

**1A1 KEY TELEPHONE SYSTEM  
LINE PICKUP, HOLDING, LINE AND BUSY  
LAMPS, AND COMMON AUDIBLE SIGNAL  
USING 202A AND/OR 202B AND 209A  
KEY TELEPHONE UNITS  
CONNECTION DATA**

**1.00 GENERAL**

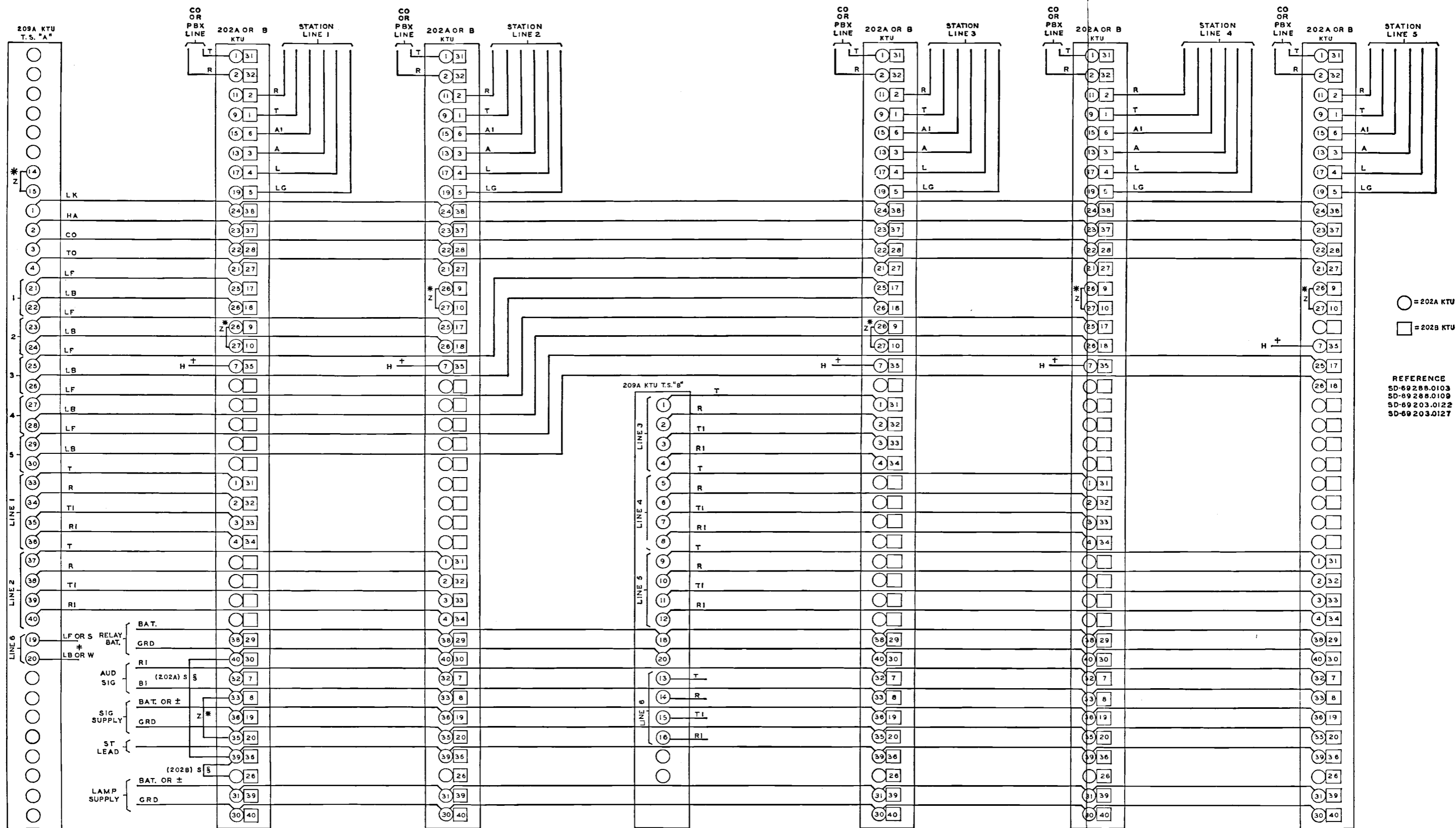
This section covers the connections required on 202A and/or 202B and 209A key telephone units. This includes strapping between the key telephone units, terminating wires from power sources, terminating lines from central office or private branch exchange, and terminating key or running cables from key telephone stations.

**2.00 CONNECTIONS**

**2.01** The connection drawing shows the necessary terminations to be made for incoming lines, power, cross-connection straps within and between key telephone units, and the terminations of key or running cable from key telephone stations (see Fig. 2).

**2.02** The connection drawing is supplemented by a feature circuit drawing (see Fig. 1). This drawing has been included as an aid for clearing possible cases of trouble which might be encountered.





○ = 202A KTU  
 □ = 202B KTU

REFERENCE  
 SD-69 288.0103  
 SD-69 288.0109  
 SD-69 203.0122  
 SD-69 203.0127

\* Remove Z wiring when wink hold is provided.  
 † H lead to 101A and 101B line key circuit.  
 ‡ To 6th line or wink circuit when provided.  
 § Remove S wiring when ST lead is used for interrupted audible signal.

Fig. 2 — Central Office or Private Branch Exchange Lines — 202A or B and 209A Key Telephone Units

**3.00 DESCRIPTION OF OPERATION****CENTRAL OFFICE OR PBX LINE CIRCUIT****Incoming Call**

**3.01 Signaling**—When ringing current is applied, the ac component flows through the *R* capacitor, the *R* thermistor, and the secondary of the *R* relay on one half of the cycle and through the *R* varistor on the other half of the cycle and ground, operating the *R* relay. The *R* relay locks operated on its primary winding under control of the *A* relay and of the *TO* relay. The *R* relay closes the circuit to the heater winding of the *TO* relay, starts the lamp flashing circuit (relays *FA* and *FB* operating), connects the signal lamp lead to the flashing circuit, and closes the circuit of the common audible signal circuit operating a continuous audible signal.

**3.02 Answering an Incoming Call**—An incoming call is answered by operating the pickup key associated with the line being rung, and removing the handset from its mounting. Operation of the set switch connects ground through the pickup key to the *A* relay causing it to operate. Operation of the *A* relay connects the tip and ring of the line to the station, lights the signal lamps steady, → and operates the *TO* relay. Operation of the *TO* relay opens the heater circuit of the thermal unit ↵ and operates the *PF* relay.

**3.03 Outgoing Call**—The procedure for originating an outgoing call is the same as for answering an incoming call except that the pickup key operated must be associated with the line on which the call is to be made. The call is then advanced in the normal manner.

**3.04 Holding**—An incoming or outgoing call can be held by operation of the hold key in the telephone set, which opens the ground on the *A* lead and permits the *A* relay to release, removing the short circuits on the windings of the *H* relay and allowing it to operate on line current through the telephone set. The *TO* relay is a slow-release relay and remains operated during the time its primary winding is opened by the release of relay *A*, while the *H* relay operates and closes the secondary of the *TO* relay, holding it operated. The *H* relay locks operated and lights the signal lamp steady.

**3.05 Release of the Holding Bridge When the Call is Again Picked Up**—When any station of the key telephone system seizes the line by operating the associated pickup key and removing the handset from the mounting, the *A* relay is operated, short-circuiting the windings of the *H* relay, causing it to release and remove the holding bridge. This restores the circuit to the talking condition.

**3.06 Disconnection**—When the station disconnects on either incoming or outgoing calls, the *A* relay releases, extinguishing the signal lamp, releasing the *TO* relay, and restoring the circuit to normal.

**COMMON CIRCUITS****Lamp Flashing and Incoming Signal Time-out Circuit**

**3.07 Lamp Flashing Circuit**—When there is an incoming call on any line of a system, ground will be connected to the *TO* lead and will operate the *FB* relay through back contacts of the *FA* relay. Operation of the *FB* relay lights the signal lamps of the called line or lines and operates the *FA* relay. Operation of the *FA* relay releases the *FB* relay. The *FA* and *FB* relays continue to operate and release at a rate of approximately 1 cycle per second, lighting the signal lamps while the *FB* relay is operated. The flashing circuit is released when the incoming call is answered or the time-out circuit operates.

**3.08 Incoming Signal Time-out Circuit**—The time-out feature is provided to release locked-in relays on abandoned calls when the system is unattended. The ground which starts operation of the flashing circuit is also placed on the heater winding of the thermal relay section of the *TO* relay. If the call is not answered in approximately 30 seconds, the thermally operated contacts open and release the locking circuit for the → *R* relay, restoring the circuits to normal. Incoming call signals are released by disconnection of the distant station. When a station of the key telephone system is busy or a line is held, the magnetic portion of the *TO* relay is operated, opening the heater winding to prevent timing-out of incoming signals when there is an indication that the system is attended.

↵ **3.09** In case of a power failure, the windings of the *H* relay are short-circuited by contacts ↵ on the *PF* relay, and calls may proceed.