIME		FACTOR		TIME		FACTOR		TIME		FACTOR		TIME		FACTOR		NO. TESTS	UNUS-ABLE DAYS (√)	DAILY WTD % OVER 3''	ACCUM. WTD % OVER 3''	ESS-CROSSBAR PANEL-SXS TT POINTS EARNED		ESS NO. BLOCKED DT BH
DATE BUS. DAYS	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''					DAILY	CUM.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	30
TOT.																							
AVG.																							

WEIGHTING FACTORS			24	CALCULATED DIAL TONE SPEED TESTS	25	31	NOTES		T O T A L	ADJUSTMENT FACTOR	26
CLASS	AVG. CLASS BH PEG COUNT	FACTOR		NO. EXPECTED TESTS:						TOTAL ADJ. INDEX POINTS EARNED	27
				ALLOWABLE DEVIATION:					M O N T H	COMPONENT INDEX	28
				MAX _____ MIN: _____						WEAKSPOT (\)	29
TOTAL		1.000								IF MORE THAN ONE PAGE IS USED SHOW TOTALS ON THE LAST PAGE	

Fig. 6—Example of Form E-4372, "Busy Hour Dial Tone Speed" (6.08)

Form E—4372 (5—73)
Printed in U.S.A.

BUSY HOUR DIAL TONE SPEED

REPORT MONTH_____ 19_____   PAGE_____ OF_____

ENTITY_____   TYPE OF C.O. EQUIPMENT_____   TYPE OF DTS EQUIPMENT _____ •

CLASS AND TYPE	TIME	FACTOR			TIME	FACTOR			TIME	FACTOR			TIME	FACTOR			TOTAL CLASS BUSY HOURS				ESS—CROSSBAR PANEL—SXS TT		ESS
DATE BUS. DAYS	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	NO. OVER 3''	% OVER 3''	WTD % OVER 3''	NO. TESTS	UNUS-ABLE DAYS (√)	DAILY WTD % OVER 3''	ACCUM. WTD % OVER 3''	POINTS EARNED DAILY	POINTS EARNED CUM.	NO. BLOCKED DT BH
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	30
TOT.																							
AVG.																							

WEIGHTING FACTORS [24]

CLASS	AVG. CLASS BH PEG COUNT	FACTOR
TOTAL		1.000

CALCULATED DIAL TONE SPEED TESTS [25] [31]

NO. EXPECTED
TESTS:_____

ALLOWABLE
DEVIATION:

MAX:_____ MIN:_____

NOTES

TOTAL MONTH

ADJUSTMENT FACTOR	[26]
TOTAL ADJ INDEX POINTS EARNED	[27]
COMPONENT INDEX	[28]
WEAKSPOT (√)	[29]

IF MORE THAN ONE PAGE IS USED SHOW TOTALS ON THE LAST PAGE