

**PRECUTOVER**  
**GENERAL DESCRIPTION**  
**NO. 3 ELECTRONIC SWITCHING SYSTEM**

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(WECO) manufactures and assembles on a unit, frame, and system level. When shipped as a unitized system, factory tests are performed at each level to ensure accurate production of the system. When shipped on a frame level, WECO assembles the frames together at the factory and performs the factory tests at each level. After passing the factory tests, the system is broken down to frame level and shipped with the interconnecting cables used during factory testing. At the TELCO site, the system is installed by the WECO installers. During this installation, WECO performs tests to ensure the operational capability of the system. When the installed system has met its performance requirements, WECO turns the system over to the operating TELCO.

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**1.04** Site testing is generally directed toward verification that the system is in the same condition as it was when it left the factory. For this reason, not all WECO installation tests described in handbook sections 500 and 600 will be performed.

**1.05** During the WECO installation testing period, TELCO should be observing and verifying that all tests performed meet requirements. A list categorizing all the WECO installation 500 and 600 handbook tests is indicated in Table A. By observing and verifying the results of the testing done by WECO, a TELCO should not have to repeat some of the tests and prolong the precutover period. Normally, the TOCO interval should be on the order of 2 weeks, unless unusual circumstances warrant more time, see 3.05.

**1. GENERAL**

**1.01** This section provides a general description and some overall guidelines to develop the turnover/cutover (TOCO) test plan for a No. 3 Electronic Switching System (ESS).

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

**1.03** When the telephone company (TELCO) orders a No. 3 ESS, Western Electric Company

**1.06** Interconnecting the system frames and loading the office generic indicates the beginning of hardware/software interface (system verification) tests. These tests verify that the hardware, generic, and office data are compatible.

**NOTICE**

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

TABLE A

**PARTIAL LISTING OF INSTALLATION  
ENGINEERING HANDBOOK – 269 SECTIONS**

SECTION NUMBER	TYPE OF TEST	SUBJECT
500	System Verification	Planning Information
502 and 503	System Verification	General Information
507	System Verification	Trunk Equipment Tables
508	System Verification	Initialization (Load Generic)
512	System Verification	Office Data
520	System Verification	Peripheral Controller Tests
521	System Verification	Network Fabric
525	System Verification	Ringing and Tone Plant
528	System Verification	Trunk and Line Test Panel (General Information)
530	System Verification	Trunks and Service Circuits, Test and Troubleshooting Procedures Using the Trunk and Line Test Panel
533	System Verification	Junctor Circuits
534	System Verification	Service Circuits
535	System Verification	Trunk Circuits
536	System Verification	Line Circuits

TABLE A (Cont)

PARTIAL LISTING OF INSTALLATION  
ENGINEERING HANDBOOK – 269 SECTIONS

SECTION NUMBER	TYPE OF TEST	SUBJECT
542	System Verification	Teletypewriter Output of Alarms
544	System Verification	Automatic Line Insulation Test
546	System Verification	Data Link
555	System Verification	Error Recovery and Emergency Action Facilities
600	Operational Testing	Planning Information
610	Operational Testing	Service Circuits
612	Operational Testing	Trunk Circuits
614	Operational Testing	Line Circuits
631	Operational Testing	Data Link Facilities
634	Operational Testing	Custom Calling Features
635	Operational Testing	Billing Treatment
636	Operational Testing	Hunt Arrangements
637	Operational Testing	Miscellaneous Features
638	Operational Testing	Coin Features
639	Operational Testing	Permanent Signal and Partial Dial Treatment

TABLE A (Cont)

**PARTIAL LISTING OF INSTALLATION  
ENGINEERING HANDBOOK – 269 SECTIONS**

SECTION NUMBER	TYPE OF TEST	SUBJECT
640	Operational Testing	Abbreviated Volume Test
642	Operational Testing	Cutover Program Features
655	Operational Testing	Idle System Volume Test
660	Operational Testing	Volume Test (General Information)
680	Operational Testing	Half Office Test

**1.07** After the system verification tests, the system operational tests are then conducted. These tests verify that the office sustains all basic operational requirements. Such testing verifies site performance prior to turnover.

**1.08** The TOCO test plan is intended to assist TELCO personnel during the TOCO interval. The TOCO interval is from completion of the No. 3 ESS office installation until the office is officially cut into service.

**1.09** The objectives of the TOCO test plan are as follows:

- (a) To provide a final check of the No. 3 ESS system performance prior to cutover.
- (b) To provide specific procedural information for functions that must be performed by the TELCO personnel during the TOCO interval. Examples are alarm tests, office-to-office tests, system operational tests, and cutover procedures.
- (c) To provide information for additional tests which may be performed as necessary to ensure that certain critical circuits and/or features are continuing to operate normally. These are generally circuits and/or features which would require periodic evaluation in a working office

environment and which may have been tested previously during the installation interval.

- (d) To provide information that will be of assistance in establishing a specific plan for the TOCO interval and cutover of the new office.

## **2. TURNOVER/CUTOVER TEST PLAN**

**2.01** The TOCO test plan gives general information that assists the TELCO personnel in the development of a program which meets the specific requirements of their TOCO interval.

**2.02** One of the most critical parts of the TOCO test plan is an accurate and well thought out time schedule of the test activities. The schedule should be established with the agreement of all supervisory personnel who have definite responsibilities for areas of testing during the TOCO interval.

**2.03** The TELCO personnel charged with the responsibility of preparing the office for cutover must first decide which tasks will be performed during the TOCO interval. A brief description of each task identified for use during the TOCO interval is provided in Part 4.

**2.04** Table B is provided to schedule the tasks which will be performed during the TOCO interval. Space is provided for filling in the dates of the TOCO interval, the scheduled time for a task, and the actual time required.

**2.05** Table C may be reproduced and used to schedule any other tasks which will be required during the TOCO interval. Table C may also be used to schedule specific items of any task in Table B. For example, a schedule could be made for testing all outgoing trunks to other offices. Copies could be made and distributed to all interfacing offices to coordinate the test effort.

**2.06** The interval of time required to perform each task will vary and may be dependent on one or more of the following:

- Available personnel
- 1, 2, or 3 shift coverage
- Number of lines
- Number of trunks and service circuits
- Switching control center (SCC) involvement.

### **3. PRETURNOVER ACTIVITIES**

**3.01** Some preturndover activities are briefly mentioned here to bring them to the attention of personnel associated with cutover of the No. 3 ESS office. The actual activities and detailed procedures to accomplish those activities are determined on a local basis. The following are typical preturndover activities and can usually be completed prior to turnover.

#### **ADMINISTRATIVE INTERFACE**

**3.02** This activity involves the setting up of procedures, policies, and materials necessary to ensure support of the No. 3 ESS office. Examples of these supporting actions are the ordering and procuring of the appropriate Bell System Practices, battery records, routine records, test equipment, etc. When an SCC is involved, other administrative actions may be necessary to support the office.

#### **EFFECT ON HALF-TAP**

**3.03** TELCO plant engineering should investigate the effect on transmission quality when half-taps are inserted into and removed from the loop.

#### **VERIFICATION OF OFFICE RECORDS AND TRANSLATIONS**

**3.04** A check of preliminary office records, such as input forms, and actual translation data contained in the No. 3 ESS should be verified by the dial administration organization. This check should be accomplished on a line-by-line comparison to ensure that each line or trunk item has been correctly administered.

#### **OPERATIONAL READINESS CHECK**

**3.05** WECO preliminary procedures verify that all components are available, that they are properly interconnected, that power is applied properly, and that the office alarms are operating properly. WECO system verification and system operational tests verify that the hardware/software interfaces are properly functioning and that the office can support its engineered call capacity. An operational readiness check should be performed by TELCO immediately before turnover. The TELCO personnel charged with the responsibility of preparing the office for cutover should (if possible) be present when volume tests are run. Whether present or not during volume tests, the TELCO personnel should receive and analyze the printouts of the volume tests to determine the operational readiness or health of the system.

**3.06** Volume tests are the last series of system operational tests performed by WECO before the office is turned over to the TELCO. These tests verify the capability of the system to function as an active telephone office. They simulate real customer traffic as nearly as possible and have the objective of providing an efficient method of revealing hardware and wiring faults. They are run within two weeks of turnover using the generic program issue with which the office will be cut into service. All hardware change notices required for the program issue being used are installed prior to these tests. TELCO should be notified at least 12 hours prior to the start of the tests.

## SECTION 233-170-100

**3.07** All volume tests must meet the following requirements:

- (a) Major alarms are not allowed.
- (b) All error detection and all TTYs shall be enabled during the period.
- (c) All maintenance printouts that occur must be investigated and accounted for.
- (d) All troubles must be cleared.

**3.08** For the integrated volume and maintenance volume tests, a call volume of at least 500 calls per equipped network frame is recommended. For these two tests, it is required that the number of mishandled calls, eg, calls left high and dry, calls wrongly routed, etc, must not exceed 1 in 10,000. The allowable troubles which indicate some malfunction but do not definitely indicate a failure to complete shall not exceed 5 in 10,000 calls.

**3.09** To perform an integrated volume test, the office is run under simulated traffic. During this period, each duplicated unit is active for approximately half the time. All periodic functions are performed and all diagnostic programs are run on all diagnosable units.

**3.10** The maintenance volume test verifies the capability of the system to process the offered volume when any off-line duplicated unit is powered down at its frame.

**3.11** Table D is provided as an aid to analyze the volume tests described. The performance requirements for each test are listed in the second column. As the test results are analyzed, a check (✓) can be entered in the third or fourth column depending on whether the performance requirement passed or failed. A remarks column is provided for indicating reasons for pass, fail, or variation of a check of any performance requirement.

**3.12** Table D could be used as a permanent record of the operational readiness of the office at the time of turnover if copies of printouts and WECO test records which were analyzed are attached.

**3.13** The following criteria should be observed while performing the operational readiness check. (Reference should be made to Section

800-630-180 and Section 820-650-180 for more details.)

- (a) A trouble is any condition in a circuit which prevents it from responding properly to a test or causes service failures.
- (b) Troubles may only be discounted when they are definitely located and cleared in the test equipment or in the associated circuits used for testing.
- (c) A circuit failure consists of one or more troubles encountered on a circuit which cannot be discounted.

## 4. POST-TURNOVER/PRECUPTOVER ACTIVITIES

**4.01** The TOCO interval begins when the TELCO and WECO agree that the system has exhibited the capability to function in accordance with the stated performance requirements for the system. The performance requirements for No. 3 ESS are contained in Bell System Practices (BSP) Sections 801 and 820, Equipment Design and General Equipment Requirements and Engineering Information.

**4.02** Acceptance of installed special line circuits for proper operation should be planned for during the TOCO interval. These circuits include but are not limited to the following:

- (a) Scanner applique circuit
- (b) Group alerting line circuit
- (c) Noise immunity line circuit
- (d) Dial tone first coin line circuit.

## ACCEPTANCE TASKS

**4.03** The acceptance tasks are procedures performed by operating company personnel to verify that new equipments have, in fact, been properly installed and are operating as intended. The following is a brief description of the acceptance tasks identified for use during the No. 3 ESS TOCO interval. The detailed procedures for all of these tasks are located in the Task Oriented Practice (TOP) 233-142-100.

TABLE B - TURNOVER / CUTOVER SCHEDULE

TASK	TASK ASSIGNED TO	MONTH																												
		DATE																												
		DAY	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
ACCEPT POWER		*																												
		**																												
VERIFY SYSTEM OPERATIONAL CAPABILITIES		*																												
		**																												
ACCEPT OFFICE ALARMS		*																												
		**																												
ACCEPT SYSTEM TEST CIRCUITS		*																												
		**																												
ACCEPT TRUNK CIRCUITS		*																												
		**																												
ACCEPT SPECIAL LINE CIRCUITS		*																												
		**																												
ACCEPT RING AND TONE PLANT		*																												
		**																												
ACCEPT SERVICE CIRCUITS		*																												
		**																												
PERFORM OFFICE TO OFFICE PROCEDURES		*																												
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\* SCHEDULED TIME  
 \*\* ACTUAL TEST TIME

Table B



TABLE C - TURNOVER / CUTOVER SCHEDULE

TASK	TASK ASSIGNED TO	MONTH																													
		DATE	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
		DAY	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
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\* SCHEDULED TIME  
 \*\* ACTUAL TEST TIME

Table C



TABLE D

OPERATIONAL READINESS CHECK LIST

TEST DESCRIPTION	PERFORMANCE REQUIREMENTS	PASS	FAIL	REMARKS
IDLE SYSTEM TEST	<ol style="list-style-type: none"> <li>1. Control Complex ran for 8 hours with no traffic</li> <li>2. The teletypewriter and all error detection should be enabled</li> <li>3. Each System Control ran for 4 continuous hours with no traffic</li> <li>4. No circuit failures in the control complex</li> <li>5. No circuit failures in the periphery</li> <li>6. No major alarms</li> <li>7. All 24 hour periodic exercises and hourly routines ran from each System Control</li> </ol>			
INTEGRATED VOLUME TESTS	<ol style="list-style-type: none"> <li>1. Test ran with simulation of actual traffic</li> <li>2. The teletypewriter and all error detection should be enabled.</li> <li>3. No major alarms occurred</li> <li>4. No more than one call origination failed to terminate per 10,000 call originations</li> </ol> <p><i>Note:</i> This requirement is based on failure to terminate due to system errors.</p>			

## OPERATIONAL READINESS CHECK LIST

TEST DESCRIPTION	PERFORMANCE REQUIREMENTS	PASS	FAIL	REMARKS
<p>MAINTENANCE VOLUME TESTS</p>	<p>5. No more than 5 troubles in 10,000 calls which indicate some malfunction but do not definitely indicate a failure to complete</p> <p><i>Note:</i> If more than one trouble print-out is due to the same equipment malfunction, it should be counted as only one trouble.</p> <p>1. Test ran for one complete cycle</p> <p>2. The teletypewriter and all error detection should be enabled</p> <p>3. No more than one call origination failed to terminate per 10,000 call originations</p> <p><i>Note:</i> This requirement is based on failure to terminate due to system errors.</p> <p>4. No more than 5 troubles in 10,000 calls which indicate some malfunction but do not definitely indicate a failure to complete</p> <p><i>Note:</i> If more than one trouble print-out is due to the same equipment malfunction, it should be counted as only one trouble.</p> <p>5. Call completion rate returned to normal after completion of initialization.</p> <p>6. Stable calls still terminated after transient clear initialization</p> <p>7. Stable calls disconnected by stable clear initialization memory reload initialization, past office data or backdate office data initialization</p>			

**A. Accept Power**

**4.04** This task is designed to:

- (a) Check 151A power plant output and regulation
- (b) Check the alarm circuitry of the 151A power plant
- (c) Check stabilization of storage batteries
- (d) Check +24V converter output and alarm circuitry
- (e) Check  $\pm 130V$  converter output and alarm circuitry
- (f) Check +48V converter output and alarm circuitry
- (g) Simulate power failures and check system reaction.

**B. Verify System Operational Capabilities**

**4.05** This task provides a method to be followed in evaluating a No. 3 ESS office on an overall system basis. Included in this task are checks of network fabric, system initializations, half-office tests, call completion rate volume, office routing, charging, dial tone first coin line circuit, and autoconnect line circuit.

**4.06** Refer to 3.05 which states the requirements for call completion rate tasks. Observation and verification of WECO Installation's Idle System, Maintenance Volume, and Integrated Volume tests should satisfy the operational capabilities requirements as recorded in Table D during the preturnover period.

**C. Accept Office Alarms**

**4.07** This task checks the occurrence of all types of office alarms. Certain failures are introduced into office equipment to check the proper reaction and classification of the alarm generated by hardware and software.

**D. Accept System Test Circuits**

**4.08** The test circuits are checked for proper operation by diagnostics and manual means. Manual tests are performed on the test circuits

for which there are no diagnostics. These test circuits are accessed via the trunk and line test panel. The test circuits are:

- (a) Continuity and polarity test circuit
- (b) Station ringer test line circuit
- (c) Transmission test environment
- (d) Milliwatt and transmission environment test circuit
- (e) Dial pulse receiver test circuit
- (f) TOUCH-TONE® receiver test circuit
- (g) Tone presence detector
- (h) Loop environment test circuit
- (i) Test vertical test circuit
- (j) Line insulation test circuit.

**E. Accept Trunk Circuits**

**4.09** This task tests the various office trunk circuits prior to cutting the office into service. Trunk pretests, verification tests, transmission tests, and noise measurement tests are performed. The types of trunk circuits are:

- (a) Outgoing reverse battery trunk circuit
- (b) E and M lead trunk circuit
- (c) Incoming reverse battery wink or immediate start trunk circuit
- (d) Incoming reverse battery delay dial trunk circuit
- (e) Outgoing high-low reverse battery trunk circuit.

**F. Accept Ring and Tone Plant**

**4.10** This task tests the ringing and tone plant transfer under various trouble conditions in both the on-line and off-line ringing and tone plant.

**G. Accept Service Circuits**

**4.11** The service circuits are checked for proper operation by diagnostics. The service circuits checked are:

- (a) Customer dial pulse receiver
- (b) TOUCH-TONE receiver
- (c) Superimposed ringing circuit
- (d) Regular ringing circuit
- (e) Dial pulse transmitter
- (f) Coin control circuit
- (g) Tone circuits
- (h) Multifrequency receiver circuit
- (i) Multifrequency transmitter circuit
- (j) Recorded announcements.

**H. Perform Office-to-Office Tests**

**4.12** The office-to-office tests are designed to test the subscriber lines from the No. 3 ESS office to the connection of those lines at the existing subscriber lines served by the old office. These tests check for continuity shorts, crosses, grounds, and reversals. A program automatically performs these tests, or they can be done manually, if desired, using the local test desk (14-type); or the local test cabinet (No. 3 type). Local conditions and the availability of equipment and personnel will usually dictate the most appropriate methods to follow.

**4.13** During office-to-office tests, the precutover mode is employed where the ESS program control keeps the line cutoff contacts open to isolate the lines in the existing office from the No. 3 ESS office. Trunk circuit isolation still requires the use of mechanical cutover devices unless new trunk facilities are being provided.

**4.14** When a No. 3 ESS installation replaces an existing office, cross-connections for subscriber lines must be installed prior to cutover. Also, prior to cutover, the switching functions are performed by the existing office. The line cutover

program ensures that customer service is not interrupted before cutover and that quick transition of service from the old office to the new office takes place. The cutover program can also be used to transfer existing lines in another office to a No. 3 office already in commercial service.

**MISCELLANEOUS ACTIVITIES**

**4.15** The following precutover items are normally the responsibility of personnel assigned to the No. 3 ESS office and should be completed prior to the day of cutover. This list may not be complete for any particular office, but it could be used as a guideline in the preparation of a detailed work schedule.

- (a) Make a complete rehearsal of the cutover procedures
- (b) Install communications system for use during cutover. Necessary communications should be established between departments and the cutoff and cut-in stations.
- (c) Make arrangements for safety goggles, hoods, etc, for all personnel assigned to remove heat coils in the old office
- (d) Identify and protect all heat coils in the old office that should not be removed at cut
- (e) Update recent change.

**5. CUTOVER ACTIVITIES**

**5.01** The cutover committee should develop a cutover schedule which meets the specific requirements of their No. 3 ESS office. The cutover procedures will provide detailed information about precutover, cutover, and post-cutover items which will be of assistance in developing a cutover schedule. Refer to No. 3 ESS TOP for these cutover procedures.

**5.02** A cutover rehearsal should be performed prior to the actual cutover to familiarize each person with individual duties during the cutover.

**5.03** After all tasks or test activities have been completed, the cutover committee should evaluate all test records and repair or replacement records (if any) to ascertain that the office is ready

to be cut into service before proceeding with the cutover schedule.

## 6. REFERENCES

**6.01** This part contains a list of pertinent sections and any other documents which are germane to this section.

Section 233-142-100—No. 3 ESS—Task Oriented Practices

Section 800-630-180—Performance Requirements—General

Section 801-000-000—Numerical Index—Common Systems—Equipment Design Requirements

Section 820-000-000—Numerical Index—ESS—Equipment Design Requirements

Section 820-650-180—Performance Requirements—No. 3 Electronic Switching System

## 7. GLOSSARY

**7.01** A glossary of terms is provided to aid in the understanding of definitive words in this section.

**Cutover**—Time or point at which the No. 3 ESS office begins to handle or process customer telephone service.

**Half-Tap**—A bridge that is placed across conductors without disturbing their continuity.

**Initialization**—A program restart at a fixed location to provide an orderly return to a stable state in the data processing routines. A count of the number of restarts incurred during a given time is used to progressively clear areas until the system recovers its sanity.

**Local**—Location within the No. 3 ESS office.

**Remote**—Location beyond the immediate vicinity or outside the No. 3 ESS office.

**Switching Control Center**—Remote office which monitors and controls several offices.

**Turnover**—Time or point at which TELCO accepts the office from WECO.

