

## VOICE CONNECTING ARRANGEMENT GTS

### 1. GENERAL

**1.01** This section provides information on the KS-21440, List 1 coupler when used in Voice Connecting Arrangement (VCA) GTS.

**1.02** VCA GTS provides a protective interface for customer-provided (CP) answer-only station equipment.

**1.03** The customer may obtain a copy of the Technical Reference covering this VCA by contacting the local Telephone Company Business Office or Marketing Representative.

**1.04** This issue of the section is based on the following drawing:

SD-69918-01, Issue 3—KS-21440, List 1 Coupler

If this section is to be used with equipment or apparatus reflecting later issue(s) of the drawing, reference should be made to the CD and SD to determine the extent of the changes and the manner in which the section may be affected.

### 2. IDENTIFICATION

#### *Purpose*

- To provide a 2-wire interface between a telephone line and customer-provided equipment (CPE) such as answering sets, message recorders, dictation machines, etc.
- To protect the telephone line from hazardous voltages generated in the CPE.

#### *Application*

- 2-wire CO/PBX lines with or without 1A1 or 1A2 Key Telephone System (KTS).

#### *Ordering Guide*

Order basic unit as:

- Coupler, KS-21440, List 1

Order replaceable components as:

- Fuse, Buss, AGX 1/16A (2 required) *do not substitute.*

#### *Design Features*

**2.01** The KS-21440, List 1 coupler provides the following features:

- Standard 4-prong telephone jack on bottom for customer connections.
- Can be powered either by ac or dc supplied by the telephone company. Requires a maximum of 32 milliamperes in the off-hook mode when powered from a 28V dc supply.
- Activated by CO ringing to transmit ac ringing signal to CPE over CT and CR leads. Reacts to a CPE dc termination across CT and CR to trip ringing and establish a transmission path between telephone line and CPE.
- Permits 2-way voice transmission in the off-hook mode allowing for a prerecorded announcement to a calling party and recording of incoming transmission.
- Protects the telephone line from hazardous voltages generated by CPE by means of F1 and F2, isolation transformer T1 and diode CR6.
- Provides a balanced telephone line termination.
- Prevents line seizure except after ring detection by inhibiting dc pulsing and limiting the amplitude of voice-frequency signals.

### 3. INSTALLATION

**3.01** Where possible, the coupler should be mounted in a location that permits access to the telephone line, CPE and an electrical outlet when transformer powered. The coupler is housed similar

to a 105-type apparatus unit and is mounted in the same manner.

**3.02** Connection to the CPE is made through the jack on the bottom of the coupler (Fig. 1). A 4-prong plug such as a 505A is required on the end of the customer wiring.

**3.03** Line connections are made to terminals T and R and when required behind 1A1 or 1A2 KTS, to terminals A and A1. Any telephone sets or audible signals associated with the line should also be connected to these terminals.

**Note:** To insure proper operation of the ring detector circuit, no more than two ringers may be connected to the T and R terminals.

**3.04** Additional terminals are provided for power connections. Use a 2012B transformer for single installations or a KS-5714, List 4 or List 5 transformer or 19-type power unit for multiple installations and connect to terminals 1 and 2. The power supply should be connected to a 60-hertz circuit where possible and not under control of a switch.

**3.05** When all installation work is complete perform the tests shown in 6.02.

#### 4. OPERATION

##### *Incoming Call*

**4.01** An interrupted ac ringing signal applied to the telephone line causes relay RD to operate. The operation of RD disconnects the voltage limiting circuit and causes ringing to be supplied through T1 to the CPE over CT and CR.

**4.02** If the ring detector circuit in the CPE reacts and applies a dc termination across CT and CR, relay OH will operate to:

- Trip CO ringing and seize the line
- Release the RD relay
- Apply A1 ground to the A lead if required.

The RD relay released connects the voltage limiting circuit diode CR6 across T1.

**4.03** In this state, 2-way transmission is established through the coupler between the telephone line and the CPE. The CPE can transmit a prerecorded message and record incoming messages. Rotary dialing from the CPE is inhibited by the slow release of the OH relay.

**4.04** Release of the coupler is dependent on the CPE disconnecting the dc termination on CT and CR. If the termination is not removed, the CO line will be resealed initiating the CO permanent signal circuitry. Removal of the dc termination releases the OH relay allowing the circuit to return to normal.

#### 5. PROTECTION

##### *Telephone Line Protection*

**5.01** Longitudinal voltages induced on leads CT and CR are prevented from reaching the telephone line by the isolation transformer and normally open contacts on relay OH. Metallic voltages applied to CT and CR, if sufficiently large, cause relay OH to operate whether normal power is applied to terminals 1 and 2 or not. Operation of OH prevents RD from operating so that voltages on the line are limited to safe levels. Currents in excess of 1/16 ampere will cause fuses F1 and F2 to operate to protect coupler components.

#### 6. MAINTENANCE

**6.01** Maintenance of VCA GTS is limited to the following:

- Wiring of telephone line and A and A1 leads
- Customer plug securely in place
- Proper power source and connections
- Replacement of fuses F1 and F2.

**6.02** If a check of the items above does not clear the trouble, test the KS-21440, List 1 coupler as follows:

- (1) Disconnect plug to CPE.
- (2) If line is associated with 1A1 or 1A2 KTS, connect an 81A test set to terminals A and A1 with switch in C position.

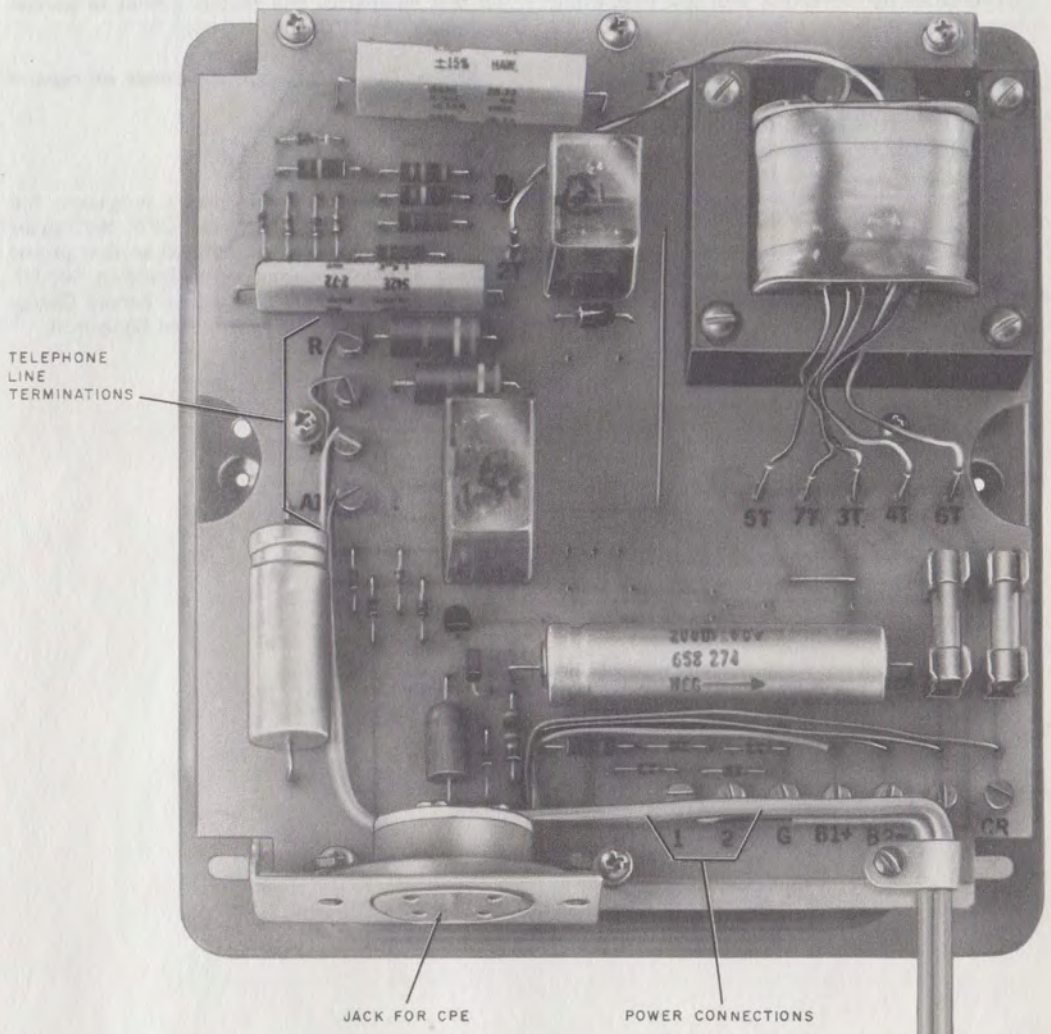


Fig. 1—KS-21440, List 1 Coupler, Cover Removed

- (3) Plug a 500-type telephone set equipped with a 505A plug and wired for bridged ringing into the CPE jack on the coupler.
- (4) Using another line, call the local test desk and ask that a call be returned on the line under test.
- (5) When the call is returned, the RD relay will operate and the test telephone should ring (may require placing biasing spring in low notch).
- (6) Go off-hook—Relay OH should operate. The 81A test set should operate indicating continuity on A and A1. Check for normal

conversation by conversing with test desk using test telephone.

- (7) Go on-hook—Relay OH should release.
- (8) After 30 seconds go off-hook on test telephone. Relay OH should not operate.
- (9) Remove plug from jack and disconnect 81A test set.

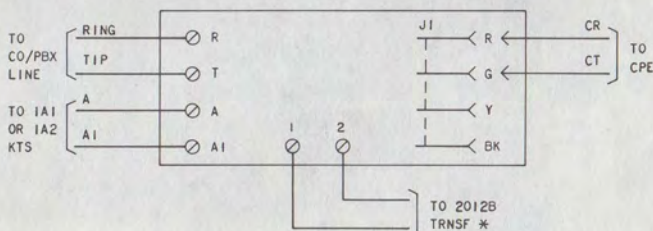
**6.03** If trouble is indicated in coupler, replace coupler. If all tests are satisfactory, remove

all test equipment and restore circuit to normal by connecting CPE plug.



**Do not attempt any tests or repairs to the CPE.**

**6.04** When in the repairman's judgment the trouble is located in the CPE, the Repair Service Bureau should be notified so that proper billing can be initiated as outlined in Section 660-101-312 entitled Maintenance of Service Charge on Services with Customer-Provided Equipment.



\* AT MULTIPLE INSTALLATIONS USE A KS-5714, LIST 4 OR LIST 5 TRANSFORMER OR A 19-TYPE POWER UNIT. ONLY ONE KS-21440, LIST 1 COUPLER MAY BE POWERED FROM A 2012B TRANSFORMER

**Fig. 2—KS-21440, List 1 Coupler, Connections**