

**SEQUENTIALLY CONTROLLED AUTOMATIC TRANSMITTER START SYSTEM (SCATS)**  
**14 TRANSMITTER-DISTRIBUTOR CONTROL CIRCUIT EA-12347-SD**  
**DESCRIPTION, OPERATION, AND TEST PROCEDURE**

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**1. GENERAL**

**1.01** This section gives a description, the operating principles, and test procedure for the 14 TD control circuit per EA-12347-SD.

**2. DESCRIPTION**

**2.01** This control circuit was designed for use at an outlying station on a SCATS system (EA-10669).

*Note:* For the basic operation of sequential transmitter starts from TSCs with emergency manual transmitter start when circuit is idle, but without the "quiet" feature, and applicable only to half-duplex service, refer to EA-10963-SD. This circuit was designed for use with a 28 RO and a 14 TD. For 28 ASR operation refer to EA-12632-SD.

**2.02** The purpose of the circuit is to place a 14 Transmitter-Distributor (TD) under control of contacts in a 28 selective calling stunt-box so as to respond to the transmitter start and quiet codes sent from a remote SCATS control station.

**2.03** Design of the circuit provides for recognition of an assigned transmitter start code with an automatic transmitter start if a "tape-available" condition exists.

**2.04** The circuit will recognize "end-of-tape" or "tangled-tape" conditions and stop the transmitter.

**2.05** By use of a EMER key transmission may be started manually without receipt of the normal Transmitter Start Code (TSC) if the circuit (half-duplex) is idle.

**2.06** A "quiet" condition will prevail upon transmission of FIGS QS LTRS from the TSC circuit if there is an over-all "no-tape" condition.

**2.07** This "quiet" condition is the halting of the TSC circuit, added to the lack of transmission due to the "no-tape" condition.

**2.08** The "quiet" condition may be ended by any station presenting a "tape-available" condition.

**2.09** With the resumption of transmission by use of the EMER key, the TSC poll circuit is released and will resume operation when the circuit is idle.

**2.10** Test jacks are provided to measure both the bias and operating current of the LD relay (AYLZV micropositioner).

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**2.11** The control circuit equipment consists primarily of the following.

- 1 — 582656B-1 Rectifier
- 1 — AYLZV Relay
- 1 — AG22 Relay
- 1 — AF7 Relay
- 1 — AG20 Relay and associated resistors, capacitors, and fusing
- 2 — 303A Jacks

**2.12** If space is available, this equipment may be mounted in the XRT205 table or, separately in an ED91472-70 cabinet.

### 3. THEORY OF OPERATION

#### AUTOMATIC START OF TD

**3.01** Assuming tape available at an outlying station, receipt of a valid TSC from the control station by the 28 stuntbox will cause the contacts to operate and produce a momentary short on AA and BB leads.

**3.02** Ground from BTC lead will be fed through the tape out and tape stop contacts to ACS lead. The short on AA and BB leads will complete an operate path for TS1 relay which will:

- (a) Lock to the tape out and tape stop contacts in the 14 TD (EM8).
- (b) Provide battery on PR lead (EM9).
- (c) Start release of normally operated TS2 relay (EB11).

**3.03** The TS2 relay releases slowly and its EB10 contacts close the operating path of the 14 TD start magnet by connecting K and ACT leads. Transmission now takes place from the station transmitter.

**3.04** When the tape has run out, operating the tape out contact or when tangled tape operates the tape stop contact, TS1 relay will unlock and release, reoperating TS2 relay which will open the start magnet circuit to stop the transmitter.

**3.05** At this time, reinsertion of tape will not restart the transmitter until the station is again polled.

#### MANUAL START OF TD

**3.06** If provided, the EMER key (option E) may now be used to restart the transmitter without waiting for a TSC.

**3.07** With tape available, the EMER key is held operated, grounding EM lead.

**3.08** If transmission is in progress (half-duplex operation), the LD relay will be spacing at least once per character preventing SR relay from releasing.

**3.09** When the line becomes idle, the steady "marking" condition of the LD relay will permit the SR relay to release and connect the ground from EM lead to operate the TS1 relay.

**3.10** The action that follows is the same as covered in 3.02. When transmission has started, the EMER key is released.

#### QUIET FEATURE

**3.11** The "quiet" feature permits halting of the SCATS TSC circuit when a no-traffic condition is encountered.

**3.12** It is applicable to both half- and full-duplex operation.

**3.13** This "quiet" condition is achieved when the FIGS QS LTRS is transmitted in each cycle of polling.

**3.14** Assuming a "no-tape" condition, the receipt of QS by the 28 stuntbox will cause these contacts to operate and produce a momentary short on Q1 and Q2 leads thereby operating the Q relay which will:

- (a) Lock to the Q3 lead (EM5).
- (b) Prepare a shunt-down path for the TS2 relay (EM4).
- (c) Open the initial-operate path of the start code generator.

**3.15** No further TSCs will be transmitted. If tape is placed in the transmitter, the tape out and tape stop contacts will close, ground from the BTC lead will be connected to the ACS lead and through the Q relay contacts to shunt-down the TS2 relay which will release and start the transmitter.

**3.16** The first characters transmitted will be LTRS preceding the address, causing release of the Q relay in one of the following ways.

(a) **Half Duplex Operation:** In half-duplex (option H) operation, the first character will operate the "letters-universal" contacts in the stuntbox. The LTRS had previously latched in at the end of the "quiet" code. This contact will momentarily remove the Q4 ground from the Q3 locking lead to permit the Q relay to release.

(b) **Full Duplex Operation:** In full-duplex (option F) the first character will cause the LD relay to remove ground from its marking contact 6 permitting Q relay to release. Relay Q in releasing will open the shunt-down path and TS2 relay will reoperate to stop transmission. The circuit is now normal and the transmitter start patterns will resume.

**3.17** If, during the "quiet" period, another station had tape available, the action for half-duplex operation would have been the same as covered in 3.16(a).

**3.18** In the case of full-duplex operation, the SCATS control circuit would transmit the "quiet-release" code FIGS HS LTRS. Operation of these contacts in the stuntbox will open the lock path of the Q relay.

#### **4. TESTS**

**4.01** Tests of the control circuit features at an outlying station require that the station under test remain connected to the main circuit for observation of the "quiet" condition.

**4.02** The Serving Test Center (STC) should make telegraph transmission tests on all transmissions.

**4.03** A sufficient number of tests shall be made to insure satisfactory operation. In the event of locating and clearing any trouble, all tests shall be repeated on the equipment affected and special attention given to prevent a recurrence.

#### **HALF-DUPLEX OPERATION**

**4.04** Ascertain first that loop current is 60 milliamperes, then check the LD relay bias current by inserting an ammeter in the BIAS CUR jack. This bias current should be 30 milliamperes.

**4.05** The test operate current may be checked by use of the ammeter in the BIAS CUR jack and a dummy plug in the REL TEST jack.

*Note:* The dummy plug operation reduces the bias current to 5 milliamperes so that a loop current of 10 milliamperes will serve as a check of the LD relay.

#### **Automatic Start of TD**

**4.06** At the outlying station place tape in the transmitter. No message format is required. Proceed as follows.

(a) When the SCATS controller operates, observe that the tape is transmitted upon receipt of its assigned TSC.

(b) During the tape transmission, operate the tape stop arm to simulate a "tangled-tape" condition.

(c) Observe that the transmitter should stop, and that reinsertion of the tape will not restart the transmitter until the station has been polled.

(d) Observe that the transmitter stops when a "no-tape" condition is reached.

#### **Manual Start of TD**

**4.07** While transmission is in progress on the circuit, place a tape in the station transmitter and hold the EMER key operated. Action is as follows.

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- (a) No interruption should occur to the transmission on the circuit, but the station transmitter should start immediately after line transmission ceases.
- (b) The EMER key may now be released and station transmission should continue until a "no-tape" condition is reached.

### Quiet Feature

**4.08** To test the "quiet" feature, it is necessary that a "no-tape" condition prevail at all stations. Proceed as follows.

- (a) Under these conditions, transmission of the "quiet" code (FIGS QS LTRS) should halt the TSC search. This "quiet" code occurs once in each cycle of the poll.
- (b) Placing tape in the station transmitter should now close the tape stop and tape out contacts and effect a transmitter start.
- (c) The SCATS control circuit should be re-activated and resume polling when transmission is completed.

### FULL-DUPLEX OPERATION

**4.09** Repeat LD relay tests as covered in 4.04 and 4.05.

### Automatic Start of TD

**4.10** Place tape in transmitter and observe that transmission occurs on receipt of the assigned TSC activating the 28 stuntbox. Check for a transmitter stop when tape has run out.

### Quiet Feature

**4.11** With a "no-tape" condition at all stations, check for the "quiet" condition on receipt of FIGS QS LTRS which should be sent once each cycle on the TSC circuit. Proceed as follows.

- (a) During the "quiet" period place tape in the transmitter.
- (b) The TSC circuit should now operate and furnish a transmitter start for this tape.

## 5. CONNECTING CIRCUITS

**5.01** Drawing EA-10964 is the arrangement for equipping the 28 stuntbox.

## 6. REFERENCES

**6.01** The following are Bell System Practices and EA drawings related to this section.

- AA128.006 — List of General Requirement Sections
- AA286.021 — WSU for Telegraph Subscriber Lines
- AA286.031 — 128B2 Teletypewriter Subscriber Set
- AA286.039 — 130B1 Teletypewriter Subscriber Set
- AA286.917 — SCATS
- EA-10669 — SCATS Control Circuit
- EA-10720 — MXD Timing and Control Circuit
- EA-11623 — 28 TTY — Wiring for TP152345 Stuntbox SOP
- EA-12149 — Connect 28 from Transmitter Start
- EA-12348 — Count Circuit for Outlying Station (SCATS)

**Note:** For information on basic teletypewriter apparatus, refer to standard instructions covering the particular apparatus.