

CAROT (CENTRALIZED AUTOMATIC REPORTING ON TRUNKS 2) ENGINEERING CONSIDERATIONS

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1. GENERAL

1.01 This practice discusses the types of equipment utilized by the CAROT (Centralized Automatic Reporting on Trunks) System. In addition, references are provided (in tabular-type format) where detailed equipment and engineering related information may be found. Refer to paragraph 3.01 for a listing of terms and abbreviations relating to CAROT.

1.02 This practice is being reissued to add information concerning new and modified system features as introduced with 2CAROT4 (CAROT 2, generic 4) CAROT operating system software and related hardware changes. Revision arrows have been used to denote significant changes.

1.03 This practice provides an overview of the major equipment components of the CAROT System and is compatible with generic 2, 3, and 4 software packages of CAROT. The main objective of this practice is to provide a comprehensive reference listing of documentation associated with the CAROT System. This practice is therefore intended to aid operating company personnel in finding detailed information relating to CAROT.

A. TOSC (Trunk Operations Support Center)

1.04 ♦The TOSC concept has been established to provide centralized coordination of administrative and operational activities essential to the efficient utilization of the CAROT System. The TOSC operations apply only to stand-alone CAROT systems (i.e., CAROT systems not deployed with CMS-1/4 ESS* switching equipment testing arrangements). The TOSC terminology will completely replace references to and use of the term "CAROT center".♦

1.05 Some of the major responsibilities of the TOSC are as follows:

- Operates and administers the CAROT controller
- Tests trunks
- Maintains quality of the record base
- Supervises the ROTL (remote office test line) and test line maintenance

- Prepares and administers TOSC results and measurement plan

- Administers demand testing functions of the controller on trunks and circuit orders.

1.06 In general, the concept of the TOSC does not vary much with respect to operations of the CAROT controller in the "old" CAROT center. However, the TOSC concept of operation does provide several new administrative-type responsibilities necessary to efficiently operate the CAROT System. ♦For detailed descriptions of generic versions of CAROT systems, refer to the following practices:

- Generic 2, Practice 190-102-100
- Generic 3, Practice 190-103-100
- Generic 4, Practice 190-103-110♦

B. The Evolution of CAROT

1.07 Historically, new developments in trunk testing have been brought about by the necessity to reduce manual involvement and testing time, while maintaining accurate measuring techniques. The increase in sophistication of the trunk network, including the introduction of new and complex carrier systems, has brought about the need for more frequent testing and more types of testing than were formerly adequate. Thus, the telephone companies have moved from two-man manual testing, through the following steps (in rough chronological order):

- (1) One-man, 1-way testing to various dialup test lines
- (2) One-man, 2-way loss and noise tests to 104-type test lines
- (3) Automatic, 2-way transmission testing via test frames and 104-type test lines
- (4) Automatic, 2-way transmission testing from a central office by means of ATMS (Automatic Transmission Measuring System) directors, test frames, 105-type test lines, ATMS responders, and later from remote offices utilizing ROTLs
- (5) Centralized, automatic, 2-way transmission testing and end-to-end operational testing

* Trademark of AT&T.

from electromechanical offices via a CAROT controller, ROTLs, and responders.

1.08 During its time of operation, ATMS used automatic test frames and ATMS directors to control ROTLs in distant offices. Under control of a director (in one office) a ROTL in a second office can seize a trunk to a third office. Then utilizing responders at each end, perform transmission tests. With the ATMS, each director is given routine testing responsibility for its home office and several other switching offices in the area. Testing control was provided via paper tape or cards. These contained information on trunk location, test parameters, and FETL (far-end test line) dialing numbers.

1.09 The CAROT concept uses much of the remote hardware of ATMS. However, instead of using directors and test frames in many different locations, CAROT centralizes the testing control center. The CAROT concept has gone through five phases of development. The first phase was CAROT 1, which used trunk testing information stored on cassette tapes to perform routine trunk tests. With the advent of CAROT 2, the trunk testing information previously stored on cassette tapes is now stored in the CAROT controller. The CAROT 2 System has progressed through four phases called generics 1, 2, 3, and 4. Generic refers to the characteristics of the system capabilities. For example, CAROT 2, generic 1, provided certain system features; whereas, CAROT 2, generic 2, provides features in addition to and improvement to generic 1. Generic 4, which is the latest version, provides changes and improvements to generic 3. This includes software, as well as hardware changes and improvements and new features. The CAROT System employing a CAROT 2 controller with generic 4 operating system software is designated as 2CAROT4. With this nomenclature, the first number (2) identifies the hardware configuration and the number (4) following the system name identifies the generic issue of the operating system software.

1.10 Some of the more important features of the generic 2 version of CAROT 2 are listed in Table A. Table B contains a listing of the various features associated with the generic 3 version of CAROT 2. Note that the generic 3 version includes not only new features, but also changes and improvements to features introduced in the generic 2 software package. Table C contains a listing of generic 4 features

which includes existing, improved existing, and new CAROT features.

2. GENERAL SYSTEM CONFIGURATION

2.01 Generally, the CAROT System can be divided into three major areas as follows:

- CAROT controller
- Near-end office (ROTL office)
- Far-end office.

2.02 Figure 1 shows a partial block diagram of the CAROT System. The controller gains access to the DDD (direct distance dialing) network via touch-tone calling subscriber loops connected to its home central office A. Central office B is equipped with a ROTL to seize and hold the trunk under test, and a responder to perform tests in conjunction with the FETL at office C. It is also possible for a CAROT to access and use the ROTL capabilities of an RTTU (remote trunk test unit). The FETL (Fig. 1) may be a 105-type that interfaces with a responder. With responders at both ends of the trunk, automatic 2-way transmission measurements may be performed. The FETL may also be a 100-, 102-, 103-type, synchronous or nonsynchronous, or an RTTU. For No. 5 crossbar ROTLs with the EOTT (enhanced operational trunk testing) option, other FETLS for the operational tests may be utilized.

A. CAROT Controller

2.03 The CAROT controller (Fig. 1) connects to the telephone network via 1 to 21 remote-user multiplex loops and up to 14 test port subscriber loops. The test port subscriber loops enable the controller to send and receive trunk-testing information to the ROTLs. The remote-user multiplex loops enable the remote users to send and receive information to the controller. The CAROT controller does not have to be physically located in a switching central office but may be located by itself or housed commonly with other OSSs (Operations Support Systems).

TABLE A
CAROT GENERIC 2 FEATURES
FEATURE
Routine transmission (loss and noise) testing of trunks
Automatic scheduling of routine trunk testing
Analysis of routine test results
Management summaries and TTMI (trunk testing maintenance index) reports
Test frame tape preparation
Demand testing
Automatic make-busy
Interaction with CMS (Circuit Maintenance System) 1C
Automatic dispersal of routine test results
Automatic call-back for demand test results
Operational tests from electromechanical offices
Connection-appraisal testing
Data base update capability from a remote-user terminal
Testing CCIS (common control interoffice signaling) trunks
Interrogator program
Manual schedule override on a facility-group basis
Circuit-order data base
Automated data base update

2.04 Figure 2 shows the hardware configuration of the CAROT controller, which basically consists of the following:

- Two HP* (Hewlett-Packard) minicomputers (data and test processors)
- The remote-user multiplex (optional)
- Test ports
- CMS data links (optional)
- Magnetic-tape unit
- Disc drive
- Line printer and console
- Security callback trunk for automatic make-busy feature (optional).♦

Due to the different systems deployed (and different generics issued) the model numbers of the CAROT controllers may vary from installation to installation. For more detailed information on the CAROT controller equipment, organization, and administration, refer to Table D.

* Registered trademark of Hewlett-Packard.

<p style="text-align: center;">TABLE B</p> <p style="text-align: center;">CAROT GENERIC 3 FEATURES</p>
<p style="text-align: center;">FEATURE</p>
<p>Routine transmission testing of trunks</p> <p>Automatic scheduling of routine trunk testing</p> <p>Analysis of routine test results</p> <p>Management summaries, TTMI report, and NTTMP (network trunk transmission measurement plan) tapes</p> <p>Demand testing</p> <p>Automatic make-busy</p> <p>Interaction with CMS 1C</p> <p>Automatic dispersal of routine test results</p> <p>Automatic call-back for demand test results</p> <p>Operational tests from electromechanical offices</p> <p>Daily testing of trunks reported in trouble</p> <p>Data base update capability from a remote-user terminal</p> <p>Testing CCIS (common control interoffice signaling) trunks</p> <p>Interrogator program</p> <p>Facility group demand testing</p> <p>Circuit order data base</p> <p>Automated data base update</p> <p>Crash recovery</p> <p>CMS link diagnostics</p> <p>RSS (Remote Switching System) channel testing</p> <p>Comprehensive testing — demand and routine</p> <p>Demand and routine balance testing</p> <p>EOTT (enhanced operational trunk testing) coin and charge testing (5XB)</p> <p>5XB, 3 ESS switching equipment, and 4XB call failure analysis</p> <p>RTTU (remote trunk test unit) testing</p> <p>Special service trunk ID (identification) format</p>

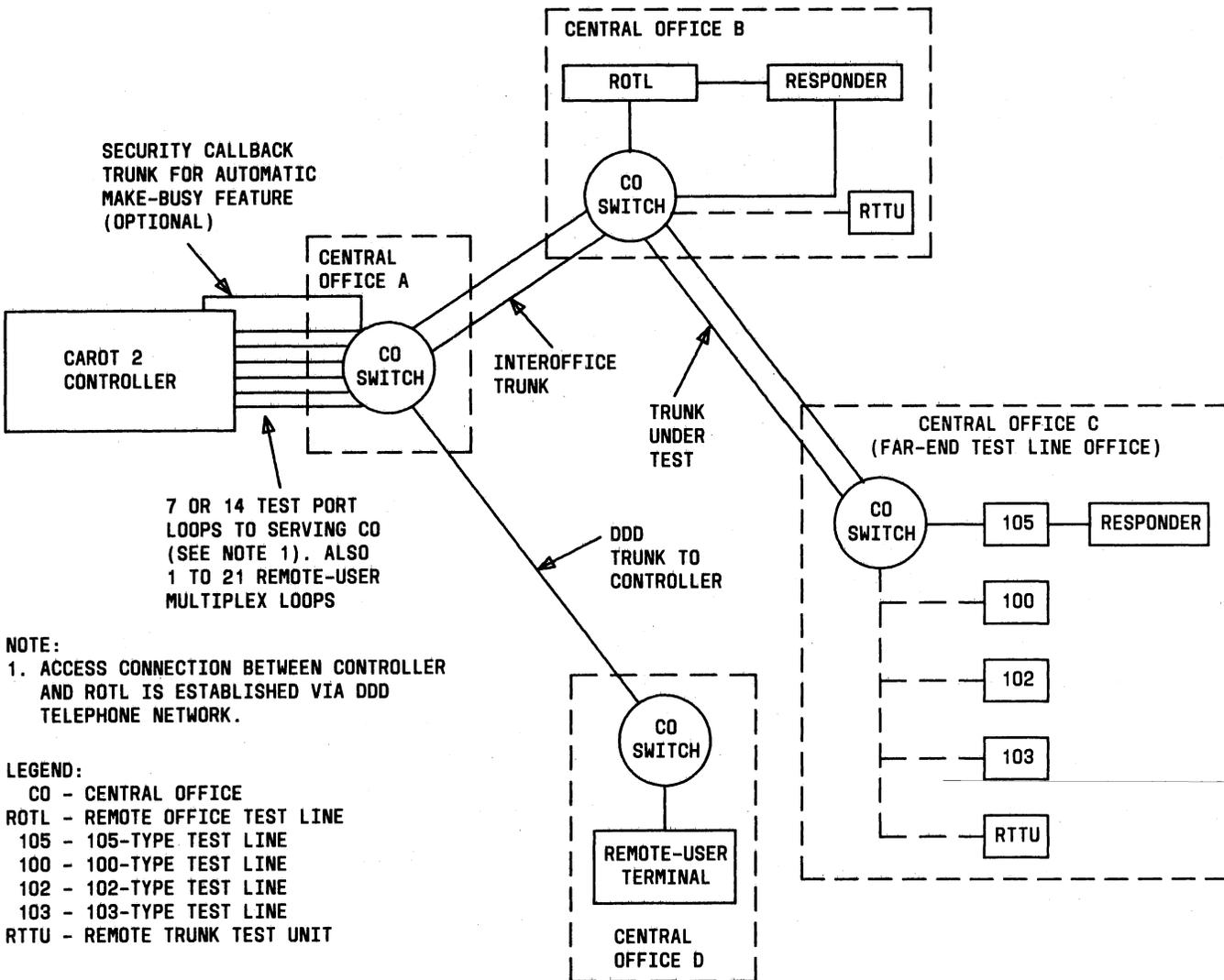


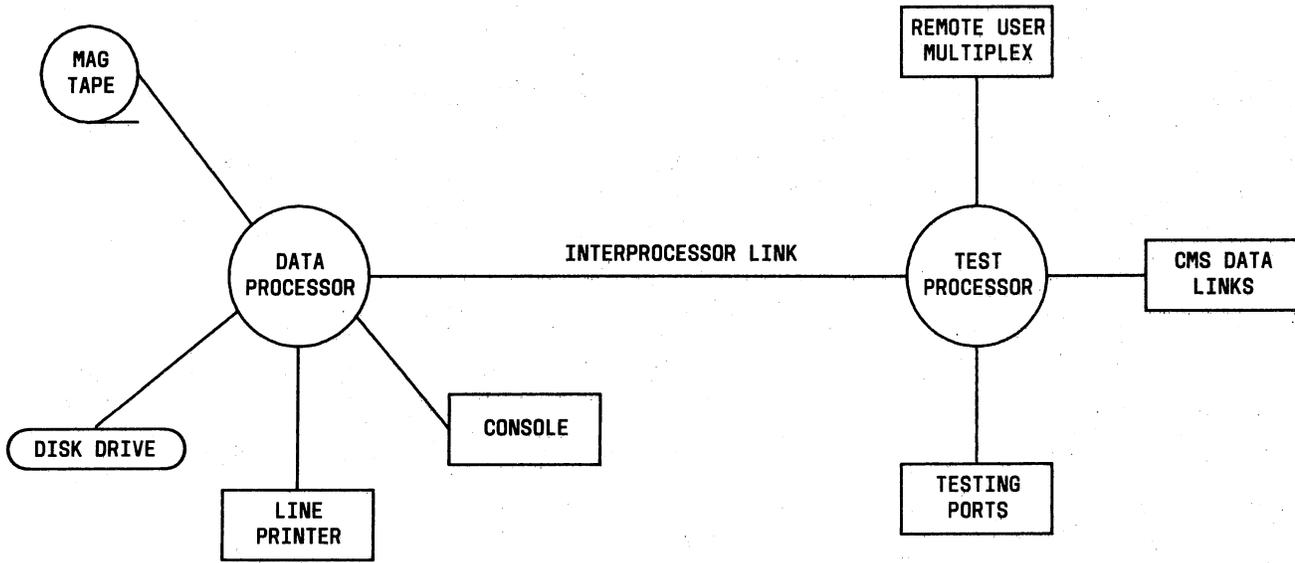
Fig. 1—Typical CAROT System Configuration

B. ROTL (Remote Office Test Lines)

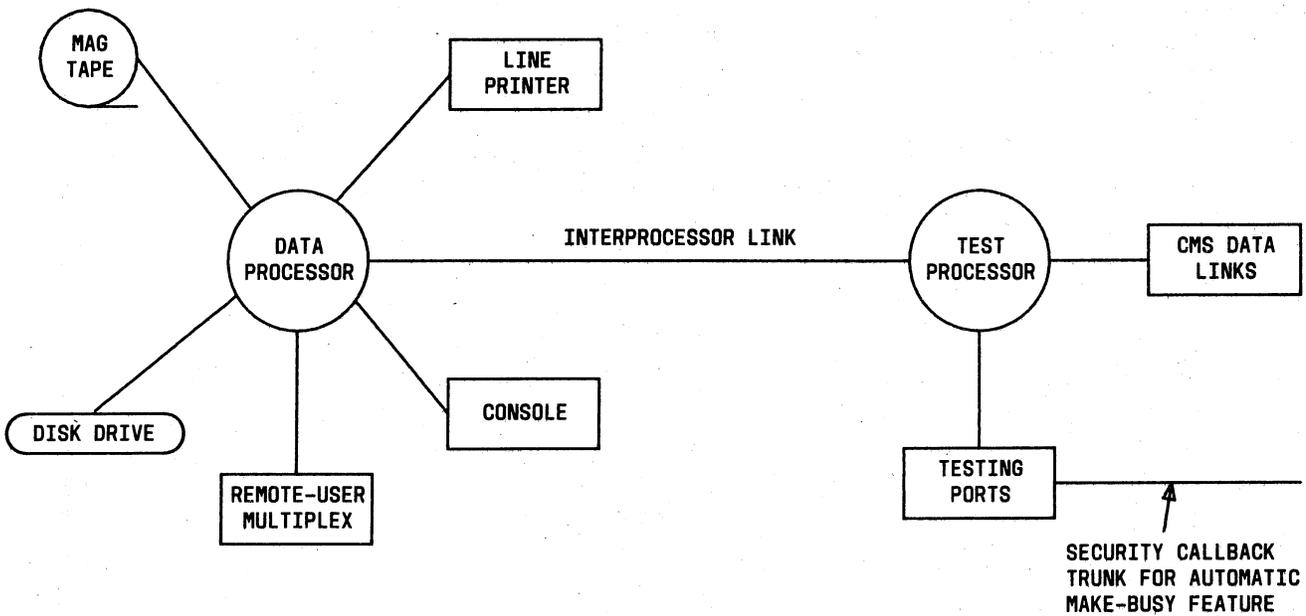
2.05 The ROTL provides a means for remotely accessing trunks. After the CAROT controller has accessed a ROTL over the switched telephone network, the controller sends out information which permits the ROTL to seize a particular trunk out of trunks to which it has access. The format and the actual information sent depend upon the type of ROTL used. Table E is a listing of the different types of trunks and the types of tests that are possible according to ROTL type. Table F is a listing of ROTL testing capabilities.

2.06 The ROTLs are available for step-by-step, No. 5 crossbar, No. 4 crossbar (as part of an OTTS [Outgoing Trunk Testing System]), No. 1 crossbar, crossbar tandem (XBT), 1/1A ESS switching equipment, 2/2B ESS switching equipment, 3 ESS switching equipment, 4 ESS switching equipment, and 5ESS*, and AXE-10 digital switch (Ericsson) switching equipment. Each type of switching equipment requires very different ROTL hardware and/or software, and different ROTL types require different priming information from the CAROT controller.

* Trademark of AT&T.



A. GENERICS 2 AND 3



B. GENERIC 4

Fig. 2—CAROT Controller Configurations

▶TABLE C◀

2CAROT4 FEATURES

FEATURE	
<p>212A modem support and Hewlett-Packard multiplexer for improved 21-port remote-user interaction*</p> <p>Analysis of routine test results</p> <p>Automatic data base update</p> <p>Automatic dispersal of routine test results</p> <p>Automatic make-busy</p> <p>Automatic scheduling of routine trunk testing</p> <p>CMS link diagnostics</p> <p>Callback by controller for demand test results</p> <p>Circuit order data base</p> <p>Circuit log file for remote user activity*</p> <p>Connection appraisal type of demand testing*</p> <p>Daily testing of trunks previously reported in trouble</p> <p>Daily trouble tracking</p> <p>Data base access via circuit group serial number*</p> <p>Data base update capability from a remote-user terminal</p> <p>Demand and routine balance testing</p> <p>Demand test without maintenance busy override*</p> <p>Demand testing</p> <p>EOTT coin and charge testing</p> <p>Enhanced routine test report retrieval*</p> <ul style="list-style-type: none"> • Retrieval by administrative entity • Retrieval by discrete categories <p>Expanded control office for trunks file, up to 1500 entries*</p> <p>Expanded digit outpulsing*</p> <p>Facility group demand testing</p> <p>Interaction with CMS 1C</p>	<p>Interrogator program</p> <p>Management summaries, TTMI reports, and NTTMP tapes</p> <p>Multiple simultaneous report dispersal*</p> <p>No. 4 crossbar (ROTL/OTTS) operational tests</p> <p>No. 5 crossbar, 3 ESS switch, and No. 4 crossbar call failure analysis</p> <p>RSS channel testing (1 ESS and 2 ESS switches)</p> <p>Remote-user demand remote make busy and release capability*</p> <p>Revised user function codes*</p> <p>Routine testing scheduling capability verification*</p> <p>Routine transmission testing of trunks</p> <p>Selective RTMB (remote trunk make busy)*</p> <p>Selective TDL (temporary daily list)*</p> <p>Separate category on management summary report and index for SPHTs (supervisory hits) and NOAS (no answer supervision)*</p> <p>Special service trunk ID format</p> <p>System recovery</p> <p>TOSC generated report dispersed utility*</p> <p>Testing CCIS (common control interoffice signaling) trunks</p> <p>Testing of No. 5 ACD (automatic call distributor) trunks for directory assistance and INWATS (inward wide area telephone service) trunks from No. 4 crossbar and 4 ESS switching equipment</p> <p>Testing via RTTUs</p> <p>Tests to operational test lines</p> <p>Time-stamp remote-user batch results*</p> <p>User contact telephone number*</p> <p>User identification with expanded administrative entities*</p>
<p>* Features added or enhanced by Generic 4.</p>	

▶TABLE D◀

CAROT REFERENCE MATERIALS

REFERENCE	TITLE
Practice 190-102-010	TOSC Operations and Administration—Generic 2
Practice 190-102-015	Analysis of Test Results—Generic 2
Practice 190-102-100	General System Description—Generic 2
Practice 190-102-103	Remote-User—Description and Operation—Generic 2
Practice 190-102-201	Data Base Administration—Generic 2
Practice 190-102-202	Controller Administration—Generic 2
Practice 190-102-203	Data Base Description and Requirements—Generic 2
Practice 190-102-204	Circuit Order Activity—Implementation and Description—Generic 2
Practice 190-102-205	Text Editor Program—Generic 2
Practice 190-102-206	SELEC Program—Generic 2
Practice 190-102-207	Report Program Generator—Generic 2
Practice 190-102-301	Operating Procedures—Generic 2
Practice 190-102-305	Remote User—Operating Procedures—Generic 2
Practice 190-102-500	System Trouble-Locating Procedures—Generic 2
Practice 190-102-501	System Recovery Strategy—Generic 2
Practice 190-102-502	Remote-User Port Diagnostics—Test Descriptions—Generic 2
Practice 190-103-015	Analysis of Test Results—Generic 3
Practice 190-103-017	2CAROT4 Controller—Analysis of Test Results
Practice 190-103-100	General System Description—Generic 3
Practice 190-103-103	Remote User—Description and Operation—Generic 3
Practice 190-103-105	CAROT/CMS Interface Description—Generic 3
Practice 190-103-110	2CAROT 4 General System Description
Practice 190-103-113	2CAROT4 Controller—Remote User—Description and Operation
Practice 190-103-115	2CAROT4 Controller—CAROT/CMS Interface Description
Practice 190-103-201	Data Base Administration—Generic 3

◆TABLE D (Contd)◆

CAROT REFERENCE MATERIALS

REFERENCE	TITLE
Practice 190-103-202	Controller Administration—Generic 3
Practice 190-103-203	Data Base Description and Requirements—Generic 3
Practice 190-103-204	Circuit Order Activity—Generic 3
Practice 190-103-205	Text Editor Program—Generic 3
Practice 190-103-206	SELEC Program—Generic 3
Practice 190-103-207	Report Program Generator—Generic 3
Practice 190-103-210	Installation Procedures—Generic 3
Practice 190-103-211	2CAROT4 Controller—Data Base Administration
Practice 190-103-212	2CAROT4 Controller—Administration
Practice 190-103-213	2CAROT4 Controller—Data Base Description and Requirements
Practice 190-103-214	2CAROT4 Circuit Orders Activity—Implementation and Description
Practice 190-103-215	2CAROT4 Controller-Edit Program
Practice 190-103-216	2CAROT4 Controller—Select Program
Practice 190-103-217	2CAROT4 Controller—Report Program Generator
Practice 190-103-220	2CAROT4 Controller—Installation Planning and Procedures
Practice 190-103-300	Operating Procedures—Generic 3
Practice 190-103-305	Remote User—Operating Procedures—Generic 3
Practice 190-103-310	Output Message Manual—Generic 3
Practice 190-103-400*	2CAROT4 Controller—Generic 4—Operating Procedures
Practice 190-103-405*	2CAROT4—Remote-User Terminal—Operating Procedures
Practice 190-103-410*	2CAROT4 Controller—Console Output Message Manual
Practice 190-103-500	CAROT 2 Controller—System Trouble-Locating Procedures
Practice 190-103-501	System Recovery Strategy—Generic 3
Practice 190-103-502	Remote-User Port Diagnostics—Test Descriptions—Generic 3
Practice 190-103-511*	2CAROT4 Controller—System Recovery Strategy

*These practices have not been issued as of this date. Consult future issues of indexes as to the availability of these documents.

◆TABLE D (Contd)◆	
CAROT REFERENCE MATERIALS	
REFERENCE	TITLE
Practice 802-001-196	General Grounding Requirements for Data-Processing Computer System Installation
Practice 824-101-112	CAROT Equipment Design Requirements
Practice 865-203-100	CAROT 2 Engineering Considerations
Practice 865-203-101	CAROT 2 EIMS
Practice 951-700-100	RTTU/CTTU (Remote Trunk Test Unit/Central Trunk Test Unit)—General Descriptive Information
Practice 951-710-100	CAROT 2 General System Description—Generic 3
Practice 951-710-101	2CAROT4—General Description
CIR 190-099-036NP	2CAROT4 Applications—Planning Guide and Benefit Package
GL 75-06-001, EL 3877/PL 2936,	Description of CAROT 2 System
GL 76-04-032, EL 4226/PL 3080,	Announcement of CAROT 2 Controller and Software
GL 76-09-073	CAROT 2 Training Program
GL 76-10-166	TFMS/CAROT—Planning Guidelines for 4XB
GL 76-10-062	Standardization of Modifier Field in CLCI
GL 77-06-058	Make-Busy Callback Circuit—Description and Ordering Information
IL 80-02-238, EL 5943	Terminal Balance Testing Recommendations
GL 77-02-007A, EL 4954A	Testing of CCSA (Common Control Switching Arrangement) and Other Special Service Trunks
GL 78-03-280B	Maintenance Task Force Guidelines for CAROT and TCAS (T-Carrier Administration System)
GL 78-07-066A&B	Announcement of CAROT 2, Generic 2, Hardware and Software
IL 82-11-101	Load Limit Guidelines for Generic 3
PL 82-04-037	Preliminary Planning for CAROT, Generic 3
Select Code 500-208	Remote-User Pocket Guide

▶TABLE E◀

TYPES OF TRUNKS TESTABLE VIA CAROT/ROTL-INCLUDING EOTT

TRAFFIC USAGE CODE	MEANING	TYPE OF TEST POSSIBLE	TYPE OF ROTL USED (NOTE)
CA	CAMA	Transmission except when ONI or CAMA transfer	All
		With JT modifier for EOTT tests	5XB expanded and mini-ROTL
DD	Class 5-to-class 4 DDD access trunk	Transmission and operational	All
		For EOTT tests	5XB expanded and mini-ROTLs
DT	Tandem connecting-toll	Transmission and operational	All
EB	Direct interexchange feature-trunk group B	Transmission and operational	All
ED	Direct interexchange feature-trunk group D	Transmission and operational	All
IA	Intraoffice	Transmission and EOTT	5XB (small, mini, and expanded) transmission only
IE	Interexchange	Transmission and operational	All
		For EOTT	5XB expanded and mini-ROTLs
IM	Intermarker group	Transmission and EOTT (expanded only)	5XB (small and expanded)
IT	Intertoll	Transmission and operational	All
JT	A traffic use code of JT (intra-end office junctor) with a modifier of CA. This trunk group is used to provide billing information to CAMA operators.	EOTT only	5XB expanded and mini-ROTLs
LP	Line link pulsing circuits	EOTT only	5XB expanded and mini-ROTLs
MI	Toll subscriber auxiliary trunks.	EOTT only	5XB expanded and mini-ROTLs
MT	Intertandem	Transmission and operational	All

See note and footnote at end of table.

▶ TABLE E (Contd) ◀

TYPES OF TRUNKS TESTABLE VIA CAROT/ROTL-INCLUDING EOTT

TRAFFIC USAGE CODE	MEANING	TYPE OF TEST POSSIBLE	TYPE OF ROTL USED (NOTE)
OO	Operator connecting (two-way)	Transmission and operational	All
RM	RSS channels	Transmission and operational	All
SP	Traffic service position	Transmission and EOTT	5XB expanded and mini
TB	Tandem to point of presence interexchange-trunk group B	Transmission and operational	All
TD	Tandem to point of presence interexchange-trunk group D	Transmission and operational	All
TE	End-office toll	Transmission and operational	All
TG	Tandem completing	Transmission and operational	All
TM	Tandem completing and toll switching combined	Transmission and operational	All
TO	Tandem originating	Transmission and operational	All
VR	A trunk group used to verify subscriber line conditions (i.e., busy line, etc.)	EOTT only	5XB expanded and mini-ROTLs
*	Central office-to-PBX trunks arranged for direct inward dial except for those using dial tone as a start dial system	Transmission	Expanded 5XB, 1 ESS switch

Note: ESS switch ROTLs cannot perform operational tests; mini-ROTL cannot perform busy line verification test.

* Common language usage codes not assigned.

TABLE F

ROTL TESTING CAPABILITIES

TESTS	SMALL ROTLS	EXPANDED ROTLS								MINI-ROTLS			RTTU	
		5XB	SXS	1XB	XBT	"ESS" SWITCHES				4XB OTTS/ROTL	SXS	3 "ESS" SWITCH		5XB
						1	2	4	5					
Transmission test to 100 TL, 102 TL, and 105 TL	Yes*	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Operational test (synchronous TL and nonsynchronous TL)	Yes*	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No
Operational test (103 TL)	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No
Balance and long-term test	Yes†	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Make-busy and restore	Yes	No§	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Trunks status request	Yes	No§	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Trunk group status by trunk ID	Yes	No§	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Trunk group status by group ID	No	No§	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes
Security callback request	No‡	No§	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Connection appraisal (100 TL, 102TL, and 105 TL)	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes
HOTL (home office test line) test (100 TL, 102 TL, and 105 TL)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	105 only	No	Yes	Yes
HOTL test (synchronous TL, nonsynchronous TL, and 103 TL)	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	No	Yes	No
Manual on-site cut-through trunk access	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No
Special 4XB tests (quickie, ERLY RLS, reorder, announce, and operator)	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
Disconnect timing test	Yes¶	No	Yes	No	No	No	No	No	No	No	Yes	No	No	No

* One transmission test line and one operational test line for any given trunk.
† Quiet termination only.
‡ Callback is automatic on first make-busy or restore request.
§ Feature MD.
¶ EOTT feature provided.

2.07 The first version of ROTLs were the **small** ROTLs that were installed in step-by-step and 5XB offices. These ROTLs were limited in their testing capabilities. The FETL number information was hard-wired (not passed to the ROTL by the controller). The next generation of ROTLs was the **expanded** ROTLs. They gave more trunk testing capabilities and flexibility. The expanded ROTL in the 5XB office was enhanced with the use of a PDT 2A (pollable data terminal 2A). The PDT 2A provides EOTT (enhanced operational trunk testing) testing capabilities. The latest ROTL is the mini-ROTL. It provides testing capabilities in the SXS, 5XB, and 3 ESS switches. Also provided is the proper termination and sequence control for return-loss operations. The mini-ROTL

(for SXS) is commonly called the ROTL-3. For 5XB applications the mini-ROTL has been enhanced with the EOTT/RTMB (remote trunk make busy) unit. As the acronym implies, it provides the mini-ROTL with EOTT and RTMB capabilities. An RTTU (which is functionally equivalent to a ROTL, FETL, and 52A responder) is available for testing trunks associated with 1/1A ESS switch, 2/2B ESS switch, and AXE-10 switches. For a listing of more detailed information on the different types of ROTLs, refer to Table G.♦

C. Responders

2.08 Responders are used to perform the actual transmission measurements on trunks. The

▶TABLE G◀		
ROTL REFERENCE MATERIALS		
ROTL TYPE	REFERENCE	CONTENT
Small 5XB	GL 72-02-054, EL 1609	Priming information and removal of holds on No. 5 ROTL circuits and APTT-ROTL (automatic progression trunk test-ROTL) control units
	GL 70-09-186, EL 835	Priming information and request for holds on No. 5 ROTL circuits and APTT-ROTL control units
	EL 217, Topical Index Code 1B16.SC Sept 18, 1968	Small 5XB ROTL and associated arrangements
	J23263—Practice 819-713-151	Equipment design requirements
	Practice 218-743-101	Descriptive information
	Practice 218-743-301	Operational procedures
	Practice 218-743-501	Tests
	Practice 218-743-701	Build-out resistor assembly adjustment
	SD-27698-01	Small 5XB ROTL circuit
	SD-27727-01	Remote office test control circuit
SD-27799-01	Remote office trunk make-busy circuit	
Small SXS	GL 71-04-015, EL 1183	SXS (step-by-step) systems—ROTL for operational and transmission tests on outgoing trunks
	J34305—Practice 814-609-150	Equipment design requirements
	Practice 226-829-100	Description
	Practice 226-829-500	Tests
	Practice 226-829-700	Adjustment of line build-out network
	SD-32521-01	Small SXS ROTL circuit
	SD-33042-01	2-digit trunk connector
Expanded 5XB	RL 81-09-201, EL 730	EOTT features of expanded ROTL audit mini-ROTL.
	GL 73-02-045, EL 2439	5XB System—remote office testing with CAROT (1 or 2)
	J23263—Practice 819-713-151	Equipment design requirements
	TOP 218-743-000	Maintenance and operation (RSTS)
	Practice 218-743-001	Maintenance and operations (92A control unit)
	Practice 218-743-102	General description

◆TABLE G (Contd)◆

ROTL REFERENCE MATERIALS

ROTL TYPE	REFERENCE	CONTENT
Expanded 5XB (Contd)	Practice 218-743-104	Pollable Data Terminal No. 2A Description
	Practice 218-743-301	Operational Procedures
	Practice 218-743-303	System evaluation procedures
	Practice 218-743-304	Equipped with pollable data terminal No. 2A—acceptance tests
	Practice 218-743-310	Equipped with pollable data terminal No. 2A—input/output, diag., error mess.
	Practice 218-743-311	Equipped with pollable data terminal No. 2A—diagnostic test procedures
	Practice 218-743-312	Equipped with pollable data terminal No. 2—initialization and recovery procedures
	Practice 218-743-510	Trunk operational tests using the 92A control unit
	Practice 218-743-511	Transmission tests using the 92A control unit
	Practice 218-743-512	Equipped with pollable data terminal No. 2A—priming using 92A control unit
	Practice 218-743-513	Equipped with pollable data terminal No. 2A—distributor and scanner lead verification procedures
	Practice 218-743-514	Equipped with pollable data terminal No. 2A—miscellaneous test procedures
	Practice 218-743-702	Build-out resistor assembly adjustment
	Practice 218-743-704	Adjustment of drop build-out capacitor
	SD-28035-01	Access circuit
	SD-28036-01	Register circuit
	SD-28037-01	Trunk make-busy circuit (MD)
Expanded SXS	GL 73-12-159, EL 2898	SXS expanded ROTL (ROTL-2)
	J34306—Practice 814-609-151	Equipment design requirements
	TOP 226-831-000	Maintenance and operation
	Practice 226-831-100	General description
	SD-32544-01	Port circuit
	SD-32545-01	Register circuit
	SD-32546-01	Sender circuit

▶TABLE G (Contd)◀

ROTL REFERENCE MATERIALS

ROTL TYPE	REFERENCE	CONTENT
Expanded SXS (Contd)	SD-32547-01	Terminal balance circuit
	SD-32548-01	Trunk access circuit
	SD-32549-01	Miscellaneous circuit
Mini-ROTL and EOTT/ RTMB Unit 5XB	IL 79-10-011, EL 6457	No. 5 crossbar mini-ROTL
	J23268 Practice—819-713-152	Equipment design requirements
	Practice 218-743-103	Description
	Practice 218-743-105	EOTT/RTMB unit—description
	Practice 218-743-305	EOTT/RTMB unit—local operating instructions
	Practice 218-743-503	Acceptance tests
	Practice 218-743-504	EOTT/RTMB unit acceptance tests
	Practice 218-743-505	EOTT/RTMB—status and control unit—operation
	Practice 218-743-506	EOTT/RTMB—trouble locating procedures
	Practice 218-743-703	Adjustment of line build-out network
	Practice 218-743-705	Adjustment of drop build-out capacitor
	SD-28132-01	No. 5 Xbar mini-ROTL central control unit circuit
	SD-28133-01	No. 5 Xbar mini-ROTL interface circuit
Fixed ROTL-3 SXS	GL 78-01-004B, EL 5533B	Remote office test line (ROTL-3) for step-by-step systems
	J34307—Practice 814-609-152	Equipment design requirements
	Practice 226-834-100	ROTL-3 description
	Practice 226-834-300	ROTL-3 acceptance tests
	Practice 226-834-310	ROTL-3 MRTTU with RTMB data base operating instructions
	Practice 226-834-500	ROTL-3 trouble locating procedures
	Practice 226-834-700	ROTL-3 adjustment of line build-out network
	SD-35065-01	ROTL-3 central control unit circuit
	SD-35066-01	ROTL-3 trunk access switch circuit
Portable ROTL-3 SXS	IL82-02-180, EL 7514	Portable remote office test line (PORTABLE ROTL-3) for step-by-step systems
	J34307—Practice 814-609-152	Equipment design requirements
	Practice 226-834-101	Portable ROTL-3 description
	Practice 226-834-301	Portable ROTL-3 acceptance tests

▶ **TABLE G (Contd)** ◀

ROTL REFERENCE MATERIALS

ROTL TYPE	REFERENCE	CONTENT
Portable ROTL-3 SXS (Contd)	Practice 226-834-501	Portable ROTL-3 trouble locating procedures
	Practice 226-834-701	Portable ROTL-3 adjustment of line build-out network
	SD-35066-01	ROTL-3 trunk access switch circuit
	SD-35076-01	Portable ROTL-3 central control unit and TAS interface circuit
1XB and XBT	GL 73-08-102, EL 2748	1XB and XBT systems—remote office testing with CAROT (1 or 2)
	J28555—Practices 816-601-153 and 817-701-154	1XB and XBT ROTL—equipment design requirements
	TOP 216-780-000	1XB ROTL—maintenance and operation
	Practice 216-780-101	1XB ROTL—general description
	TOP 220-462-000	XBT ROTL—maintenance and operation
	Practice 220-462-101	XBT ROTL—general description
	SD-28067-01	1XB and XBT ROTL circuit
	J27753—Practices 816-601-150 and 817-701-150	Incoming trunk test circuit—equipment design requirements
SD-25161-01	Incoming trunk test circuit	
1/1A ESS switching equipment	GL 73-07-012, EL 2505/PL 2671	ESS switching equipment—2-wire—ROTL and PCI (processor-controlled interrogator)
	J1A076A—Practice 820-502-151	Equipment design requirements
	TOP 231-055-008	Maintenance and operation
	Practice 231-032-000	Description
	SD-1A330-01	Frame circuit
	SD-1A314-01	Applique circuit
	SD-1A133-01	Master scanner applique circuit
	SD-1A146-01	Signal distributor applique circuit
2/2B ESS switching equipment	J2H039A—Practice 820-640-152	Equipment design requirements
	Practice 232-190-205	Description—near end and far end
	TOP 232-132-301	Maintenance and operation
	Practice 232-132-101	Description—ROTL
	Practice 232-132-102	Description—RTTU

▶TABLE G (Contd)◀

ROTL REFERENCE MATERIALS

ROTL TYPE	REFERENCE	CONTENT
2/2B ESS switching equipment (Contd)	GL 76-09-164	Ordering information
	SD-2H183-01	ROTL applique circuit
	SD-2H184-01	105 test line applique circuit
3 ESS switching equipment	IL 79-04-096, EL 6404	3 ESS ROTL (remote office test line) feature
	Practice 233-135-110	Description
	TOP 233-142-110	Maintenance and operation
	Practice 233-190-205	Features
	SD-99392-01	Mini-ROTL circuit
4 ESS switching equipment	J4A007A—Practice 820-741-156	Equipment design requirements
	Practice 234-110-080	Description
	Practice 234-110-081	Theory
	TOP 234-150-005	Maintenance and operation
	SD-4A021-01	Frame circuit
	SD-4A061-01	4 ESS switching equipment ROTL circuit
	SD-4A062-01	105 test line circuit
5ESS switching equipment	Practice 235-132-100	Description
	SD-5D035-01	
No. 4XB OTTS/ ROTL unit	J1P012—Practice 824-101-103	Equipment requirements
	Practice 103-261-101	Description and operation
	Practice 103-261-502	Maintenance
	SD-1P066-01	OTTS/ROTL circuit
RTTU/ Mini-RTTU	OPG-1P032-01	System Index
	OPD-1P033-01	Overall System Description
	OPD-1P034-01	RTTU—Frame Description
	OPP-1P035-01 SC1	CTTU Overall System
	OPP-1P035-01 SC2	RTTU 1/1A ESS Performance Test Requirements
	OPP-1P035-01 SC3	RTTU 2/2B ESS Performance Test Requirements

▶TABLE G (Contd)◀

ROTL REFERENCE MATERIALS

ROTL TYPE	REFERENCE	CONTENT
RTTU/ Mini-RTTU	OPP-1P035-01 SC4	RTTU 5ESS Performance Test Requirements
	OPP-1P035-01 SC5	MRTTU 3 ESS Performance Test Requirements
	OPP-1P035-01 SC6	MRTTU SXS Performance Test Requirements
	OPP-1P035-01 SC7	MRTTU 5XB Performance Test Requirements
	OPA-1P036-01 SC1	CTTU General User Guide
	OPA-1P036-01 SC2	CTTU 1/1A ESS User Guide
	OPA-1P036-01 SC3	CTTU 2/2B ESS User Guide
	OPA-1P036-01 SC4	CTTU 5ESS User Guide
	OPA-1P036-01 SC5	CTTU 3 ESS User Guide
	OPA-1P036-01 SC6	CTTU SXS User Guide
	OPA-1P036-01 SC7	CTTU 5XB User Guide
	OPM-1P037-01	RTTU/CTTU Overall System Maintenance and Tests
	OPM-1P038-01	RTTU Maintenance and Trouble Locating Procedures 2/2B ESS
	OPM-1P039-01	RTTU Maintenance and Trouble Locating Procedures 1/1A ESS
	OPD-1P040-01	MRTTU System Description—3 ESS, 5XB, SXS
	OPM-1P041-01	MRTTU Maintenance and Trouble Locating Procedures 3 ESS, 5XB, SXS
	190-104-100	RTTU/CTTU Overall System Description
	190-104-101	RTTU System Description 1/1A ESS and 2/2B ESS
	190-104-103	MRTTU System Description 3 ESS, 5XB, SXS
	190-104-201	CTTU Overall System Performance Tests
190-104-202	RTTU 1/1A ESS Performance Test Requirements	
190-104-203	RTTU 2/2B ESS Performance Test Requirements	
190-104-204	RTTU 5ESS Performance Test Requirements	
190-104-205	MRTTU 3 ESS Performance Test Requirements	
190-104-206	MRTTU SXS Performance Test Requirements	

▶TABLE G (Contd)◀

ROTL REFERENCE MATERIALS

ROTL TYPE	REFERENCE	CONTENT
RTTU/ Mini-RTTU	190-104-207	MRTTU 5XB Performance Test Requirements
	190-104-301	CTTU General User Guide
	190-104-302	CTTU 1/1A ESS User Guide
	190-104-303	CTTU 2/2B ESS User Guide
	190-104-304	CTTU 5ESS User Guide
	190-104-305	CTTU 3 ESS User Guide
	190-104-306	CTTU SXS User Guide
	190-104-307	CTTU 5XB User Guide
	190-104-501	RTTU 2/2B ESS Trouble Locating Procedures
	190-104-502	RTTU 1/1A ESS Trouble Locating Procedures
	190-104-503	MRTTU 3 ESS, 5XB, SXS Trouble Locating Procedures
	190-104-504	RTTU/CTTU Overall System Maintenance and Tests
	824-101-118	(J1P051) RTTU Equipment Design Requirements
	824-101-124	CTTU Equipment Design Requirements
	865-205-100	RTTU/CTTU Engineering Implementation and Methods System and Engineering Considerations
	951-700-100	RTTU/CTTU General Description
	CIR 190-099-006 IR	MRTTU/CTTU Information Release
	CIR 190-099-022 IR	RTTU/MRTTU/CTTU Information Release
CIR 190-099-028 MG	CTTU Maintenance Release—Software ISS. 5	
CIR 190-099-035 NP	RTTU Enhanced ROTL Port	
All Types	Practice 103-251-112	92A Control Unit Operation
	700-187	92A Control Unit Operation

MF (multifrequency) commands received by the responder cause it to perform either loss, noise, noise-with-tone, gain slope, or balance measurements. In addition, the responder can perform a self-check of its own circuitry. Measurement results are sent back to the controller location by means of frequency shift data signals.

2.09 A responder is always required with 105-type test lines as shown in Fig. 1. In addition, a responder is required at each ROTL location. A responder used in conjunction with a ROTL requires additional features as compared to a responder used only with a 105-type test line. It receives MF commands from the controller location; but, additional data signals from far-end 105-type test lines are transmitted through the ROTL responder to the controller location. A responder can be shared between a ROTL and a 105-type test line if so desired.

2.10 Several different types of responders exist. The 51B-type [rated MD (“manufacture discontinued”)] can be used in conjunction with the small ROTLs and the 105-type test line. This 51B-type responder is capable of making 2-way loss and C-message noise measurements. The 52-type responder can be used in conjunction with all ROTLs and the 105-type test line. It also provides additional testing capability such as gain-slope and return loss.

The 56A-type responder is designed for small end offices, community dial offices, and PBXs (private branch exchanges). With the exception of terminate only capability for return loss, all functions are identical to those provided by the 52A-type responder. The 51B-type responders have been rated MD. The testing capabilities of the various responder types are listed in Table H. For a listing of documents containing detailed information on the different types of responders, refer to Table I.

D. FETL (Far-End Test Lines)

2.11 The FETLs associated with CAROT are all accessed via the switched network. The 105 TL (test line) can make any test for which its associated responder is equipped (Table H).

(a) The test lines used for transmission tests with CAROT are as follows:

- 100 TL—The older version of the 100 TL switches a quiet termination onto the trunk to be tested after going off-hook. The new combined 100 TL returns 5 seconds of 1000-Hz tone at 0 dBm after going off-hook and then switches a quiet termination onto the trunk being tested. Only the new com-

TABLE H			
RESPONDER TESTING CAPABILITIES			
TEST	51B	52A-TYPE	56A
Loss: 1004 Hz at 0 dBm0	Yes	Yes	Yes
Noise—quiet termination	Yes	Yes	Yes
Gainslope: 404 Hz at -16 dBm0 1004 Hz at -16 dBm0 2804 Hz at -16 dBm0	No	Yes	Yes
Balance: ERI (echo return loss), SRL (singing return loss), and SRL HI (singing return loss high)	No	Yes*	Yes†
Noise-with-tone: 1004 Hz at -16 dBm	No	Yes	Yes
* Options provide “measure/terminate” capability, or “terminate only” capability.			
† “Terminate only” capability is standard. Measurement capability is not available with this type responder.			

TABLE I		
RESPONDER REFERENCE MATERIALS		
RESPONDER TYPE	REFERENCE	CONTENT
51B	GL 73-10-091, EL 2719/ PL 2708, Oct 17, 1973	Change in 51B responder
	GL 73-10-002, EL 2072/PL 2724	Change in 51B responder
	J94051— Practice 801-250-163	Equipment design requirements
	Practice 103-250-100	51-type ATMS—description
	Practice 103-250-302	Trouble location
	Practice 103-250-502	Alignment using CP101RT per ED-99959-30
	Practice 103-250-503	Alignment using CP101RT per ED-1C334-01
	SD-99747-01	Functional schematics
	SD-99745-01	Circuit schematics
52	GL 73-05-104, EL 228/ PL 2630, May 16, 1973	52A responder and 52B responder access panel
	J94052— Practice 801-250-172	Equipment design requirements
	Practice 103-252-100	52A responder—description and operation
	Practice 103-252-101	52B responder access panel—description and operation
	SD-1C399-01	52-type responder circuit
	SD-1C152-01	52B responder access panel circuit
	Practice 103-252-102	52C responder alignment unit — description and operation
	Select Code 700-251	52C responder alignment unit — user guide
	Practice 103-252-103	52D responder — description and operation
	Practice 103-252-500	52A and 52D responder — maintenance and testing
56A	J94056— Practice 801-250-175	Equipment design requirements
	Practice 103-252-104	Description and operation
	SD-99393-01	Circuit schematics
	EL 6175	Ordering information

bined 100 TL can be used with CAROT/ROTL.

- 102 TL—The 102 TL generates a 1000-Hz tone at 0 dBm. Usually, this tone is interrupted every 10 seconds by 1 second of quiet termination. However, some 102 TLs give 9 seconds of tone and then go on-hook.
 - 105 TL—The 105 TL connects a responder to the far end of a trunk under test for responder-to-responder testing. A test progress tone (2225 Hz) is returned to the originating end (for at least 1 second) until the responder is connected for testing. Measurements are made at each end by the responders, and the results are transmitted to the control position.
- (b) The test lines used for operational tests are as follows:
- Synchronous TL—The synchronous TL makes possible tests of supervisory and tripping functions. Specifically, it tests for application of ringing signal, tests for pretripping of machine ringing, provides ringing tone, tests for tripping of machine ringing, and provides supervisory tests. Off- and on-hook signals are generated toward the originating location.
 - Nonsynchronous TL—The nonsynchronous TL performs an operational test which is not as complete as that of the synchronous TL. It returns audible ringing to the originating office, causes ringing to trip, and returns a 60-IPM (interruptions-per-minute) flashing signal until disconnection.
 - 103 TL—The 103 TL is used to check the ability of a trunk to pass supervisory signals in both directions. Off-hook, on-hook, and 120-IPM flashing signals are returned to the originating end when control signals are received by the 103 TL.

For a listing of more detailed information on FETLs associated with CAROT, refer to Table J.

E. Remote Users

2.12 The basic purpose of CAROT is to provide automatic routine testing. However, the system can also provide a wide variety of other capabilities, with one of the more significant being demand testing. The demand testing features allow a person to request (demand) the CAROT System to perform tests.

2.13 The demand tests may be made by remote users (Fig. 1, central office D) communicating with the CAROT controller via DDD trunks. Remote users may communicate with the controller by using a TTY (teletypewriter), DATASPEED* 40 terminal set, or any acoustically coupled data terminal capable of sending and receiving 300- or 1200-baud asynchronous ASCII (American Standard Code for Information Interchange) data.

F. CMS-1 (Circuit Maintenance System) Interaction

2.14 Each office utilizing 4 ESS switching equipment will have a CAROT controller associated with it. The CMS-1, which is part of the 4 ESS switch environment, interfaces with the CAROT controller via a 1200-baud dedicated data link. The CMS-1 will have most of the capabilities of a remote user, as well as some additional features.

2.15 The CAROT controller can support up to three 4 ESS switch machines. A separate data link connecting CMS-1 to the CAROT controller is required for *each* 4 ESS switch served by CAROT.

G. RTTU/CTTU (Remote Trunk Test Unit/Central Trunk Test Unit) System

2.16 The RTTU/CTTU System is made up of the CTTU [which is resident in an SCC (Switching Control Center)] and one or more RTTUs (which are primarily software in the 5ESS switch), or mini-RTTUs which reside in the switching office(s) served by the CTTU. Communications between the CTTU and the RTTU and between the CTTU and other OSSs are accomplished via four dialup links (two data links and two voice links [Fig. 3]). One data link is provided between the RTTU frame and the CTTU console, and its primary purpose is to allow the CTTU to control the RTTU. A second data link provided by the system enables the CTTU technician to communicate with

* Registered trademark of AT&T

TABLE J		
FETL REFERENCE MATERIALS		
FETL TYPE	REFERENCE	CONTENT
100 and 102	GL 70-05-014, EL 539	Modification of 100 test line
	J94004—Practice 801-250-152	100 and 102 test lines—equipment design requirements
	Practice 103-335-500	General information on milliwatt test lines
	SD-98100-01	100 and 102 test line circuits
105	J93020—Practice 801-250-167	Equipment design requirements
	Practice 103-250-101	Description
	Practice 103-250-702	Build-out resistor assembly adjustment
	SD-96601-01	105 test line circuit
Nonsynchronous	SD-31636-01 SD-31642-01	Nonsynchronous test line circuits
Synchronous	SD-96096-01	1XB circuit
	SD-68583-01	4XB circuit
	SD-27640-01	5XB circuit
	SD-25771-01	5XB circuit (MD [manufacture discontinued])
	SD-96096-01	Panel circuit
	SD-27149-01	XBT circuit
103	SD-68399-01	4XB circuit
	SD-27795-01	5XB circuit
	SD-56221-01	SXS circuit
	SD-25939-01	XBT circuit
	GL 75-06-124	1 ESS switch circuit

other OSSs which include the CAROT System, and TIRKS (Trunks Integrated Records Keeping System).

2.17 The RTTU/CTTU System was designed to accomplish the following objectives:

- Provide a common TWS (trunk work station) that is applicable to switching machines served by the SCC
- Support the existing capabilities of the CAROT System
- Provide the TWS with comprehensive demand trunk testing capabilities equivalent to those provided at on-site test panels
- Provide line access and testing capabilities to satisfy the needs of the SCC
- Provide a TWS that is compatible with an operational environment where mechanized records and work administration are used
- Provide the TWS with efficient interfaces to CAROT and TIRKS
- Provide the flexibility (derived from modular construction and state-of-the-art technology) that would allow the system to add the required capabilities that would satisfy future needs of the central offices, SCCs, and the TNOP (total network operations plan).

2.18 Table G contains references to additional information on the RTTU/CTTU.

H. Associated Testing Equipment

J94054 MCI (Manually Controlled Interrogator)

2.19 The MCI (manually controlled interrogator) physically consists of a J94054B (54B) test control circuit and a J94054C (54C) panel circuit. The J94054D (54D) RCU (ROTL control unit) is an option to the 54C panel circuit. The MCI (54B and 54C) is used as a controller and data interpreter for making transmission measurements with a 51B-, 52A-, or 52D-type responder at the near end and with a test line at the far end of a trunk under test. The 54D RCU option provides manual access and control of all small and expanded ROTLS for other testing pur-

poses. A J94054F (54F) resistance build-out panel is used for buildout in dedicated responder applications whenever more than one 54C panel is associated with the 54B test control circuit and the difference in the distances between each 54C and the 54B exceeds a maximum number of feet. For detailed information on buildout procedures and limitations, refer to Practice 103-251-111, 54-Type Manually Controlled Interrogator—Adjustment of Loss in Transmission Paths.

2.20 The 54B test control circuit contains the necessary measurement and control electronics to conduct a test. It is miscellaneously mounted in a relay rack within a central office. The 54C panel circuit serves as the data entry and display device for conducting the tests. The 54C panel circuit and 54D RCU are frame-mounted adjacent to a test position within a central office. The 54B, 54C, and 54D can also be mounted in a console for desk top operation at the TOSC.

2.21 As many as four 54C panel circuits can be wired to one 54B test control circuit, but only one 54C panel circuit can be used at any given time to test trunks. Service is provided in a serial fashion to each of the panels. For more detailed information on the MCI/RCU, refer to Table K.

J94054A (54A) PCI (Processor-Controlled Interrogator)

2.22 The 54A PCI (processor-controlled interrogator) is designed to work with the processor used in a 1/1A ESS electronic switch. It is under direct control of the 1/1A ESS switch. The PCI is used as a data interpreter and controller for making transmission measurements with a 52A responder at the near end and a 100, 102, or 105 TL at the far end of a trunk under test. For more detailed information on the PCI, refer to Table K.

RCP (ROTL Control Panel)

2.23 The RCP (ROTL control panel) provides a means for manually controlling ROTLS for electromechanical switching systems. The functions of the RCP are as follows:

- (a) Provide trunk under test cut-through to a single-access point for manual testing

- (b) Control ROTLs remotely and to use their long-term balance testing features for balance testing of incoming trunks in class 4 or higher offices
- (c) Provide control for conducting operational tests on outgoing trunks via ROTL
- (d) Use the ROTL trunk make-busy and interrogation features on a direct or remote basis. A security callback answer capability is provided during remote usage.
- (e) Use with the 92A control unit or the H-310-150 RSTS (ROTL System test set) for interrogator-controlled automatic transmission measurements
- (f) Use as a controller for ROTL maintenance testing.

For more detailed information on the RCP, refer to Table K.

92A Control Unit

2.24 The 92A control unit is designed to replace almost all applications of MCI/RCU and RSTS. It will be used in conjunction with the ROGT (remote outgoing trunk) test set in the electromechanical switching control center to provide transmission, operational test control, and dc access for message trunks. The 92A control unit provides two options: option 1 provides 52C responder alignment capability while option 2 provides 8A tone detector test capability. For more detailed information on the 92A control unit, refer to Table K.

H-310-150 RSTS (ROTL System Test Set)

2.25 The H-310-150 RSTS is used to test small and expanded ROTLs and to make transmission measurements with a 52A, 52D, or 51B responder at the near end of a trunk under test. The H-310-150 RSTS has been rated MD. For more detailed information on the H-310-150 RSTS, refer to Table K.

J94008A (8A) Tone Detector

2.26 The 8A tone detector (lists 1 and 2) is designed to be used with ESS switching equipment and electromechanical ROTLs. The list 1, 8A tone detector detects 1004-Hz, 2225-Hz TPT (test progress tone), and call disposition tone (reorder, busy, audi-

ble ring, and voice) signals. It is intended to be used to detect the signals that are received from the far end of a trunk to be tested and to cause the ROTL to repeat the signals or their envelopes back to the control location. The tone detector also provides the means for preventing unauthorized use of the ROTL capability to place calls.

2.27 The list 2, 8A tone detector detects 1300-Hz signals. It is intended to be used in association with an input port of a ROTL to detect commands (recycle, drop-access trunk, and rering) received from a control location and to cause the ROTL to execute them. For a listing of more detailed information on the 8A tone detector, refer to Table K.

52C RAU (Responder Alignment Unit)

2.28 The J94052C (52C) RAU (responder alignment unit) is a portable test set designed especially to test the circuits of the 52-type responders. It consists of a main unit and alignment pack, a cover, and condensed operating instructions. In the cover of the 52C RAU are three accessories necessary to test the 52-type responders:

- (1) 748A extracting tool
- (2) ED-6G385-(), G1 extender card
- (3) HP 10525T logic probe.

For more detailed information on the 52C RAU, refer to Table K.

ATMS (Automatic Transmission Measuring System) Director and Test Frames

2.29 The TOSC may prepare test frame tapes for the J94051A (51A) director used in ATMS. For more detailed information on the 51A director, refer to Practice 103-250-100, 51-Type ATMS—General Description. For a listing of more detailed information on ATMS test frames, refer to Table L.

3. GLOSSARY

3.01 The following is a list of abbreviations used in this practice:

AOTT

Automatic outgoing trunk test

APTT

Automatic progression trunk test

ASCII

American Standard Code for Information Interchange

ATMS

Automatic Transmission Measuring System

CAROT

Centralized automatic reporting on trunks

DDD

Direct distance dialing

EOTT

Enhanced operational trunk testing

FETL

Far-end test line

HOTL

Home office test line

IPM

Interruptions per minute

MCI

Manually controlled interrogator

MD

Manufacture discontinued

MF

Multifrequency

OSS

Operations Support Systems

OTTS/ROTL

Outgoing Trunk Test System with ROTL option (No. 4 crossbar)

PDT 2A

Pollable data terminal 2A

PCI

Processor-controlled interrogator

RAU

Responder alignment unit

RCP

ROTL control panel

RCU

ROTL control unit

ROGT

Remote outgoing trunk

ROTL

Remote office test line

RSTS

ROTL System test set

RTMB

Remote trunk make busy

RTTU

Remote trunk test unit

SCC

Switching Control Center

SXS

Step-by-step

TL	TWS
Test line	Trunk work station
TIRKS	XBT
Trunks Integrated Records Keeping System	Crossbar tandem
TLP	1XB
Transmission level point	No. 1 crossbar
TNOP	4XB
Total network operations plan	No. 4 crossbar
TOSC	5XB
Trunk operations support center	No. 5 crossbar
TPT	
Test progress tone (2225 Hz)	

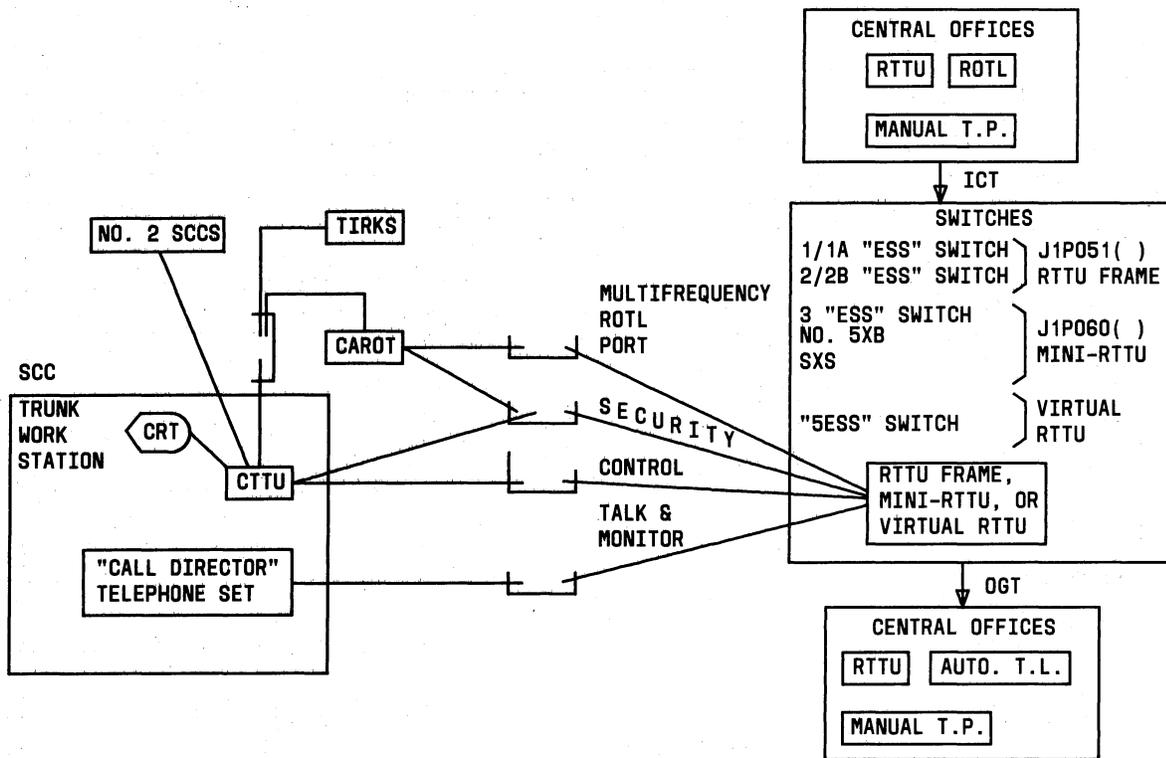


Fig. 3—RTTU/CTTU System Block Diagram

TABLE K

**MCI/RCU, PCI, RSTS, 52C RAU, 8A TONE DETECTOR,
RCP, AND 92A CONTROL UNIT REFERENCE MATERIALS**

EQUIPMENT	REFERENCE	CONTENT
MCI-RCU	GL 75-09-011, EL 3493/PL 2936	ATMS manually controlled interrogator and ROTL control unit
	J94054-Practice 801-250-173	Equipment design requirements
	Practice 103-251-110	Description, operation, and use
	Practice 103-251-111	Adjustment of loss in transmission paths
	CD- or SD-96608-01	MCI/RCU circuit
PCI	GL 73-07-012, EL 2505/PL 2671	1 ESS switching equipment—2-wire—ROTL and PCI
	J94054-Practice 801-250-173	Equipment design requirements
	Practice 103-251-105	Description
	CD- or SD-1C478-01	PCI circuit
RSTS	Practice 100-175-101	Description and operation
	H-310-150	ROTL system test set
52C RAU	GL 73-06-043, EL 2464/PL 265	52C RAU
	Practice 103-252-102	Description and operation
	CD- or SD-1C407-01	52C RAU circuit
8A & 8B Tone Detector	GL 73-04-032, EL 2146/PL 2631	General information
	J94008A—Practice 801-250-170	Equipment design requirements
	Practice 201-578-502	Tests and adjustment
	SD-99551-01	8A tone detector circuit
RCP	GL 76-06-227, EL 4225	ROTL control panel
	J93027—Practice 801-205-150	Equipment design requirements
	Practice 201-838-101	Description and operation
	Practice 201-838-701	E6 repeater adjustment
	CD- or SD-97585-01	RCP circuit

TABLE K (Contd)

**MCI/RCU, PCI, RSTS, 52C RAU, 8A TONE DETECTOR,
RCP, AND 92A CONTROL UNIT REFERENCE MATERIALS**

EQUIPMENT	REFERENCE	CONTENT
92A Control Unit	Practice 103-251-112	Description and operation
	Practice 103-251-113	Installation procedures
	Practice 103-251-114	Summarizing specifications
	Practice 660-503-500	Use of expanded ROTL balance and long-term test port
	IL 79-03-294, EL 6272	Ordering information
	Select Code 700-187	User guide
	SD-99640-01	92A-control unit test set

TABLE L		
ATMS TEST FRAME REFERENCE MATERIALS		
TEST FRAME TYPE	REFERENCE	CONTENT
SXS AOTT	EL140 Feb. 4, 1969	SXS automatic outgoing trunk test frame
	J35304— Practice 814-604-151	Equipment design requirements
	Practice 226-591-100	AOTT-description
	Practice 226-591-300	Compiling data for control tapes
	Practice 226-591-301	Preparation of control tapes
	Practice 226-591-501	Operational and transmission tests on outgoing dial trunks using AOTT
	Practice 226-591-510	AOTT frame (SD-32504-01) tests
	Practice 226-591-701	Adjustment of buildout networks
	Practice 955-905-100	General description
	SD-32504-01	Automatic outgoing trunk test circuit
4XB AOTT	Practice 212-512-101	Description
	Practice 212-512-301	Compiling data for control tapes
	Practice 212-512-302	Control tape preparation
	Practice 212-512-501	Tests
	Practice 212-512-701	Buildout resistor assembly adjustment

TABLE L (Contd)		
ATMS TEST FRAME REFERENCE MATERIALS		
TEST FRAME TYPE	REFERENCE	CONTENT
5XB APTT	J23450— Practice 819-712-150	Equipment design requirements
	Practice 218-220-301	Compiling data for control tapes — operational
	Practice 218-220-302	Preparation of control tapes — operational
	Practice 218-220-303	Compiling data for control tapes — transmission
	Practice 218-220-304	Preparation of control tapes — transmission
	Practice 218-220-701	Buildout assembly adjustment
	Practice 218-262-502	ATMS transmission tests
	Practice 218-262-503	Manual transmission tests
	Practice 958-910-100	General descriptive information
	SD-25938-01	Automatic progression trunk test circuit
All ATMS test frames	J93020— Practice 801-250-167	ATMS — Equipment design requirements