

**FIELD ASSISTANCE AND SUPPORT TEAM
(FAST)
SOFTWARE TECHNICAL (SOFTEC) SUPPORT**

CONTENTS	PAGE
1. GENERAL	1
OBJECTIVES OF SOFTEC SUPPORT	2
2. SOFTEC SUPPORT PERSONNEL	2
A. Qualifications	2
B. Organization	3
C. Responsibilities	3
Fundamental Responsibilities	3
Continuing Responsibilities	4
D. Recording SOFTEC Support Activities	5
3. CASE ESCALATION	7
4. COORDINATION	12
INTERDEPARTMENTAL COORDINATION	12
5. TEST EQUIPMENT	12
A. Field Force Test Equipment	12
B. SOFTEC Support Test Equipment	12
Figures	
1. Minicomputer Repair Report—Form BS284	11

1. GENERAL

1.01 This section describes the objectives and operation of the Software Technical (SOFTEC) Support. In addition, it outlines the background, the coordinating procedures, and the test equipment SOFTEC personnel need to perform effectively. SOFTEC is a discipline of the Field Assistance and Support Team (FAST) concept. Other FAST disciplines are Data Technical (DATEC) Support, Voice and Nondata Special Services Technical (VOITEC) Support and Customer Switching Technical (CSTEC) Support.

1.02 Whenever this section is reissued, the reason for the reissue is contained in this paragraph.

1.03 The emergence of customer premises-located mini/microcomputer communications support systems and the growth of software-driven/dependent terminals has demonstrated the necessity of establishing teams of software technical experts. These SOFTEC Support personnel must have the knowledge, skill, and equipment to go beyond the normal capabilities of the installation and maintenance forces in resolving software-related communications problems. The existence and effective functioning of SOFTEC Support is essential to maintain quality software-driven/dependent communications systems and to ensure customer satisfaction.

1.04 For the purpose of this section the term software is defined as the communications programs, algorithms, and machine instructions essential to the operation of a stored-program controlled device. The software may reside in volatile memory or firmware that includes communications hardware, communications controller, data link control, and message management control procedures (protocols). The term "field forces" refers to the installation, maintenance, and testing personnel and their supervisors who are involved with the normal

NOTICE
Not for use or disclosure outside the
Bell System except under written agreement

provisioning of software-driven/dependent special services.

OBJECTIVES OF SOFTEC SUPPORT

1.05 The *primary objective* of SOFTEC Support is to improve our software-based and software interactive special services by bringing service problems to the attention of software technical support personnel through the use of FAST mandatory escalation procedures. The use of these procedures, in conjunction with existing Bell System Practices (BSPs), can be an effective aid in reducing long-term service delays which can cause customer dissatisfaction.

1.06 A *second objective* of SOFTEC Support is to provide technical guidance in the design, implementation, operation and maintenance of Bell System-contracted, customer premises-located mini/microcomputers.

1.07 A *third objective* of SOFTEC Support is to assist in the coordination of interregional and interarea software and protocol service affecting problems by establishing definite procedures for obtaining software assistance from distant locations.

1.08 A *fourth objective* of SOFTEC Support is to provide vendors of software-driven/dependent products and services a contact for those technical questions regarding Bell System services that are not routinely referable to Technical Specialist and Customer Service Representatives. These types of contacts can be cultivated in both directions and could become invaluable when multivendor service problems arise.

1.09 Some of the services of concern to SOFTEC Support are:

- ACS (Advanced Communications Services)
- AEMIS (ACD-ESS Management Information System)
- Applications Processor
- CNCC (Customer Network Control Center)
- Call Rating System
- SMDR (Station Message Detailed Recorder)
- CSMDR - 93B Customer Premises System

- COMM-STOR II* — SMDR communications storage unit
- DATASPEED† 40 Teletypewriter Service
- DATASPEED 4540 Teletypewriter Service
- E911 - ALI (Expanded 911 - Automatic Location Identification)
- SADSC (Stand Alone Data Station Controller)
- Teleprinter 1000
- Transaction Telephone
- VUSET ‡ video display unit
- 12A CIS (Customer Information System)
- 13A CIS (Customer Information System)
- UNIX§ Operating System.

SOFTEC Support personnel are also concerned with other similar customer premises-located mini/microcomputer information systems and software interactive products from a systems maintenance prospective.

2. SOFTEC SUPPORT PERSONNEL

2.01 This part describes the typical qualifications, organization, responsibilities, and activities of SOFTEC Support personnel.

A. Qualifications

2.02 To perform effectively, SOFTEC Support personnel must be experienced or trained in the following subjects.

- Telecommunications system design
- Bell System data modems products

*Registered Trademark of Sykes Datatronics, Inc.

†Registered Trademark of AT&T.

‡Registered Trademark of Plantronics, Inc.

§Trademark of Bell Laboratories.

- Bell System supported terminal products
- Interface circuits and arrangements
- Computer telecommunication access methods
- Computer communications operating systems
- Communication control units
- Bell System supported protocols
- Minicomputer operations
- Minicomputer maintenance considerations
- Minicomputer software considerations
- PBX SMDR outputs formats.

2.03 SOFTEC Support personnel will often be communicating with individuals and organizations both inside and outside the Bell System. Therefore, they must have sufficient software background to be effective in these situations. In addition to knowing contents of SOFTEC BSPs and System Letters, SOFTEC Support personnel should have a working knowledge of the Intercompany Services Coordination (ISC) Plan and the other FAST Support groups: DATEC, VOITEC, and CSTECH.

B. Organization

2.04 The specific manner in which SOFTEC Support is organized may vary in different locations. However, SOFTEC Support designees who are part of the FAST organization should be assigned to Regional FAST Support Centers (RFSC) and to High Activity Locations (HAL).

2.05 The number of SOFTEC Support personnel needed for adequate assistance is strongly influenced by the quantity, geographical dispersion, and complexity of software driven/dependent services and customer premises-located mini/microcomputers. There should be a minimum of one management Regional SOFTEC designee at the RFSC for each Region. HAL SOFTEC personnel shall be assigned as needed per the recommendations of the FAST Region. The designees must be able to travel to any Area of the Region that requires on-site

technical management whenever necessary to carry out SOFTEC responsibilities.

C. Responsibilities

2.06 The responsibilities of SOFTEC Support personnel fall into two general categories: **fundamental responsibilities** and **continuing responsibilities**. The fundamental responsibilities apply directly to the primary objective of SOFTEC Support which is to provide software technical support to the Business Services Installation and Maintenance field forces, and to provide overall maintenance guidance to the company regarding customer premises-located mini/microcomputers. The continuing responsibilities apply indirectly to the primary objective of software/minicomputer technical support and should be performed between fundamental case occurrences or during a particular case when they apply.

Fundamental Responsibilities

2.07 On-Site Technical Field Assistance:

SOFTEC Support personnel may be required to go to customer locations, central offices, test centers, and intermediate locations to identify and resolve difficult software-related telecommunication and minicomputer problems. The Support personnel should coordinate their efforts at their locations with the local work groups according to normal administrative procedures. When assistance is needed at locations outside their assigned territories, SOFTEC Support personnel should coordinate their activities through the RFSC with the SOFTEC or DATEC Support personnel at the distant locations.

2.08 Technical Counsel: SOFTEC Support personnel will advise on questions of a software nature relating to software-driven/dependent telecommunications and software/hardware questions concerning customer premises-located mini/microcomputer special services. These questions may originate from inside or outside the Bell System and may concern any of the following:

- Advice on trouble analysis and testing procedures
- Software compatibility between customer equipment and Bell System equipment
- Specific software/hardware options involving interface, protocols, and device/systems performance

- Advice on the technical feasibility of a software-driven/dependent service.

Caution: *Discretion must be followed when advising on questions of a technical nature when the person(s) receiving this advice is outside of the Bell System. Questions of a proprietary nature should be referred to the local General Trade Products or Independent Company Relations contacts.*

2.09 Policy Counsel: The SOFTEC Support will assist the field forces in interpreting Bell System technical responsibilities regarding software-driven/dependent terminal equipment and customer premises-located micro/minicomputer. Some of the major items of concern are the following:

- Technical responsibilities outlined in the Tariffs
- Technical reference requirements
- Maintenance philosophy involving Customer Provided Equipment (CPE) services
- Maintenance philosophy concerning customer premises-located micro/minicomputers
- Maintenance contracts on software-driven/dependent devices
- Activities at the interface of software-driven/dependent equipment
- Performance expectations of Bell System-provided software-driven/dependent equipment and services.

It is not intended that SOFTEC, in providing technical counsel or policy counsel, would preclude or in any way change the responsibility of other organizations (ie, Engineering or Marketing) to provide advice on such matters, but rather to complement the efforts of those organizations.

2.10 Supplemental Training of Field Forces: SOFTEC Support personnel will supplement the formal training of the field forces through telephone and on-site contacts on difficult service problems. The use of sophisticated methods and test

equipment should be demonstrated and explained where practical. This training can be of great benefit to both the field forces and support personnel by sharing knowledge gained during problem investigations.

Continuing Responsibilities

2.11 Quality Control: Quality control is a major continuing responsibility of SOFTEC Support personnel. As a result of SOFTEC Support personnel involvement in a variety of service problems, they are in an excellent position to identify areas where improvement is needed and refer them to the proper responsible organization. Items of concern should include the following:

- Proper test equipment utilization, programming, and availability
- Poor service order documentation
- Feedback to the responsible organization on service planning and installation problems
- Technical recommendations for service improvements
- Recommendations to AT&T product management on systems equipment design
- Recommendations on BSP improvements.

2.12 Monitor Training Requirements and Effectiveness: SOFTEC Support personnel's frequent contact with interdepartmental activities involving software-based services offers an excellent opportunity to monitor training needs and effects. Some items of interest may include:

- Repeated field force difficulty with similar problems
- Excessive time to complete BSP tests before escalating software-based service problems
- Misunderstanding by marketing or customers of a service's operation, capabilities, or limitations.

SOFTEC Support personnel should document any training deficiencies and recommended improvements to the appropriate training organization.

2.13 Availability: SOFTEC Support personnel must always ensure that someone is accessible

to assist on software-driven/dependent service problems during working hours. After-hour assistance should be handled through normal off-hour administrative channels. The Support personnel must not be so encumbered by non-SOFTEC duties that they are unavailable to the field for technical support activities.

2.14 Relationship to DATEC: The DATEC Support responsibility is usually hardware-based technical support of data telecommunication services. SOFTEC Support concentrates on the software (programs) that drive the Bell System products, system, and services being supported. Minicomputer support is both a hardware and software support function for SOFTEC Support personnel.

2.15 Relationship to CSR-BS: The Customer Services Representative-Business Services (CSR-BS) is concerned with presale activity concerning software and functional system design for the Bell Marketing team. SOFTEC is concerned with supporting the installation and maintenance activities of Business Service operations in the area of software-driven/dependent devices and mini/microcomputers. Software problems identified as design problems should be referred to the CSR-BS by SOFTEC Support personnel if the service was designed by the CSR-BS.

D. Recording SOFTEC Support Activities

2.16 All case activities of SOFTEC personnel should be recorded on the FAST SOFTEC Case Notes (Form BS-1289) outlined in the FAST Operations Guide.

2.17 Documentation, such as the SOFTEC Case Notes with an outline of the problem and its solution, is an invaluable aid in appraising communications and minicomputer service efforts and SOFTEC Support effectiveness. With increasing competition and the variety of data communication terminal suppliers, documentation concerning service problems in all centers that provide factual information when requested by appropriate managers is required. Nonescalated cases of software and minicomputer advice by telephone or assistance on other SOFTEC or DATEC Support service problems also deserve documentation on the FAST Activity Notes form.

2.18 Each HAL and RFSC SOFTEC Support person will maintain an individual active current

file of SOFTEC Case Reports. Activity Summary Reports will be generated by the Technical Support Management System (TSMS). These reports can display activities on a HAL, Region, Corporate, or FAST discipline (eg, SOFTEC) basis.

2.19 Particular software service problem solutions may be of interest to SOFTEC Support personnel in other RFSCs. These SOFTEC cases should be entered into the Computer Assisted Technical Support/Data Bank (CATS/DB) system for transmission to the RFSCs and to AT&T FAST Headquarters.

2.20 The CATS/DB system is a data bank of stored information that assists in complex problem solving. It contains Technical Advisories, Flashes, and other technical inputs concerning known trouble conditions and their remedies.

2.21 The Minicomputer Repair Report, Form BS284 shown in the FAST Operations Guide, is intended to be used by SOFTEC Support personnel for documenting corrective maintenance activity, system installation, and system modifications. A report should be generated when any of these activities are performed. When completed, it should be retained by SOFTEC Support personnel for ongoing trouble analysis.

2.22 Minicomputer Repair Report Preparation: Definitions of terms, instructions for field entries, and disposition of a Minicomputer Repair Report is given here.

(a) Definitions

(1) **System Impaired:** This term refers to a state of the system in which the system can perform its intended purposes, but is not fully operational. For example, the system would be considered impaired if, in a system with multiple output devices, a fault occurs in one of these devices, but the system is capable of functioning with the remaining devices. Another example would be a duplex system in which a fault occurs in one of the subsystems, but the other subsystem remains on line.

(2) **System Down:** This term implies that the system is not available to perform its designed purpose. This situation could arise as a result of hardware or software faults or from the necessity to run diagnostic programs.

(3) **Problem Localized:** When listing the performance of the diagnostic programs, this term is used to indicate that the problem has been localized to a reasonable number of circuit boards.

(b) Corrective Maintenance

Upon notification of a problem, the following Mini-computer Repair Report fields should be recorded:

- (a) **System:** System designations, such as AEMIS, 12A, etc.
- (b) **Location:** Location of computer system.
- (c) **Customer:** User of the support system.
- (d) **Rptd. By:** Individual reporting problem.
- (e) **Phone No.:** Telephone number of individual reporting problem.
- (f) **Date/Time:** Date and time that problem is reported.
- (g) **Status:** Status of the system when problem is reported to SOFTEC Support.
- (h) **Trouble Details:** Description of trouble symptoms and any other useful information which might be of use.
- (i) **Action Taken by Local User:** If action taken by the customer is known at this time, this field should be completed. Additionally, if the customer attempts some maintenance activity at the direction of the maintenance personnel, this should also be explicitly noted in this field even if the attempt proves unsuccessful. Efforts to Initial Program Load (IPL) a system or to run a diagnostic program would be examples of such activity.
- (j) **Dispatch (Time):** When dispatch is required, the dispatch block of Business Systems technicians should be checked and the dispatch time noted.
- (k) **Nondispatch:** If correction of the problem is accomplished without the dispatch of maintenance personnel, this should be noted by checking this block.

2.23 Record the following data in reports for problems requiring Technical Support:

- (a) **Start:** Date and time of contact.
- (b) **Status:** Status of the system at initial SOFTEC Support.
- (c) **Repair Steps:** During the diagnostic process, record significant events and maintenance actions in this section along with their time of occurrence. The current system **Status** should also be noted with each recording. Some examples of information which would be recorded are:
 - (1) Running of diagnostic programs
 - (2) References to schematic drawings
 - (3) Any change in the system status
 - (4) Final checkout procedures.
- (d) **Complete:** Date and time repair is completed and system is restored to full service.
- (e) **Total Maintenance Man-hours:** Total maintenance man-hours **expended** by the FAST effort. This would include any time spent by repair personnel.
- (f) **Diagnostics Used to Locate Problems:** Diagnostic programs which are run to locate problems should be noted in this section along with the coded results Diagnostic Code (DC) of the program. Digital Equipment Corporation (DEC) diagnostics may be designated by a four- or five-character name and a single-character revision code (eg, DZQKC-C). Hewlett-Packard (HP) diagnostics are designated by a ten-character code (eg, 24193-60001).
- (g) **Equipment Serviced:** The next report section is used to record specific information on the trouble details. Enter identification of any modules which were repaired or replaced. DEC's modules are generally designated: MXXX, MXXXX, GXXX, and HXXX HP's modules are generally AXXX.
- (h) **Material Used:** Enter any parts replaced in this field.
- (i) **Vendor Callout:** When appropriate, details of a vendor callout should be given in this field. A copy of the vendor field service activity report should be attached.

(j) **Remarks:** Relevant information not recorded in other fields on the form should be listed here.

2.24 Form BS284 is also used to document work performed during system additions or modifications.

2.25 Disposition of Completed Forms: The original copy of the completed Minicomputer Repair Report should be retained in SOFTEC Support files for a period of at least 2 years. It may then be disposed of in accordance with locally established procedures. A copy should be forwarded to the telephone Regional Headquarters Minicomputer Support Personnel (SOFTEC) for further analysis.

2.26 Intercompany Communications: There is a need for frequent intraregional and interregional communications among SOFTEC Support personnel. To encourage this communication, there is a personnel subsection of the Computer Assisted Technical Support/Data Base (CATS/DB) which can be used to identify names, telephone numbers, and addresses of FAST Support personnel per RFSC or HAL location. Refer to your CATS/DB user manual for instructions (Section 010-521-503).

2.27 Supportive Documentation: To keep adequately informed, SOFTEC Support personnel will require up-to-date file of reference information consisting of two categories: information from Bell System sources and non-Bell System sources.

2.28 Information from Bell System Sources:

- Technical Advisories (SOFTEC, DATEC, VOITEC, CSTECC) stored in the CATS/DB System
- Bell System Practices on data apparatus and equipment
- Bell System Technical References available from Western Electric (WE), Indianapolis, Indiana
- Telecommunications Transmission Engineering (three volumes) available from Bell Center for Technical Education, Lisle, Illinois
- Bell System Technical Journal.

In addition to the above item, SOFTEC Support personnel must have ready access to system letters, en-

gineering letters (ELs), schematic drawings (SDs), circuit descriptions (CDs), etc.

2.29 Information from Non-Bell System Sources:

- Electronic Industry Association RS232-C, RS334, RS422, RS423, and RS449
- American National Standards Institute protocol standards 3.28-1976
- "DATA Communications Standards" by Foits and Karp, McGraw Hill 1978
- "Communications Architecture for Distributed Systems" by R. J. Cypser, Addison-Wesley Publishing Co., 1978
- "Communication Networks for Computers" by D. W. Davies and D. L. A. Barber, John Wiley & Sons, 1973
- "DATA Communications Facilities, Network, and System Design" by Dixon R. Doll, John Wiley & Sons, 1978
- "The C Programming Language" Brian W. Kernighan and Dennis M. Ritchie, Prentice-Hall, 1978
- Frequently updated source by information such as DATAPRO's Communications Solutions, Data Communications, and Reports on minicomputers
- Publication by various vendors on their equipment and its operation
- Military standard MIL.STD 188
- "A User Guide To The UNIX System" by Rebecca Thomas and Jean Yates, AOsborne/McGraw Hill, 1982.

A good working relationship should be established between SOFTEC Support personnel and data terminal/software vendors and contacts should be made periodically to discuss mutual technical problems and to exchange information related to current data and minicomputer services and hardware.

3. CASE ESCALATION

3.01 Formal and uniform escalation procedures are necessary to bring the proper resources to

bear on software-based service problems. Complex problems encountered by field forces, such as incompatibility between data terminals and the customer's method of operation programming difficulties or protocol violations, often require expert assistance for a fast resolution of the problem. To improve the installation and maintenance of software-based services and to help avoid long service delays and customer complaints, the field forces must be provided with rapid access to technical personnel who can assist in resolving these problems.

3.02 Technical case escalation is the direct referral of software-based telecommunication service problems to SOFTEC Support personnel by field force supervisors or other members of the FAST and subsequent referral by FAST Support personnel to higher levels of technical assistance as required. These escalation procedures are only to supplement existing administrative procedures and standard Bell System Practices by assisting the normal work groups in fulfilling their responsibilities, but not supplanting them.

3.03 Teleprocessing: There are three levels of teleprocessing system SOFTEC Support available for assisting the field forces in software-based service problems:

- (1) The first level is technical support from RFSC or HAL SOFTEC Support locations.
- (2) The second level is from a Regional FAST Manager-SOFTEC Support *working* through an RFSC or HAL.
- (3) Third-level support is through Regional Manager-SOFTEC to FAST Headquarters Product Engineering Control Center (PECC), WE, Bell Telephone Laboratories (BTL), Teletype Corporation (TTY), or the manufacturer of general trade products.

3.04 Mini/Microcomputers:

Three levels of mini/microcomputer SOFTEC Support field forces in resolving installation and maintenance service are the same as for teleprocessing except problems for the third level. The third level of minicomputer support comes from WE Regional Technical Assistance Center (RTAC) and/or FAST Manager SOFTEC through the Regional Manager SOFTEC.

3.05 Technical escalation of software-based service problems is appropriate under the following conditions:

- (a) The service meets Bell System specifications, but does not meet the customer's performance expectation.
- (b) The service does not meet Bell System specifications, and the problem source cannot be identified.
- (c) The service has generated a high incidence of trouble reports.

3.06 Technical Escalation Timing: Technical escalation will work successfully if a time limit for required action is established and observed. Meeting the time limit will require local procedures to keep field supervision informed of the status and expected disposition of service problems.

3.07 The following time limits for escalation are intended as a Bell System objective.

- (a) When a service meets Bell System specifications but fails to meet the customer's performance expectation, escalate immediately.
- (b) When a service does not meet Bell System requirements and the problem source cannot be identified, escalate within 4 hours of the discovery of the problem.
- (c) When three similar trouble reports on the same service are received within 30 days and have been closed out as "test ok," "came clear," "found ok," "no trouble found," etc, escalate immediately when the third report is received.

3.08 The time limits given in the escalation procedure mean that escalation can occur before the time limit specified but must not exceed this if a resolution of the problem is not in sight. These hours are usually considered to be working hours but could be continuous hours in the case of a disabling service problem.

3.09 The requirement for escalation is dependent on the cooperation of local maintenance groups. A Regional procedure should be implemented requiring compliance to the formal escalation procedure.

3.10 Escalation Procedure—Teleprocessing Systems: The following is a step-by-step description of the activities resulting from a case of technical escalation:

(a) Field forces request technical assistance to the first level of SOFTEC Support in the RFSC by escalating through their Customer Service Control Operation (CSCO).

(b) Regional SOFTEC Support will render initial assistance by telephone. If telephone consultation is not adequate to provide a timely resolution, Regional SOFTEC Support must arrange to provide on-the-job assistance by contacting the HAL SOFTEC or DATEC. It is expected that after 4 hours of telephone consultation have elapsed, an on-site analysis should be performed. This procedure gives the field forces up to 8 hours of trouble investigation: 4 hours without and 4 hours with technical consultation by phone. At any time during this 4-hour period, when a DATEC Support designee judges the problem is due to software difficulties associated with Bell-supported terminals/controllers and/or customers software activities, the RFSC SOFTEC shall be contacted.

(c) After 8 hours of on-site assistance by HAL SOFTEC or DATEC Support personnel, the designee must contact the Regional Manager SOFTEC or DATEC Support for additional technical support if a resolution of the problem is still not apparent.

(d) Request from HAL Support personnel on an escalated case to Regional SOFTEC Support personnel for information and documentation should be honored either verbally or with the actual material within 2 hours from the time the request was initiated.

(e) Problems referred to Regional SOFTEC Support personnel which remain unresolved may require additional technical support. Regional Headquarters Support will usually contact BTL, TTY, WE, or others who are to provide technical assistance on the problem as soon as possible.

(f) Additionally, Regional Managers SOFTEC Support may contact Headquarters SOFTEC support for advice or assistance.

3.12 Escalation Procedures—Minicomputer Systems: The following is a step-by-step description of the activities resulting from a customer premises-located mini/microcomputer-based service problem.

(a) The customer reports service difficulties to the CSCO. Analysis of customer-perceived

symptoms and/or remote diagnostic tests are made to solve the problem. If necessary, on-site minicomputer maintenance by the vendor or Field Service Organization (FSO) will be made. If no solutions are found by these procedures, the problem will be referred to an RFSC.

(b) Minicomputer service problems are to be escalated to the RFSC SOFTEC Support by the CSCO supervisor under the following conditions:

(1) The minicomputer vendor has exceeded the time limit established by a Business Services - Minicomputer vendor maintenance contract.

(2) Three trouble reports of a similar nature on the same service are received within 30 days.

(c) Minicomputer service problems are to be escalated by the FSO supervisor to the RFSC SOFTEC Support through the CSCO for assistance under the following conditions.

(1) The system performs satisfactorily according to diagnostic routines, however, the customer is not satisfied.

(2) Complex Installation/Repair Technician (CIRT) personnel cannot locate the reason for the failure and time limit 1 has been exceeded. (See Minicomputer Escalation Flowchart and time limit schedules in the FAST Operations Guide.)

(d) The RFSC SOFTEC Support will render initial assistance by telephone utilizing resources of the FAST CATS/DB, RTAC, and vendor's technical assistance. If telephone consultation is not adequate to provide a diagnostic solution, Regional Support SOFTEC must arrange to provide on-the-job assistance by contacting the HAL SOFTEC Support. It is expected that after time limit 2 has elapsed, an on-site analysis should be performed in an effort to isolate the cause of the system failure.

(e) Should the service problem be identified as a design problem, the Business Services Marketing department Account Executive (AE) and Customer Service Representative (CSR) should be

called upon to resolve the differences between what the customer expects and what the customer is receiving.

(f) If the customer is not utilizing the system as designed, the Business Services Customer Education and Analysis (CE&A) should be called upon to properly inform the customer's personnel of the full range of functions provided by the system.

(g) After time limit 3 has expired, the HAL SOFTEC Support should contact the Regional SOFTEC Support for further assistance.

(h) The Regional SOFTEC Support for mini/microcomputers shall:

(1) Contact the mini/microcomputer vendor for clarification of test results acquired by HAL SOFTEC Support.

(2) Contact RTAC for Current information and trouble analysis assistance.

(3) Contact the FAST Headquarters SOFTEC Support for current information and assistance, especially if the vendor or RTAC group is not supplying a reasonable level of support.

Escalated Case Report

3.13 SOFTEC Support personnel should pursue problems unresolved by initial consultation or

on-the-job assistance by a search of the CATS/DB Technical Advisory (TA) file and the Escalated Case Report (ECR) file. Search of these files will determine if a similar problem has been previously solved or escalated. If this search does not resolve the problem, the RFSC will escalate to a Subject Matter Expert (SME) for a referral, solution, or testing plan, and enter a Case Report of the problem into CATS/DB.

3.14 This Case Report will list the problem and the action taken. The RFSC will enter the Case Report into CATS/DB as normally sent to FAST Headquarters except that the word ESCALATE will be entered into the STATUS field.

3.15 Upon receipt of the Case Report, FAST Headquarters will prepare the ECR and enter it into the CATS/DB ECR file. Questions on ECRs should be referred to FAST Headquarters and not to originating RFSCs.

3.16 After an RFSC has resolved a problem that has been escalated, the RFSC will submit another Case Report into CATS/DB with reference to the ECR number. Then FAST Headquarters will convert all this information into a TA as necessary and delete the ECR from CATS/DB. Figure 1 is a flowchart of ECR procedures.

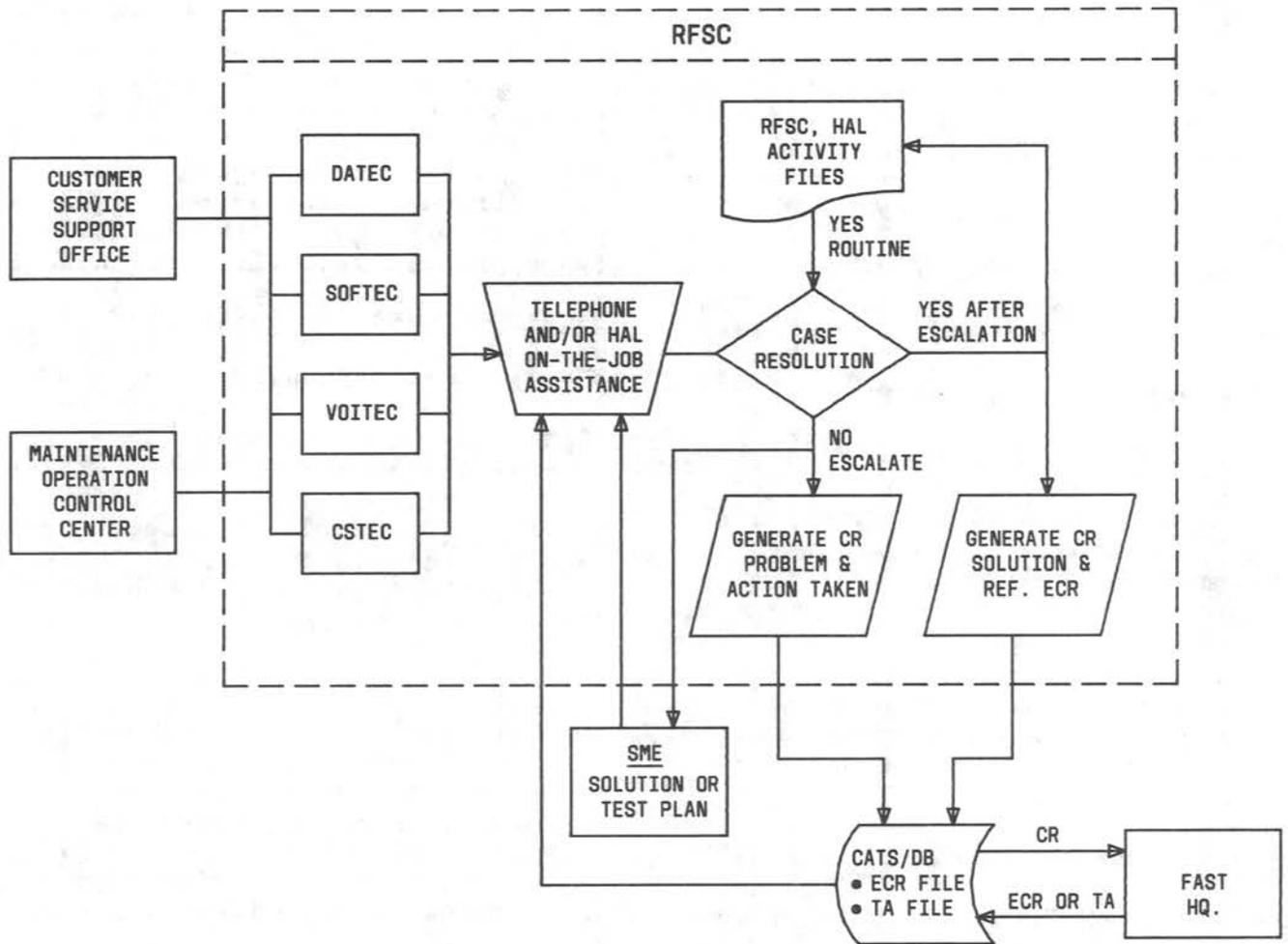


Fig. 1—Flowchart of Escalated Case Report Procedures

4. COORDINATION

4.01 This section discusses some of the coordination aspects involved with the FAST SOFTEC Support effort. These coordination procedures are intended to supplement, not replace, existing administrative and control office responsibilities and practices by efficiently bringing in the proper SOFTEC Support assistance on complex technical software-related problems.

4.02 There must be efficient coordination and cooperation among all parties concerned with the provision of software-based services. This applies equally to both inter and intraregional relationships. When more than one RFSC or HAL SOFTEC Support team is involved with a particular software/minicomputer service problem, the team that resolves the problem should always provide feedback of the results to other teams that have assisted.

INTERDEPARTMENTAL COORDINATION

4.03 The successful fulfillment of FAST SOFTEC Support responsibilities depends upon how well the support personnel in turn are supported by other organizations within a Region. Regardless of the department to which the SOFTEC designee is assigned, the SOFTEC designee must be able to freely contact and work with all other Regional organizations involved with Software design/dependent services and vice versa. The quality of a customer's service is of the utmost importance and the SOFTEC Support personnel's recommendations for improvement should be taken in that light.

4.04 *Coordination Between RFSCS:* SOFTEC Support personnel must coordinate their efforts with other SOFTEC Support personnel to whom assistance at work locations outside of their territory is required. Situations arise when a software-based service problem is escalated at one location resulting from a problem which exists at the far end or where the same software problem is escalated at each location. In these cases, coordinated analysis and problem determination among the SOFTEC teams is necessary.

4.05 *Coordination Between Network Technical Support (NTS) and RFSC:* NTS field personnel must coordinate their efforts with FAST Regional Support personnel to obtain software technical assistance at work locations outside of their

jurisdiction and vice versa. The coordination guidelines supplement normal control office procedures for difficult software-based service problems.

4.06 *Coordination with Independent Companies:* The coordination of SOFTEC Support efforts on services partially provided by an Independent Company should be handled by the RFSC in whose vicinity the Independent Company operates. The coordination of software-based service problem investigations should be similar to paragraph 4.04, depending on the System configuration, and according to the guidelines of the local Bell Independent Relations department. On some particularly complex service problems, the Independent Company may request, or agree to, assistance from SOFTEC Support personnel. This also should be handled according to local Bell Independent Relations procedures.

5. TEST EQUIPMENT

5.01 The technically complex nature of software driven/dependent computers and terminals demands that the persons involved with the installation and maintenance of these services be adequately equipped with the proper test equipment. Such equipment is highly specialized and used to capture, monitor, and emulate device, and line protocol sequences. Some of this equipment is currently being utilized by HAL DATEC Support personnel.

A. Field Force Test Equipment

5.02 The field force that installs and maintains the software-based equipment must be able to perform the basic tests outlined in the applicable Bell System Practices. The same tests are usually made when a service problem arises.

B. SOFTEC Support Test Equipment

5.03 The test equipment needs of SOFTEC Support personnel fall into four categories as follows:

- (a) Monitor Input/Output (I/O) exchanges between Communications Control Units (CCU) and/or terminals:
 - Display all captured data especially data link control bytes.
 - Record all captured data in over 2K of memory.
 - Count errors (ie, bit errors, or block errors).

- Record conditional sequences.
 - Be able to dump captured data to a mass storage unit.
 - Be transparent to the operating system.
- (b) Emulate the functions of a communication control unit and a host computer to remote controllers/terminals:
- Poll or select a single station.
 - Poll a multipoint sequentially.
 - Measure and record response time of the system or request to send clear to send interval.
 - Select an address on a multipoint.
 - Verify terminal error recovery.
 - Test line protocol sequence.
 - Test terminal dependent device protocols.
- (c) Emulate the function of a remote controller/terminal to a communications control unit/host computer:
- Test line protocol sequence.
 - Test system communications software.
 - Emulate a polled or selected terminal.
 - Measure and/or simulate system timing.
 - Verify error recovery procedures.
- (d) Analyze and acquire data link level and network level performance measurements:
- Select and display data of interest.
 - Set thresholds for selective recording and increment counters.
 - Store selected interface control status per byte of captured data.
 - Display bit and block error performance measurements.
- 5.04** The types of equipment recommended in these categories could also be utilized by Company DATEC Support groups, depending upon the number of software-based services and data services within the operating area and the need. The recommendations are designed to equip the FAST with adequate equipment usable on a wide variety of services.