SWITCHING SYSTEM NO. 301A

METHOD OF OPERATION

1. GENERAL

1.01 This section provides a detailed description of the operational characteristics of the 301A Switching System (301A S/S) located at Air Traffic Control (ATC) centers for the Federal Aviation Administration (FAA). The ATC tower console and Terminal Radar Control (TRACON) console attendants will be required to perform either a portion or all of the operations described. The information contained in this section may be used to perform overall operational tests. Section 981-204-105 contains general descriptive information. Detailed lineup (adjustments and overall tests of the system equipment) are contained in Section 480-708-501.

> ***Note:*** Operational environments will require a service release before any testing is performed.

1.02 Typical 301A S/S attendant positions are shown in Fig. 1. Figure 2 illustrates function control and line selection keys located at a typical attendant position. The remaining keys will be identified as required on the designation area of each key.

1.03 The pushbutton keys are illuminated rectangular buttons arranged for mechanical nonlocking operation. Backlighting is provided for all key designation areas for dark environments. The number of 6- or 10-button key units provided at any one position will be specified locally.

1.04 To deactivate a position, the attendant must remove all telephone instruments from the position jacks. The positions are provided with push-to-talk (PTT) features associated with the head telephone set, handset, hand transmitter, or footswitch. Operation of the PTT switch will, in general, be necessary to provide a transmit path for the attendant.

1.05 The status lamps are basic system features and provide the following indications:

(a) ***Off or Dim***—Indicates line is not in use at any position.

(b) ***Steady bright***—Line seized at another position.

(c) ***Flashing***—Incoming call. No position connected (60 ipm).

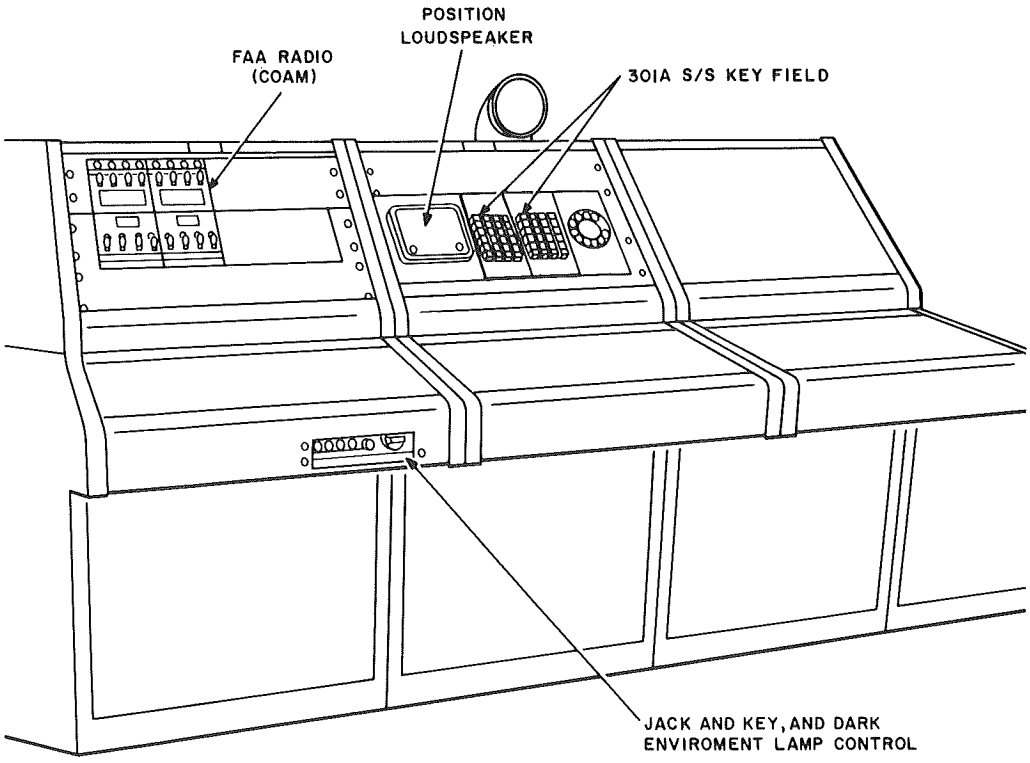
(d) ***Winking***—Central office or PBX line on hold (120 ipm).

(e) ***Fluttering***— Line seized by that position (720 ipm).

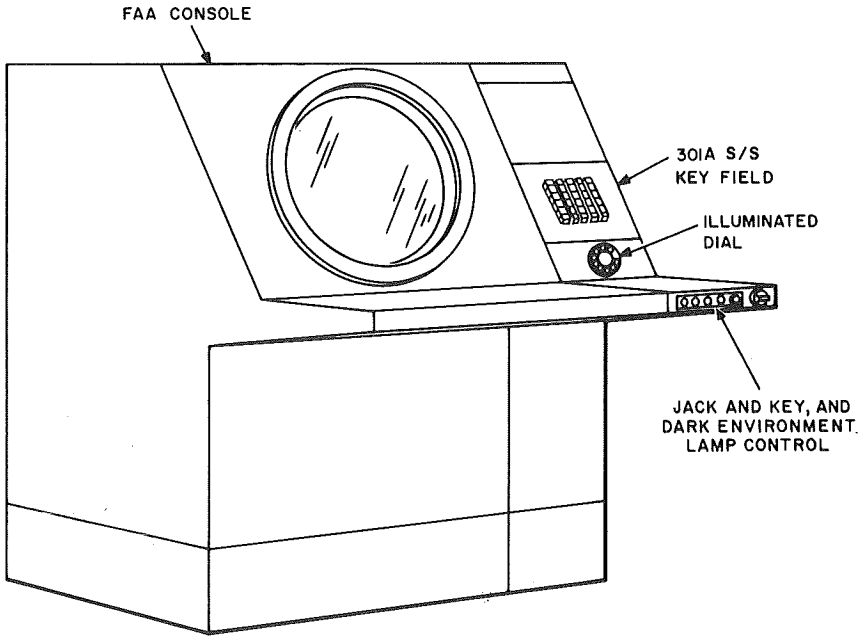
1.06 Status lamp indicators are provided for incoming voice signaling lines. A voice-operated switch provides a standard flashing signal on the pick-up key associated with the line.

1.07 Coordinator ***override*** auxiliary indicators consist of a beehive light and buzzer located at any appropriate place on the control console. The light will flash while the regular override lamp in the coordinator's position keybox lights steadily. The buzzer will sound for about two seconds after the position is overridden. This will advise the coordinator that he is being overridden, while his position is unattended.

1.08 Coordinator ***monitoring*** of controller positions is provided via the override path. The coordinator has the ability to monitor any position to which an override capability is provided. The coordinator can monitor from one to five controller positions at the same time and will not cause the override lamps to light at the monitored positions. However, the override lamps will be activated by calls from other positions as usual. This requires that the designation of one of the coordinator position buttons be the monitoring mode button (MON). When this electrically locking button is depressed, followed by the depression of from one



CONTROL TOWER CONSOLE



SEPARATOR CONSOLE FOR TRACON AREAS

Fig. 1—Typical 301A S/S Attendant Position

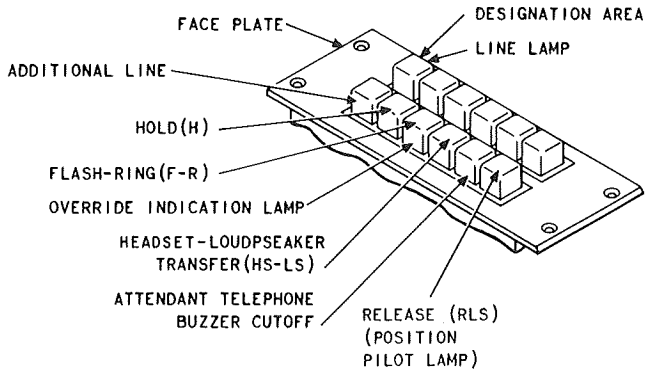


Fig. 2—J53048 CG Key Unit—Typical Assignments

to five override buttons which are associated with monitoring, the monitoring connection is completed. The override buttons become electrically locking in this mode regardless of normal selection mode. No other selections can be made during this period. Repressing the override button releases the monitoring circuit. The controller position is released from the monitoring mode by reoperating the "MON" button. Only two coordinators can monitor the same controller.

2. METHOD OF OPERATION

2.01 ***Originating Calls:***

(a) Depress the associated line button to select desired position or line. Lines are electrically locking or must be held down operation (2.07). The line lamp indications are provided for all positions associated with a locking line. In the hold down condition, fluttering lamp indication is not provided at the originating position.

(b) Further signaling depends upon the type of line (2.02).

(c) When a call on an electrically locking line is completed, if no other incoming call is to be answered, depress the release (RLS) button. The line lamp will be extinguished or result in a steady dimmed illumination. If another call is to be answered or placed, depress the button for that line and the previous connection will release.

2.02 Placing outgoing calls will require different methods of signaling after the line is selected. The type of signaling depends upon the type of equipment at the distant end. The options available are listed as follows:

(a) Loudspeaker at distant end requires voice signaling.

(b) Ringdown signaling—Depress flash and ring (F-R) button.

(c) Long-short selective ringing—Predetermined codes are used on this type of circuit.

(d) Dial selective signaling —Dial the predetermined code digits of the desired station.

(e) PBX extension line—Listen for dial tone and dial the station desired.

(f) Override calls—Depress the override (OV) line key then talk using the push-to-talk switch unless the radio circuit has also been selected at the position.

2.03 ***Incoming Call:***

(a) Incoming calls will cause the associated line lamp to flash with full brilliance at all appearances.

(b) Depress the associated line button. The line lamp changes from flashing to flutter at the selecting position. All other appearances of the line will change from flashing to steady illumination.

(c) Disconnect a button selected line by depressing the RLS button or by selecting any other electrically locking line.

2.04 The position pilot lamp flashes when an incoming wire line call is specifically directed to that position.

2.05 Supervisor positions are equipped with CALL DIRECTOR® telephones or equivalent. The

operation of this position is the same as described in 2.01 through 2.03 with the following exceptions:

(a) Removing the plugged-in handset from the switch hook will activate the position. Before answering or originating a call from this position, the handset must be off-hook.

(b) The position loudspeaker is arranged to terminate override receive calls, under control of the switch hook; or the loudspeaker is automatically disconnected when the handset is off-hook, and is activated when the handset is on-hook.

2.06 Override circuits permit a controller to talk directly into the receiver or loudspeaker of another controller.

2.07 ***Outgoing Override Call:***

(a) Two types of outgoing override operation are available on an optional basis. One is designated "hold down" operation and is installed for use in combining override with radio. The other is designated "locking" operation.

(b) In the "hold down" operation, depress and hold depressed the line pickup button assigned to the position selected and make voice contact. If the overriding controller is on radio when he overrides, the telephone transmitter is energized upon selection of the line, and the push-to-talk switch is used only to control the radio transmitter. If the overriding controller is not on radio, it will be necessary for the overriding controller to press the push-to-talk button in order to converse with the overridden controller. To disconnect, the overriding controller releases the line pickup button and the connection releases. A maximum of 4 non-locking lines can be selected simultaneously without any noticeable difference in transmission levels.

(c) In the "locking" operation, the override line button is momentarily depressed. Push-to-talk is required to converse with the overridden controller. Disconnection is accomplished by depressing the RLS button or by selecting another line.

2.08 ***Incoming Override Call:***

(a) If the headset-loudspeaker (HS/LS) button at the overridden position is in the LS position and an incoming override call is received, the overriding controller will be heard in the overridden positon loudspeaker. The overriding controller will not hear any conversation at the overridden position. The overridden controller can reply only by operating the HS/LS button to the HS position, at which time all of the conditions described in this paragraph apply.

(b) The overridden controller can talk simultaneously on radio and to the overriding controller by depressing the push-to-talk switch, or only to the overriding controller without depressing the push-to-talk switch.

(c) If the override call is received when the overridden controller is connected to a wire line, the overriding controller joins in the conversation on a party line basis, and the overridden controller push-to-talk switch controls the telephone transmitter.

(d) If an incoming override call is received at a time when the overridden controller is connected to a radio channel and another override, 4-Wire Voice Call-up or Emergency Paging line, the overriding controller's voice will be transmitted only to the overridden controller. The overridden controller can talk simultaneously to radio, to the overriding controller, and to the connected (Override, Emergency Paging, and 4-Wire Voice Call-up lines with the push-to-talk switch operated. The overridden controller can also talk to the above far ends exclusive of radio by having the push-to-talk switch in the normal position.

2.09 ***Emergency Paging Line:*** An Emergency Paging line talking circuit may be provided between the control tower and the TRACON room with voice signaling in both directions. When an Emergency Paging line is selected, the Emergency Paging loudspeaker (in local paging) or position loudspeaker for remote paging using the 4-wire Voice Call-up line, is silenced at the originating position. Both calling and called stations must hold the associated line buttons depressed to remain connected. To use the line, perform the following:

(a) Depress the associated button. Holding it depressed, call for the desired controller.

(b) The called controller will depress his associated button, hold it depressed, and answer. This silences the loudspeakers at the called position.

(c) To disconnect, release the button.

2.10 ***Radio Channel Selection:*** The 301A S/S enables a controller to select radio only, wire line only, or a combination of radio and special voice signaling and override wire lines. Selection of radio frequencies is accomplished by FAA installed and maintained radio selector keys.

(a) ***Radio Selection Only:*** To select radio only, depress: the RLS button if radio is automatically selected when no other locking line is chosen at the position (no radio button); or radio line button is depressed to clear any locking line connection. The radio receive line is connected to the controller headset automatically. However, to transmit on the radio circuit, the controller must operate the push-to-talk switch. Radio receive is transferred from the controller headset to the position loudspeaker when

(1) A line button is selected to pick up a wire line, locking override line, or locking 4-Wire Voice Call-up line.

(2) The controller has removed all instrument plugs from the attendant jacks.

(3) The controller operates the HS-LS transfer button on the attendant telephone circuit to the LS position.

(b) ***Radio and Non-locking Line Combination Selections:*** To select a combination of radio and as many as 4 non-locking lines, a button associated with each of the latter lines, (Override, Emergency Paging, and/or 4-Wire Voice Call-up lines) is held depressed. This bridges the headset with both the selected line and the radio channel. To talk to the non-locking line and radio simultaneously, operate the push-to-talk switch. To talk on the selected non-locking lines only, the push-to-talk switch is left not operated. The radio receiver line shall remain connected to the telephone instrument receiver and will not be transferred to the loudspeaker.

2.11 ***Recording:*** Each position shall be equipped with two voice recording channels terminated in a demarcation strip. One channel shall carry all voice communications at the controller telephone instrument jacks. The second channel shall be associated with the position speaker. If recording is to be accomplished on a single channel recorder, the FAA will provide 60 dB of isolation between headset and loudspeaker recorder leads. One recording channel shall be provided in each room for the Emergency Paging line and speakers.

2.12 ***Voice Line Cutoff:*** On incoming voice signal line calls, momentarily operate the associated voice line cut-off (CUT) button to cut-off incoming voice signal. As a result, the associated VL lamp at the position is extinguished and the CLD lamp lights steadily. To restore incoming voice signal line calls, again momentarily operate the associated CUT button. As a result, the VL lamp flutters, the CLD lamp is extinguished, and the incoming voice signal is restored.

2.13 ***Buzzer Cutoff:*** To cutoff buzzer, or ringer (at supervisor position), momentarily operate the BZC button. As a result, the buzzer, or ringer (at supervisor position) is silenced and the BZC button lamp lights steadily. To restore buzzer, or ringer to normal, momentarily reoperate the BZC button. As a result, the buzzer, or ringer is restored to normal and the BZC button lamp is extinguished.