NO. 4 ELECTRONIC SWITCHING SYSTEM
TRUNK OPERATIONS CENTER (TOC)
ORGANIZATION AND FUNCTION

CONTENTS PAGE

1. INTRODUCTION

1.01 The quantity and complexity of equipment in a No. 4 Electronic Switching System (ESS) office requires a planned approach to principal work functions involved with control and maintenance responsibilities. The organization and function of work centers unique to No. 4 ESS depend on such variables as office size, equipment ownership, and administrative policies and procedures. In a fully equipped office, control and maintenance responsibilities are assigned to these basic work centers:

- Maintenance operations center (MOC)
- Terminal equipment center (TEC)
- Trunk operations center (TOC).

The responsibilities of the machine administration center (MAC) and the network management center (NMC) will require that the MAC and NMC understand the functions of and work closely with these centers. Table A provides a list of all abbreviations and acronyms with applicable terms used in this section.

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

1.03 The TOC provides management and maintenance personnel a centralized location to administer control and dispatch work for trunk maintenance. This section describes the TOC in the following parts:

- Description of functions
- Interrelationships with other work centers.

1.04 The primary TOC functions although not all discussed in this practice, are these:

- Trunk status control
- Testing and sectionalizing on trunk failures
- Repair coordination
- Circuit order testing and turnup
- Routine testing
- Long-term trunk performance analysis.

For all trunks terminating on the No. 4 ESS, TOC personnel perform these test and control functions in coordination with No. 4 ESS and the Circuit Maintenance System 1A (CMS 1A).

1.05 The CMS 1A is the basic administrative tool used by TOC personnel. It acts as a record keeper, report generator, and maintenance interface. Maintenance of circuit records is an essential task of the TOC.

2. DESCRIPTION OF FUNCTIONS

2.01 The basic responsibility of TOC maintenance personnel is to sectionalize trunk troubles and to coordinate repair of the trunks so that they can be restored to normal service. This is an operational responsibility that applies to all trunks and associated terminal equipment in a No. 4 ESS office.

2.02 Each TOC is functionally organized into control areas (CAs). Each CA consists of one control position and up to nine test positions. A maximum of ten CAs within a TOC is possible; however, the CAs of the TEC impose a limitation. The CMS 1A provides the TOC the flexibility of dividing and assigning the work load to each test position. This feature allows for work load rearrangement based on coverage requirements.

CIRCUIT ORDER TESTING AND TURNUP

2.03 Through CMS 1A circuit order work lists supplied by the MAC, TOC personnel perform circuit order work. Test position personnel are responsible for the following circuit order activity within a No. 4 ESS office:

- End-to-end testing of trunks (and any subsequent repair coordination)
- Turnup/turndown coordination of trunks
- Turnup/turndown notification to MAC (via CMS 1A).

3. INTERRELATIONSHIPS WITH OTHER WORK CENTERS

3.01 In addition to the TOC, the following work centers are used by No. 4 ESS to execute the trunk maintenance plan:

- TEC
- MOC
- MAC
- Transmision System Center (TSC): This is a functional designation for the carrier facilities group(s) in the office. The CTMS and TCAS are not independently considered work centers within No. 4 ESS.

Two other work centers are directly related to trunk maintenance: CAROT 2 and the circuit maintenance system maintenance center (CMSMC). These work centers support the maintenance effort in the No. 4 ESS offices. The CMSMC and CAROT 2 may be combined, and they may be attended or unattended. The CAROT 2 does periodic routine transmission testing and demand testing on trunks. Trunk trouble or test results are sent to the CMS 1A Processor. This data is forwarded to the responsible TOC test position according to the test position assignment inputted by the CMSMC operator. The function of the CMSMC is to monitor CMS 1A itself.

3.02 The CAROT 2 provides the means for automatically performing routine transmission tests on outgoing trunks and on 2-way trunks when operating in the outgoing direction, at the proper test interval depending upon the type of facility. Trunks found to be beyond the turndown limit are reported to CMS 1A after the trunk trouble has been confirmed and placed in the maintenance state by CAROT 2. These trunks, along with trunks with less severe impairments or those which could not be tested in four test attempts, are also reported to CMS 1A. The TOC CA receives this data in the form of a morning report listing from CAROT 2.

3.03 Demand transmission tests are performed by CAROT 2 on trunks, trunk subgroups, or facility groups. Applications of this end-to-end testing include repair verification tests and circuit order tests. Demand tests may be requested of CAROT 2 even if the trunk is in an idle or out-of-service state. The CMS 1A will automatically update the CAROT 2 data base as circuit order changes occur. Refer to BSP 010-410-320 for further information on CAROT 2.

3.04 The basic repair work centers are the MOC, the TEC, and the TSC. The MOC is responsible for control of all common control terminal equipment and for repair and control of the No. 4 ESS switching equipment. However, individual trunk testing within common control terminal equipment (eg, VIF equipment) is a TOC

responsibility. The TEC is responsible for repair and circuit order work on terminal equipment (both per-trunk and common control equipment). The TEC also has the responsibility for other equipment in the office (51As, service circuits, etc). The TSC is responsible for repair and circuit order work on the transmission facilities (carrier and radio). Communication with far-end TOCs or testrooms may be necessary for trunk status control, repair coordination, and circuit order activity on trunks.

RELATED SYSTEMS

3.05 The TSC is the conceptual work center comprising the carrier facilities group. The CTMS and/or the TCAS (if available) are maintenance tools used by TSC maintenance personnel. The CTMS will provide testing for L-type multiplex coaxial and radio facilities equipment. The CMS 1A and CTMS will interact to provide trunk trouble sectionalization features on those trunks which CTMS accesses. At the present, no specific interface between the TCAS and the TOC has been defined.

3.06 The TOC uses SMAS No. 3B as an optional system. On trunks employing analog carrier systems or metallic facilities, SMAS No. 3B provides monitoring and splitting access from the 51A to the trunk under test.

3.07 More information on the work centers and systems related to the TOC may be found in the applicable sections as referenced in Part 4.

VARIATIONS OF INSTALLATION

3.08 It is possible for the MOC and TEC functions to be combined into a single MOC/TEC center if the size of the office and/or maintenance organization warrant. Therefore, TOC work referrals for terminal equipment repair may be forwarded to this combined work center. On the other hand, multiple TECs are possible due to equipment ownership, and/or the dispersion of terminal equipment. Where equipment arrangements and trouble frequency allow, TEC functions may become a permanent responsibility of the MOC, TOC, or both. Also, transmission systems may be maintained by segmented carrier facility groups instead of a TSC.

3.09 Installation variations include the sizes of work centers, office layout, equipment options (standard and nonstandard), and system options (CTMS, TCAS, and SMAS No. 3B). Because of varying office administration, maintenance environments as well as work center responsibilities may differ. BSP 234-100-010 covers the overall flexibility of the No. 4 ESS basic work centers in more detail.

4. REFERENCES

4.01 The following sections and manuals will be useful in obtaining further information regarding the organization and function of the TOC.

NUMBER	SUBJECT
966-220-000	No. 4 Electronic Switching System, Description
234-100-002	No. 4 ESS Acronyms and Abbreviations
234-100-020	No. 4 ESS and Associated Maintenance Systems—Input-Output Channels—Description
IM 4AXXX-01	No. 4 ESS Input Message Manual
OM 4AXXX-01	No. 4 ESS Output Message Manual
010-410-320	CAROT 2 Center—Duties and Responsibilities
103-270-100	CMS 1A—General Description
103-270-101	TOC Displays
163-434-100	CTMS General Description
234-100-010	Interrelationships of Operational Work Centers MOC, MAC, TOC, TEC, and NMC
234-100-015	Office Communications System—Description and Theory
234-100-050	Error Analysis of Trunk and Trunk Related Circuits—Description
234-100-051	Call Irregularity Facility for Data Output on Request

234-104-000	CMS 1A and CAROT 2 Maintenance Center—Organization and Function	667-301-109	51A Test Position Maintenance Line Interface—Description
234-152-000	TOC Task Oriented Practice (TOP)	951-700-100	CMS 1A—Description.

TABLE A

ABBREVIATIONS AND ACRONYMS

ABBREVIATION	TERM
CA	Control Area
CAROT 2	Centralized Automatic Reporting On Trunks 2
CMS 1A	Circuit Maintenance System 1A
CMSMC	Circuit Maintenance System Maintenance Center
CTMS	Carrier Transmission Maintenance System
MAC	Machine Administration Center
MOC	Maintenance Operations Center
NMC	Network Management Center
No. 4 ESS	No. 4 Electronic Switching System
SMAS No. 3B	Switched Maintenance Access System No. 3B
TCAS	T Carrier Administration System
TEC	Terminal Equipment Center
TOC	Trunk Operations Center
TSC	Transmission Systems Center
VIF	Voiceband Interface
51A	51A Test Position