

**K-346A OFF-PREMISE LINE K. T. U.
(FOR USE IN K-1A2 KEY TELEPHONE SYSTEM)
(Supersedes CK346 K. T. U.)**

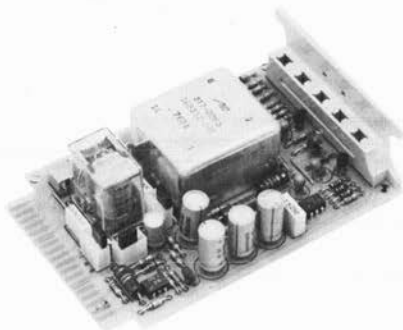


Fig. 1 - K346A Key Telephone Unit

1.00 GENERAL

1.01 The K-346A Key Telephone Unit (KTU) is a plug-in unit designed for use in a K-1A2 Key Telephone System (KTS) to permit adding off-premise stations, (standard two-wire telephone sets), to the dial intercom system or to a predetermined CO line.

1.02 A maximum of six telephone sets may be connected in parallel across the circuit.

1.03 Approximate dimensions are 3-1/2 inches wide by 5 1/4 inches long by 1 1/4 inches high. Approximate weight is 2/3 pound.

1.04 Maximum loop for the circuit is 1200 Ohms. If a minimum of 23 ma dc is required, the loop resistance is limited to 500 Ohms.

2.00 INSTALLATION

CAUTION

Be sure power to system is off before making connections and before plugging-in the K-346A KTU. Double check all connections before power is restored to the system.

Plugging in the KTU

2.01 Plug the K-346A KTU into any vacant CO/PBX line card connector. For CO line applications, the K-346A should be plugged into the connector adjacent to the line card it will access.

Connections

2.02 For intercom application, strap the connector used to the intercom circuit as shown in Table A.

2.03 For CO line extension strap the connector used for the K-346A to the connector used for the selected outside line.

SIGNALING OPTIONS

2.04 Ringing only can be supplied to the off-premise station. Strapping options are given below for the types of signaling used in the K-1A2 intercom system.

(1) GROUNDING RINGING ON INTERCOM SYSTEM. Strap A-B and E-F. (This is factory strapping.)

(2) BUZZING ON INTERCOM SYSTEM-GROUNDING RINGING TO OFF-PREMISE STATION. Strap A-B and G-H.

3.00 OPERATION

CALL FROM OFF-PREMISE SET

3.01 When the off-premise station goes off-hook, dial tone is returned. The user

then dials the desired number. At completion of dialing ring tone or busy tone, if provided, is returned. When the called station answers, voice communication between the two stations is established. When the call is completed and the off-premise set goes on-hook, the circuit is returned to idle condition.

CALL TO OFF-PREMISE SET

3.02 Calls to an off-premise station are made in the usual manner. When the call is complete and the 2-wire set goes on-hook, the circuit returns to idle condition after approximately a 700-ms delay.

4.00 CIRCUIT DESCRIPTION

Idle Condition

4.01 In the idle condition all transistors are cut-off and both relays are de-energized.

Call from Two-wire Telephone Set

4.02 When the two-wire telephone set connected to terminals 14 (T) and 9 (R) goes off-hook, current flows via resistors R9, R10 and R8, winding 3-4 of transformer T1, break-contacts LB4, winding 1-2 of T1, and R2. This current flow forward-biases transistor Q2, causing Q2 to conduct immediately. After a delay of approximately 200 milliseconds (caused by CR7, R12, C9, R14, R15 and Q3), transistors Q3, Q4, Q5 and Q6 conduct. Transistor Q6 conducting energizes relay A which closes the loop to the system via make-contact A, between the T-lead (terminal 12) and the R-lead (terminal 13). Transistor Q5 conducting applies a ground to the system via the A-lead at terminal 16. Dial tone, if provided, is now returned to the two-wire telephone set via terminals 12 and 13, transformer T1, and terminals 14 and 9.

4.03 When the two-wire station dials, the dial pulses cause Q2 and Q6 to cut-off and conduct at the dial pulse rate. Thus, relay A follows the dial pulses and the dial pulses are applied to the system via terminals T (12) and R (13). During dialing, transistor Q3 is held conducting by the delay circuit. Thus, transistors Q4 and Q5 remain conducting and the

ground to the A-lead is not interrupted by the dial pulses.

4.04 At the completion of dialing, relay A is again energized steadily and ring or busy tone, when provided, is returned to the two-wire telephone set.

4.05 When the called station answers, voice communication between the two stations is established.

4.06 When the call is complete and the two-wire telephone set goes on-hook, the loop current stops, transistors Q2 and Q6 are cut-off immediately, and relay A de-energizes. After approximately 700 milliseconds, transistors Q3, Q4 and Q5 are cut-off and the circuit is returned to the idle condition.

Call to Two-wire Telephone Set

4.07 When the calling station goes off-hook and has completed dialing, the ringing voltage (or 10 vac for buzzing) is applied to the RT input (terminal 1).

4.08 On negative half-cycles of ringing, diode CR9 is forward-biased and does not conduct. On positive half-cycles of ringing diode CR9 is reverse-biased and the LED part of U2 is forward-biased and conducts. The photo-transistor part of U2 now conducts, which causes Q7 to conduct. Transistor Q7 conducting forward-biases CR10, capacitor C12 charges, Q8 conducts, and relay LB energizes. Capacitor C12 and resistors R27 and R28 LB energized on negative half-cycles of the ringing input (RT). Thus, relay LB energizes when ringing (RT) is received and is energized for the ringing periods of the interrupted ringing cycle (follows the ringing input).

4.09 With relay LB following the ringing input, make-contacts LB4 and LB2 are following the ringing, and the 105 vac input at terminal 10 is applied to the two-wire telephone set. Break contacts LB4 and LB2 prevent the 105 vac ringing voltage from being applied to transformer T1.

4.10 If the two-wire station answers during a silent ringing period, relay A is energized as explained in par. 4.04, the ground is applied to the A-lead output, and the RT input is

removed. The two stations are now connected together via transformer T1.

4.11 If the two-wire station answers during a ringing period, make-contacts LB4 and LB2 are closed. The increased ringing current (current surge) forward-biases CR4 on positive half-cycles and charges C7. The LED portion of U1 conducts and the phototransistor part of U1 conducts. Transistor Q1 conducts to forward-bias Q2, which causes Q6 to conduct and energize relay A. Transistor Q5 now conducts causing the ground potential to be applied to the A output.

4.12 With the loop to the two-wire telephone set now complete, the ringing input at RT is cut-off and relay LB de-energizes. The charge on capacitor C7 holds U1, Q1, and Q2 conducting until the dc current of the telephone loop takes over to hold Q2 conducting. The two parties are now connected via transformer T1.

4.13 When the call is complete and the two-wire telephone set goes on-hook, the loop current stops, transistors Q2 and Q6 are cut-off immediately, and relay A de-energizes. After approximately 700 milli-seconds transistors Q3, Q4, and Q5 are cut-off and the circuit returns to the idle condition.

TABLE A. Connections To K-1A2 Key System For K-346A Feature

K346A KTU CONNECTOR		FOR INTERCOM STATION APPLICATION	FOR EXTENSION TO LINE CARD APPLICATION
PIN NO.	CONNECTOR DESIGNATION		
14	TIP	TO TWO WIRE PHONE	TO TWO WIRE PHONE
9	RING	TO TWO WIRE PHONE	TO TWO WIRE PHONE
12	TIP TO INTERCOM CKT	TO INTERCOM TIP	TO 400 LINE CARD TIP
13	RING TO INTERCOM CKT	TO INTERCOM RING	TO 400 LINE CARD RING
1	RT RINGER LEAD	TO INTERCOM RT LEAD	TO COMMON AUDIBLE SIGNAL
3	RR	TO TALK GRD	TO TALK GRD
6	LG	TO LAMP GRD	TO LAMP GRD
10	AC	TO RB RING VOLTAGE STEADY	TO RING VOLTAGE STEADY
18	24VT	TO TALK BATTERY	TO TALK BATTERY
15	GRD	TO TALK OR SIGNAL GRD	TO TALK OR SIGNAL GRD
16	A LEAD	NOT USED FOR INTERCOM	TO 400 LINE CARD A LEAD

