21A COMMUNICATION SYSTEM

(COM KEY* 2152)

*Trademark

NOTICE

Printed in U.S.A.

1. GENERAL

1.01 This section provides descriptive and ordering information for the 21A Communication System. Installation, connections, and maintenance are covered in Section 518-450-111.

1.02 Whenever this section is reissued, the reasons for reissue will be listed in this paragraph.

1.03 The Bell System Practices listed below provide additional information on key telephone units (KTUs), related communication systems, and other pertinent subjects.

SECTION	TITLE
518-215-400	Line Service KTUs
518-215-401	Auxiliary Service KTUs
518-215-402	Intercom Service KTUs
518-215-403	Control Service KTUs
518-450-100	7A Communication System
518-450-102	14A Communication System
503-701-110	832- and 2832-Type Telephone Sets
503-702-110	833- and 2833-Type Telephone Sets
518-010-105	KTS Grounding and Special Attention Requirements
463-341-102	Voice Connecting Arrangement FTP (33A Voice Coupler)
981-251-100	Loudspeaker Paging Systems — General Description

1.04 This issue of the section is based on the following drawings:

SD-69656-01, Issue 2—6B1 and 6C1 Consoles

SD-69657-01, Issue 2—7B1 and 7C1 Consoles

SD-69930-01, Issue 1—21A Communication System Equipped With 100A1 and 100B1 Connecting Units

SD-69941-01, Issue 1—21A Communication System Equipped With 101A1 and 101B1 Connecting Units

SD-699.2-01, Issue 2—128A3-, 128A4- and 138A4-Type Console

SD-69934-01, Issue 1—128A6- and 138A6-Type Console

SD-69915-01, Issue 1—20A Apparatus Unit

SD-69924-01, Issue 1—22A Apparatus Unit

2. SYSTEM CHARACTERISTICS

2.01 The 21A Communication System (Fig. 1) is a modular Key Telephone System (KTS) which offers a wide choice of features and options in an arrangement which is flexible and expandable. Its basic purpose is to provide a system in which telephone stations in a customer location can originate and answer calls on CO/PBX lines and communicate among themselves; all other features support and augment these functions. The maximum size of COM KEY 2152 is 21 CO/PBX lines and 52 stations.

2.02 The system is designed to permit selection of mounting arrangements, power supply and terminations for a variety of system sizes—depending on the number of lines and/or number of stations. Three basic units of hardware have been developed for COM KEY 2152 which permit this system flexibility:

- Panels—for mounting the required and optional KTUs

- Power panels—required in singular or combination depending on the number of lines and stations and the number of 10- and 20-button telephone sets

- Connecting units—provide the system terminations and optional wiring. Selected by the size of the system and type of telephone sets.

2.03 The telephone sets used with COM KEY 2152 are the same as those developed for earlier COM KEY systems. Unlike the earlier systems, 832- and 833-type or intercom only sets can be intermixed in a COM KEY 2152 System to satisfy the customer's needs. When expansion requires stations to be added, this can be accomplished by the addition of the required connecting unit to provide the required terminations. The original connecting unit need not be replaced.

2.04 COM KEY 2152 also provides flexibility in both the line and feature appearances at a given station. If desired, up to 14 lines can be square, that is, appear at all stations; or two of the button appearances, called flexible buttons, can be used to provide any of the following:

- Square line pickup

- Personal line pickup

- Automatic signaling intercom pickup

- Third intercom link pickup

- Private line pickup.

A personal or "nonsquare" line is a CO/PBX line which serves only a limited number of stations, perhaps as few as one or two, and can be picked up only at those stations (and by the attendant). With personal lines, the caller has direct access to a line which is less likely to be busy than a square one. On outgoing calls, the station user does not have to compete with as many other users as he would on a square line. As far as operating methods and characteristics are concerned, square and personal lines are standard CO/PBX lines in all respects. If the attendant is not to pick up a personal line, the corresponding button must be blocked. In addition, if the line is not to ring at the attendant, the common audible diode must be removed.

In COM KEY 2152, lines 1 through 5 are square on *all* stations (10- or 20-button); lines 1 through 12 are square on 20-button telephone sets. All lines appear at attendant sets.

2.05 In COM KEY 2152, the attendant station (code 0) is factory-wired to receive tone ringing on all CO/PBX lines, square and personal (common audible feature). Other stations, instead of or in addition to the attendant, can be arranged to have common audible. The maximum number of station codes that can be signaled at one time is ten. The procedure for answering calls can vary between installations, depending on the customer's needs. Individual stations can be optionally wired for CO/PBX ringing (flexible station ringing feature) on a maximum of two lines in addition to the attendant. If two lines are to ring at a station other than the attendant, neither of the two lines can ring *alone* at another station, that is, both lines must also ring at the second station. Additionally, if it is desired that one of the two lines not ring at the attendant station, the other line cannot ring at the attendant station either. Both common audible diodes would have to be removed.

2.06 In the case of a personal line, installer wiring options allow CO ringing to be connected to the served stations, in addition to
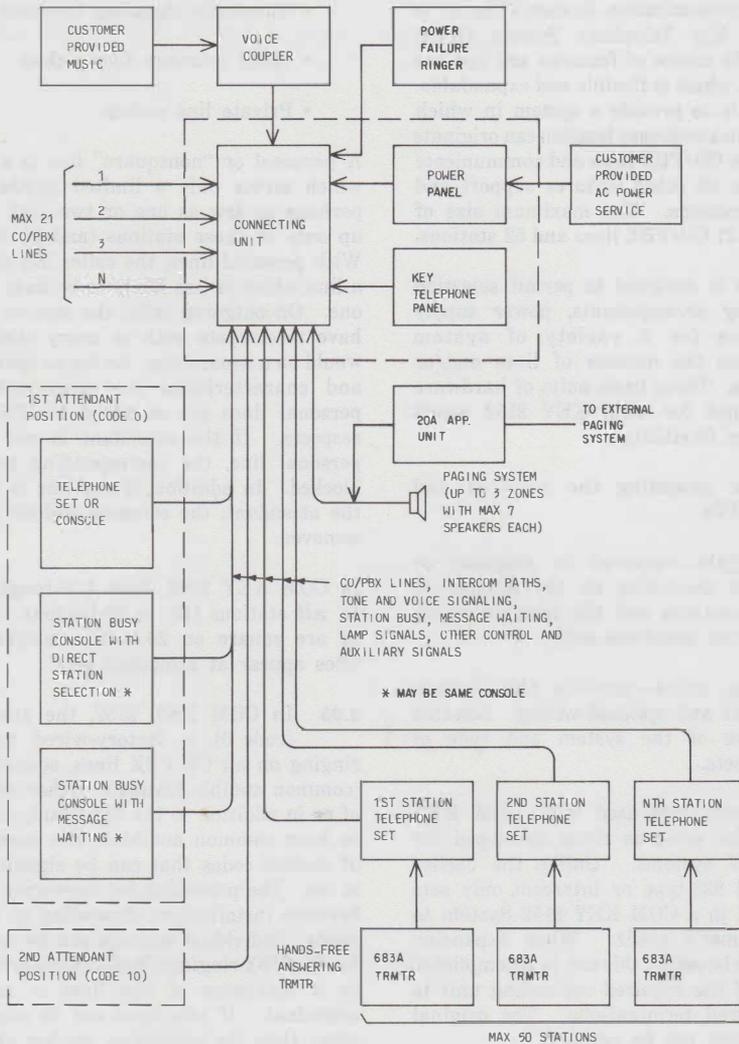
Fig. 1—Block Diagram of 21A Communication System

the attendant positions or to the served station alone. A personal line is often used for a principal station and a secondary station (boss and secretary, for example), one of whom will usually answer incoming calls directly rather than receiving them through an attendant. However, an attendant can

handle personal line calls that are not answered at the intended station within a reasonable time.

2.07 Three types of intercom are used with COM KEY 2152 and employ tone and voice signaling on the called station loudspeaker: (1) dial intercom

among all stations on two or three paths; (2) optional automatic signaling intercom among selected stations; (3) at attendant positions, the DSS feature with a dedicated intercom path, if installed, can be used to signal stations without dialing.

2.08 The hands-free answering on intercom (HFAI) feature allows any station so equipped to answer an intercom call over a microphone circuit automatically turned on by the incoming call. This can be done without using the station handset and even while another call is in progress.

> *Note:* HFAI is not activated by the automatic signaling intercom circuit. Connection to the paging system from the stations is under control of the intercom circuit. Connections to the paging circuit from the attendant positions can be either through the common IC paths or the dedicated link, provided the attendant has DSS.

If the system is equipped with three intercom paths, all stations must be wired for the three paths.

2.09 Depending on the size of the system and the features installed, the answering position(s) may use the same type of telephone set as the other stations (must have ring transfer) or may require one or two of a new family of telephone and selector consoles developed for COM KEY 2152.

2.10 As factory-wired, the 21A System furnishes common audible ringing at station code 0. All incoming lines will ring at that station unless otherwise arranged (see information on common audible and flexible station ringing). The calls are answered by lifting the handset (if using a telephone set) and depressing the flashing line pickup button. The method of forwarding the call may vary depending on the equipment at the attendant station, as follows:

(a) With all arrangements, the answered call can be placed on hold using the HOLD key on the telephone set or console at which time the steady lamp will change to wink. The attendant then selects an idle intercom path, dials the desired station, and voice signals that there is a call on a particular CO/PBX line. If necessary to reenter the conversation, the pickup button must be depressed again.

(b) If equipped with a DSS console, the attendant can voice signal the desired station by depressing the associated locking DSS button. When the DSS button is depressed, the CO/PBX line is automatically put on hold. Using the DSS does not require accessing an intercom path since the attendant uses the dedicated link which does not require the selector. If the intercom station is equipped with HFAI, 2-way conversation is possible. A call from a DSS console will preempt an automatic signaling intercom call, dial intercom call, or CO/PBX ringing. The attendant may then either go back to the held line by depressing the RE-ENT button on the DSS console, leaving the held line to be picked up by the station, or pick up another CO/PBX line by depressing the associated button after depressing RST button to clear DSS console.

(c) At positions having a tandem trunking console (128A3 or 138A4), incoming calls are answered using the line pickup buttons on the lower field. Calls can be forwarded in the usual manner by holding and using an intercom path or by DSS if so equipped. In addition, the tandem trunking field can be used to connect a line that does not appear at a station, such as a nonsquare line, as follows:

(1) Answer flashing line by depressing button, then place line on hold.

(2) Select idle intercom path (lamp off) and signal desired station using dial intercom.

Note: DSS cannot be used here for conferencing.

(3) When station answers, depress buttons in tandem trunking field associated with held CO/PBX line and selected intercom link which will connect outside party with station.

(4) Operate RLS button to remove attendant from conversation.

(5) When the intercom station goes on-hook, the status lamp in the tandem field will light indicating the connection can be released by depressing the push-to-operate, push-to-release buttons. *Only one call at a time can be processed through the tandem trunking field.*

2.11 The tandem trunking field can also be used to set up a preset conference call. The procedure is the same as above except the attendant dials the preset conference code on the intercom. Once the conference stations are on the line, the CO/PBX line button in the tandem trunking field is depressed. A third option permits the attendant to make a CO/PBX call for stations unable to do so, ie, an intercom-only station. To do this, the attendant first completes the CO/PBX call by depressing button in the lower field and dialing the desired number. The attendant then places that call on hold and calls the station on dial intercom using an idle path on the lower button field. The attendant then operates the intercom button, then the CO/PBX line button in the tandem field corresponding to the two parties. After operating the RLS button, the attendant is free to make other calls.

Option Wiring

2.12 All option wiring has been assigned to blocks 1 and 2 of the 100A1, 100B1, 101A1, and 101B1 connecting units except for some of the paging feature wiring and wiring for the 33A voice coupler which appear on block 4 of the 100A1 and 101A1 connecting unit. Blocks 1 and 2 are color-keyed, with the colors corresponding to those designated for centralized key system installations; ie, red for line service terminations, blue for telephone set terminations, and yellow for auxiliary and dial intercom terminations. Black lines are used to define the color segments.

2.13 In a few instances it may be necessary to provide connections between a 100A1 and 100B1 connecting unit or between a 101A1 and 101B1 connecting unit. An example of this is an automatic signaling intercom in which one station appears in the 100A1 and the other station appears in the 100B1. Another example is an intercom-only station whose flexible button terminations appear in the 100B1 or 101B1 connecting unit, picking up the third intercom path—the leads of which appear only in the 100A1 or 101A1 connecting unit.

2.14 To avoid running exposed jumpers between connecting units, eleven unassigned pairs are provided between a 100A1 and 100B1 or a 101A1 and 101B1 and are designated SP1-SP22 to be used as required.

3. COMMON APPARATUS

MOUNTING FACILITIES

3.01 Apparatus for mounting the power units, KTUs, and cross-connect terminal fields is selected from separately ordered components on the basis of required capacity (lines and stations) and the type of mounting (wall, floor, or relay rack). Preassembled packages are not provided for this purpose with the 21A Communication System.

121B Apparatus Box (Fig. 2 and 3)

3.02 Has the following features:

- Consists of a 197A backboard and hinged gate

- Can be mounted on wall or on 23-inch relay rack, using D-180675 kit of parts

- Approximate dimensions are 34-1/4 inches high, 25-1/2 inches wide, and 16 inches deep.

34B Cabinet (Fig. 4)

3.03 Provides following features:

- Used in floor-mount installations

- Hinged carrier gate with caster to support weight when gate is opened

- Glides or optional casters (D-180700 kit of parts) on each corner of cabinet for easy movement.

154A Cover (Fig. 5)

3.04 Provides following features:

- Used to cover 34B cabinet and 121B apparatus box

- Provides finished appearance where required for office decor.

PANELS

702A Panel
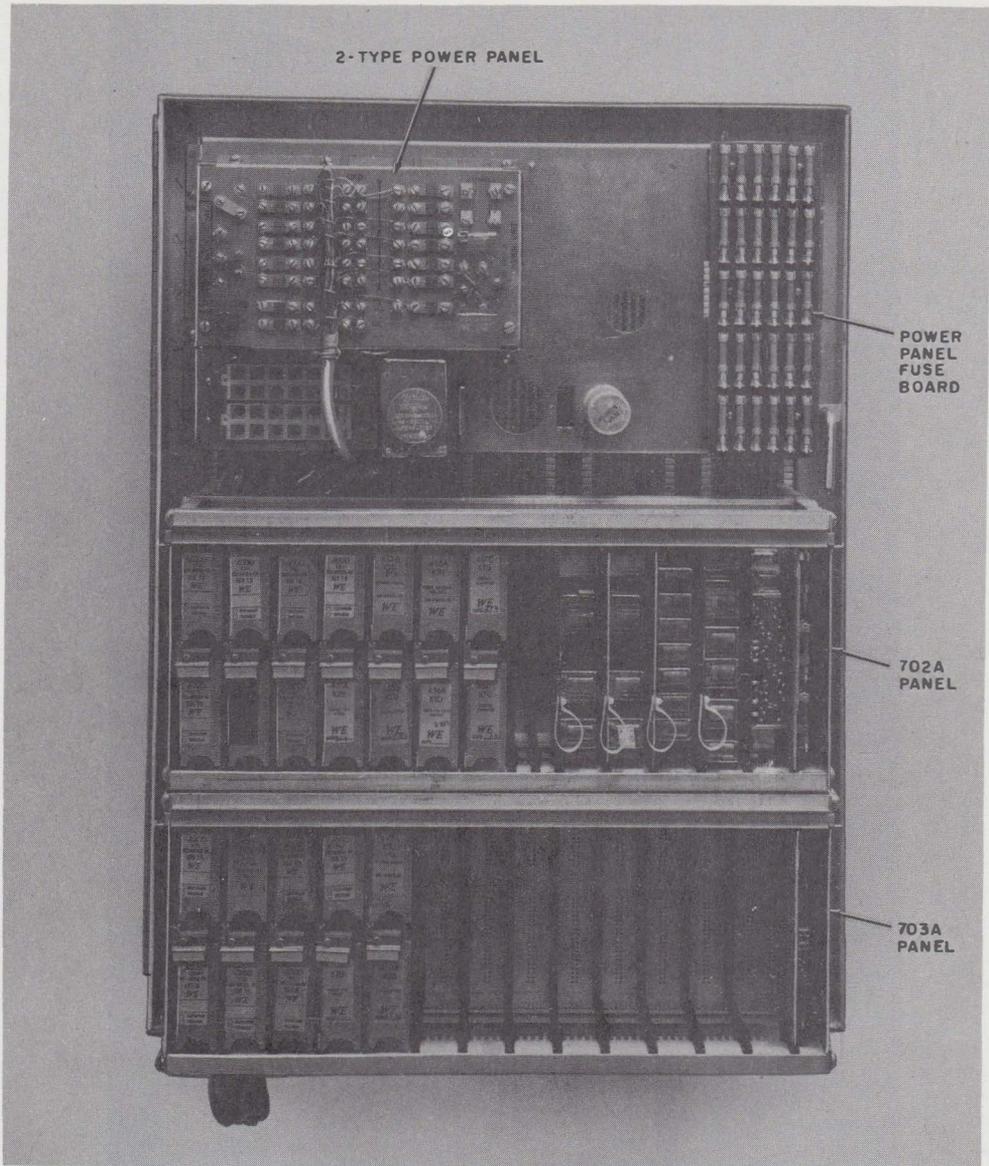
Fig. 2—121B Apparatus Box, Equipped With 2-Type Power Panel, 702A Panel and 703A Panel
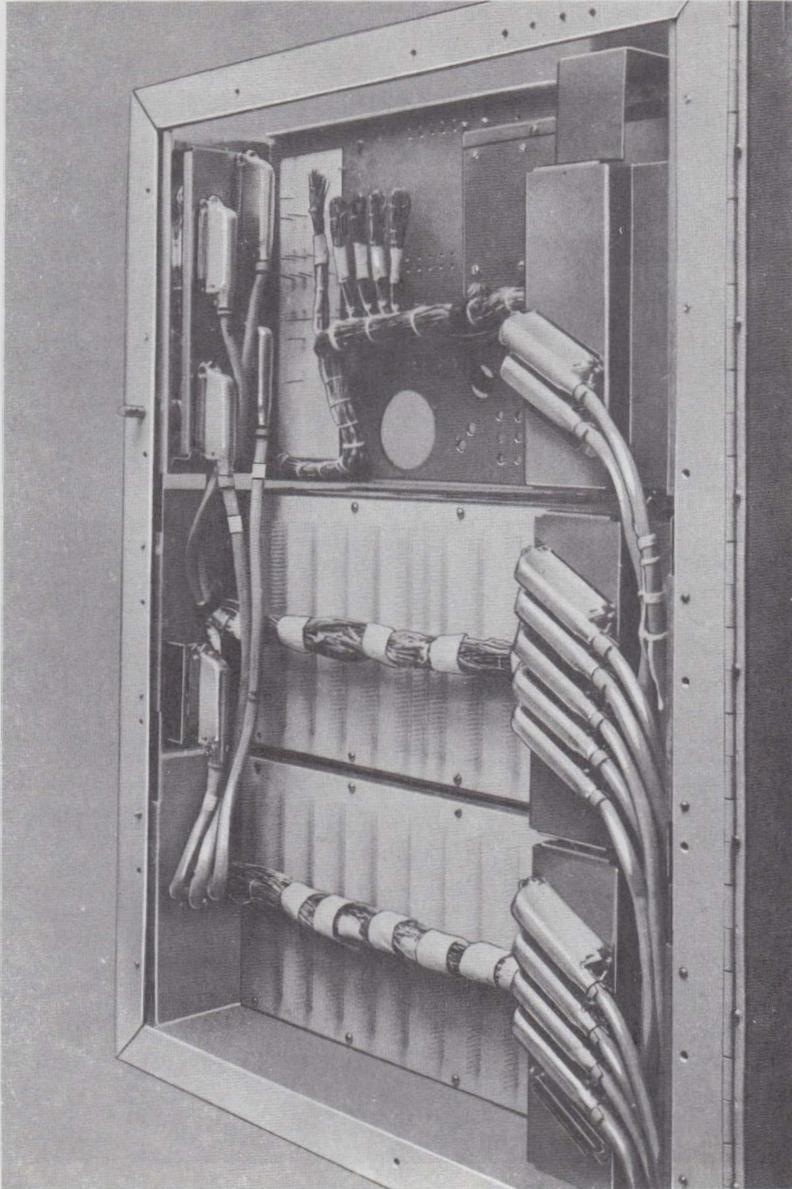
Fig. 3—121B Apparatus Box, Rear of Gate Assembly

Fig. 4—34B Cabinet

Fig. 5—154A Cover
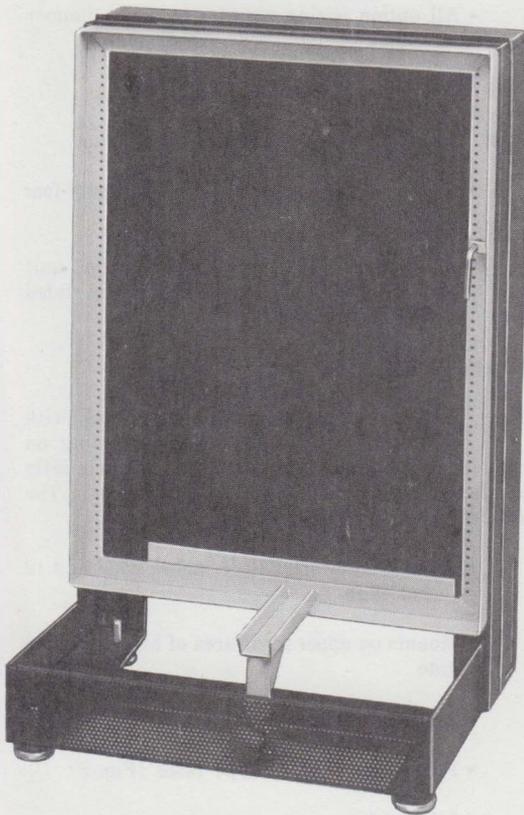
3.05 Has the following features:

- Metal framework assembly with slots and prewired connectors for holding 400-series KTUs.

- "Basic" panel providing up to 7 CO/PBX lines, 2- or 3-path intercom, and various optional features.

- Holds fourteen 4-inch and seven 8-inch KTUs.

- KTU connectors are factory-wired to connectors which mate with cables from connecting unit and power panel. Panel supplied with connector hold-down bracket.
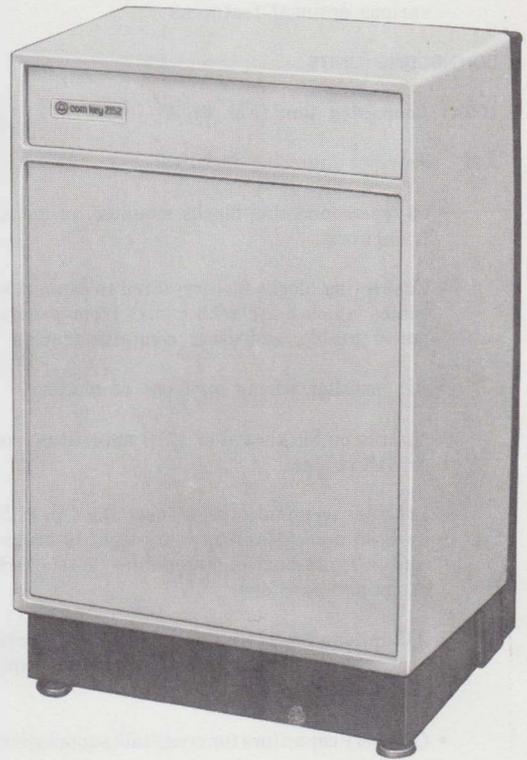
- Mounts in middle front area of gate.

- Approximate dimensions are 8-13/16 inches high, 22-5/16 inches long, and 9-5/8 inches deep.

- Fuse board in far right position—has light emitting diode (LED) to indicate blown fuse.

703A Panel

3.06 Same physical features as 702A panel, and:

- Mounts on lower front area of gate

- Holds twenty-two 4-inch and two 8-inch KTUs

Page 9

- Provides 14 additional CO/PBX lines and various optional features.

CONNECTING UNITS

100A1 Connecting Unit (Fig. 6)

3.07 Provides following features:

- 66-type connecting blocks mounted on metal framework

- Connecting blocks factory-wired to connector cables which mate with cables from panels, power panels, and other connecting units

- All installer wiring on front of blocks

- Mounts on backboard of 121B apparatus box or 34B cabinet

- Provides terminations for incoming CO/PBX lines, station cables for twenty-eight 10-button and six 20-button telephone sets (two attendant positions)

- All options for 34 stations grouped in blocks 1 and 2, including flexible buttons and personal lines

- C battery capacitors for cross-talk suppression.

100B1 Connecting Unit (Fig. 7)

3.08 Has the same physical features as 100A1, plus:

- Provides terminations for additional eighteen 20-button telephone sets

- All interconnections to 100A1 connecting unit and power panel are through plug-ended connector cables.

101A1 Connecting Unit

3.09 Same physical features as 100A1, plus:

- Provides terminations for incoming CO/PBX lines and station cables for twenty-eight 20-button telephone sets

- Option blocks mounted on gate

- All option wiring appears in same manner as 100A1.

### 101B1 Connecting Unit

3.10 Same physical features of 100B1, plus:

- Provides terminations for additional twenty-four 20-button sets

- All connections to 101A1 connecting unit and power panel are through plug-ended connector cables.

POWER PANELS

3.11 Power panels are available for use with COM KEY 2152, the choice depending on the size of the installation. They differ primarily in the type of power units they contain. The *basic panel* has the following features:

- Metal framework 23-1/8 inches wide and 12 inches high

- Mounts on upper front area of hinged carrier gate

- Line status lamps

- Fuse panel with 70-type fuses (Fig. 8)

- Interrupter

Note: In COM KEY 2152, the KS-15900 L3 interrupter runs continuously as long as power is applied to the system.

- Capacitor for A battery

- Resistors for C battery

- Outputs wired to connectors mounted on power panel bracket.

3.12 *2A Power Panel*

- 19C3 power unit

- 215C1 transformer to supply 15/18 volts ac.

3.13 *2B Power Panel*
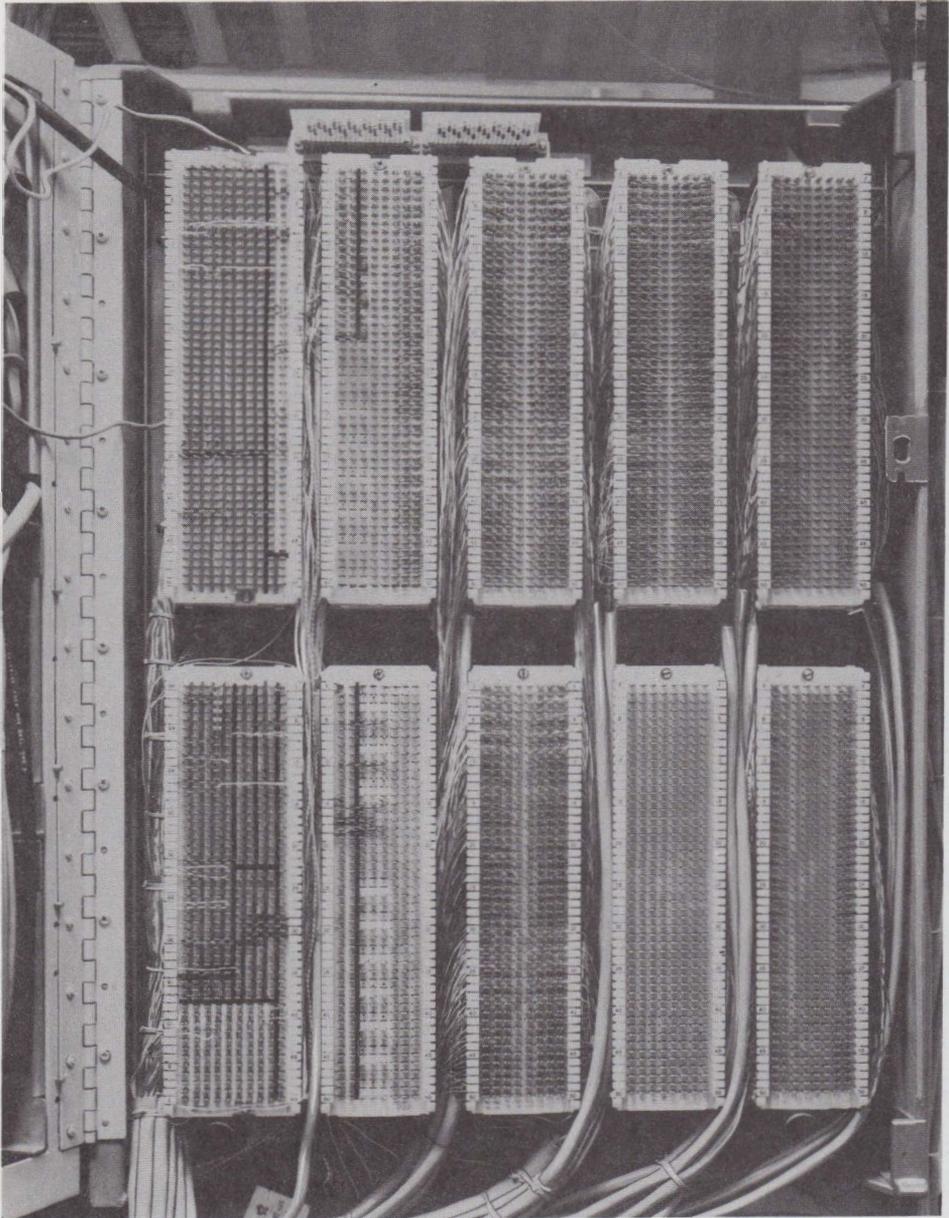
- 29E1 power unit.

Fig. 6—100A1 Connecting Unit Mounted in 121B Apparatus Box
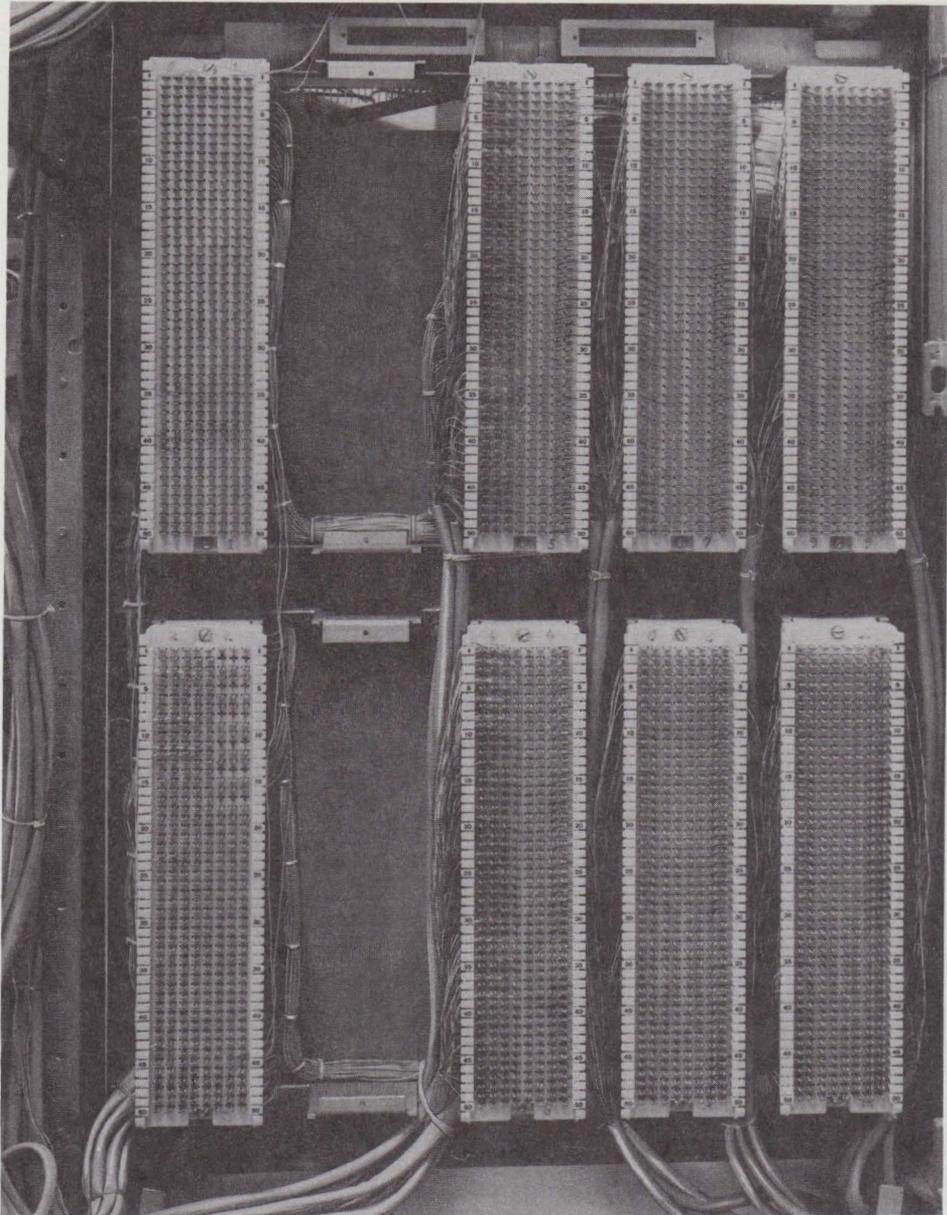
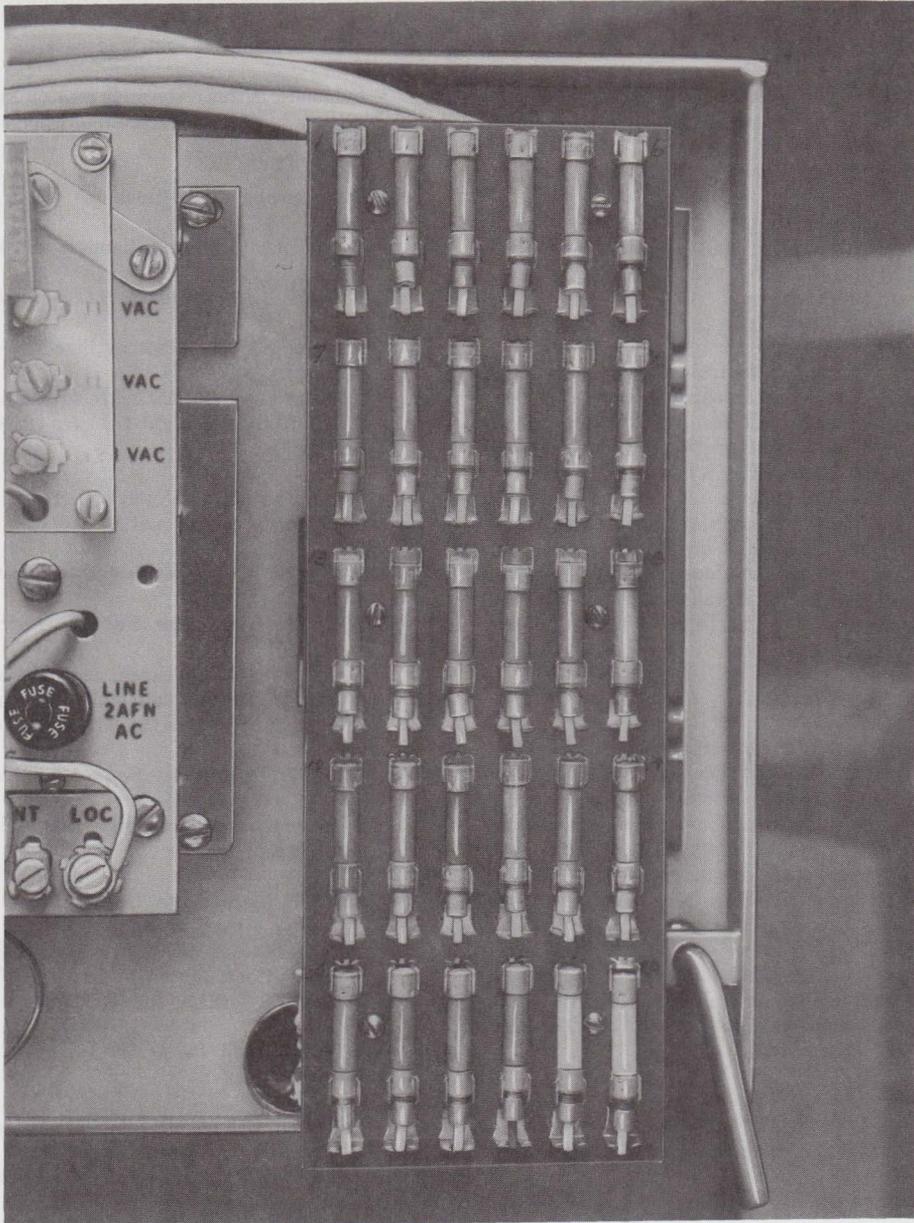Fig. 7—100B1 Connecting Unit Mounted in 121B Apparatus Box

Fig. 8—Fuse Panel on 2-Type Power Panel

3.14 *2C Power Panel*

- 29E1 power unit

- 67E1 power unit for supplementary lamp power and for interrupter motor.

3.15 *2D Power Panel*

- 67E1 power unit wired for use with the 101B1 connecting unit and in conjunction with the 2C power panel.

KEY TELEPHONE UNITS

3.16 The electronic control circuitry of COM KEY 2152 is contained in 400-series plug-in, printed circuit board KTUs. Table A provides a list of all of these units with pertinent physical and functional data. The KTUs are mounted in the 702A and 703A panels. There are dedicated slots in the panel for each type of KTU, except for the 457C and 481A which are mounted in "option slots" in various combinations, depending on the requirements of specific installations. Fig. 9 shows the arrangement of KTUs in the 702A and 703A panels.

4. STATION APPARATUS

4.01 In COM KEY 2152, each nonattendant station utilizes a single telephone set. Each attendant position (up to three per installation) will have a telephone set or a telephone console depending upon the number of CO lines served, and it may also have one or more selector consoles providing the DSS/SB and MW/SB features. All telephones and consoles are available in an ivory colored housing only, with a choice of nine faceplate colors (Table B). The features that can be provided with each set are detailed in Table C. Fig. 10 shows some of the telephone sets used with COM KEY 2152.

TELEPHONE SETS

(a) *832BM Telephone Set (11-button):*

- Rotary dial

- 10-button key with HOLD button, 7 line pickup buttons, and 2 intercom buttons

- May be equipped with third IC path

- RECALL button simulates switchhook flash

- Built-in amplifier and loudspeaker

- Automatic button restoration returns depressed buttons to unoperated position when handset is placed on-hook

- Conferencing of CO lines

- Equipped with modular handset components.

(b) *832CM Telephone Set (13-button):*

Same as 832BM except as listed below:

- 3-button key with RECALL, privacy release (PRIV RLS), and night transfer (RING TR) buttons

- Factory-wired with privacy circuit; PRIV RLS button operational

- RING TR button not factory-connected.

(c) *832DM Telephone Set (11-button):*

Same as the 832BM except arranged for wall mounting. The line switch allows the handset to hang vertically to the left of the housing.

(d) *832EM Telephone Set (13-button):*

Same as the 832CM except arranged for wall mounting.

(e) *833BM Telephone Set (20-button):*

- Two 10-buttons keys with HOLD, 14 line pickup buttons, 3 intercom buttons, RECALL button, PRIV RLS, and RING TR buttons

- Privacy circuit factory-provided and PRIV RLS operational

- Equipped with modular handset components.

(f) *833CM Telephone Set (20-button):*

Same features as 833BM except as below:

- Privacy circuit must be provided and connected in the field

TABLE A

KEY TELEPHONE UNITS

KTU	FUNCTION	QUANTITY	SD/CD
400D or 400G	CO/PBX pickup, hold, release, and related services.	1 per CO/PBX line	69513-01 69651-01
415A	Automatic private line circuit.	1 per private line	69559-01
424C	Dial intercom 19-code selector circuit; basic selector required in all dial intercom systems.	1 per intercom system	69567-01
440A or 478B	TOUCH-TONE® adapter circuit; required when TOUCH-TONE dialing is used in intercom.	1 per intercom system	69906-01 69931-01
444A	Selector extender circuit; required in addition to 424C KTU for dial codes 1 to 39.	1 per intercom system up to 34 stations; 2 per intercom with 35 to 52 stations	69636-01
451A/B	Music-on-hold circuit; used with externally mounted 33A voice coupler and customer-provided music source.	1 per 7 CO/PBX lines	69652-01
452A	Power failure transfer; transfers CO ringing to external, line-driven ringers; 7 circuits per unit.	1 per 7 CO/PBX lines	69652-01
453B	Lamp driver; supplements lamp driving capacity of 400D KTUs; operates up to 26 lamps; 7 circuits per unit.	1 per 7 lines in excess of 26 lamps per line	69653-01
454B	3-path intercom access; provides stations with talk battery, and access to selector.	1 per 3-path intercom system	69653-01
455A	Tone-ringing signal generator; supplies CO/PBX incoming line tone ringing.	1 per installation	69652-01
457C	Paging amplifier; drives up to seven 45-ohm paging loudspeakers.	1 per paging zone (max. 3)	69652-01
460B	2-path intercom access; provides stations with talk battery and access to selector.	1 per 2-path intercom system	69652-01
468A	Voice and tone alerting on intercom; supplies ringing tone to calling party, tone alerting and voice signaling to called party, input to paging amplifier; also supplies do-not-disturb tone.	1 per installation	69652-01
471A	Battery Reversal Toll Restriction.	1 per line to be restricted	69921-01
473A	Voice operated switch (VOX) for HFAI.	1 per intercom system equipped with HFAI	69930-01
474A	DSS diode matrix and preempt tone generator; allows attendant to preempt an HFAI call with a dedicated link call.	1 per 18 stations	69930-01
481A	Automatic signaling intercom; provides for direct intercom between two stations.	1 per pair of stations connected*	69930-01

* Can also be used between one station and a group of stations.

A. 702A PANEL

J1A	J2A	J3A	J4A	J5A	J6A	J7A	J8A	J9A	J10A	J11A	J12A	J13A	J14A	
400D OR 400G #1	400D OR 400G #3	400D OR 400G #5	400D OR 400G #7	452A	455A	OPT #1								F U S E
							474A	473A	444A	440A OR 478B	424C	460B OR 454B		B O A R D
400D OR 400G #2	400D OR 400G #4	400D OR 400G #6	451A	453B	46BA	OPT #2								
J1B	J2B	J3B	J4B	J5B	J6B	J7B	J8B	J9B	J10B	J11B	J12B	J13B	J14B	

B. 703A PANEL

J1A	J2A	J3A	J4A	J5A	J6A	J7A	J8A	J9A	J10A	J11A	J12A	J13A	J14A
400D OR 400G #8	400D OR 400G #10	400D OR 400G #12	400D OR 400G #14	452A	400D OR 400G #15	400D OR 400G #17	400D OR 400G #19	400D OR 400G #21	452A	OPT #3			F U S E
											474A	444A	B O A R D
400D OR 400G #9	400D OR 400G #11	400D OR 400G #13	451A	453B	400D OR 400G #16	400D OR 400G #18	400D OR 400G #20	451A	OPT #4	OPT #5			
J1B	J2B	J3B	J4B	J5B	J6B	J7B	J8B	J9B	J10B	J11B	J12B	J13B	J14B

400D/400G – CO/PBX LINE	454B – 3 PATH INTERCOM ACCESS
424C – INTERCOM 19-CODE SELECTOR	455A – TONE RINGING GENERATOR
440A/478B – TOUCH-TONE ADAPTER	457C – PAGING AMPLIFIER
444A – SELECTOR EXTENDER	460B – 2 PATH INTERCOM ACCESS
451A/B – MUSIC ON HOLD	468A – VOICE AND TONE ACCESS (WITH DND TONE)
452A – POWER FAILURE TRANSFER	
453B – LAMP DRIVER	473A – VOICE OPERATED SWITCH (HFAI)
	474A – DSS DIODE MATRIX AND PRE-EMPT TONE GENERATOR
OPTION SLOTS – 457C, 481A	481A – AUTOMATIC SIGNALING INTERCOM

Fig. 9—Jack and KTU Assignments

TABLE B

**COLOR CODES FOR FACEPLATES,
TELEPHONE SETS, AND CONSOLES**

CODE	COLOR
−100	Avocado
−108	Teak (wood grained)
−109	Walnut (wood grained)
−111	Gold
−112	Orange
−113	Brown
−114	Red
−115	Blue
−118	Black

- RING TR button factory-provided but not connected

- No provision for PRIV RLS.

(g) *833DM Telephone Set (20-button):*

   Same as the 833BM except arranged for wall mounting.

(h) *833EM Telephone Set (20-button):*

   Same as the 833CM except arranged for wall mounting.

TABLE C

TELEPHONE SET FEATURES

FEATURES	METHOD OF PROVIDING	11-BUTTON 832BM 2832BM 832DM 2832DM	13-BUTTON 832CM 2832CM 832EM 2832EM	20-BUTTON TEL SETS 833BM 2833BM 833DM 2833DM	20-BUTTON TEL SETS 833CM 2833CM 833EM 2833EM
RECALL	Factory Provided— Factory Connected	●	●	●	●
PRIVACY CIRCUIT	Factory Provided— Factory Connected		(Note 1) ●	●	
PRIVACY CIRCUIT	Field Provided Field Connected				(Note 2) ●
PRIVACY RELEASE	Factory Provided— Factory Connected		●	●	
RING TRANSFER	Factory Provided		●	●	
RING TRANSFER	Field Connected		(Note 3) ●		(Note 3) ●

Note 1: Must be disabled when used as an answering position in system without privacy.

Note 2: When used as answering position in systems with privacy.

Note 3: Must be connected at all answering positions.

BSP 518-450-110-i01_1976-12-17.jpg   Scanned by Frank Harrell, (Cowboy Frank) Castle Rock, Colorado   Oct 16, 2012 20:40:30

A. 832BM TELEPHONE SET

B. 2832CM TELEPHONE SET

C. 2833CM TELEPHONE SET

D. 832EM TELEPHONE SET

Fig. 10—Typical Telephone Sets Used With COM KEY 2152

(i) *2832BM Telephone Set (11-button):*

Same as 832BM except equipped with a TOUCH-TONE dial.

(j) *2832CM Telephone Set (13-button):*

Same as 832CM except equipped with a TOUCH-TONE dial.

(k) *2832DM Telephone Set (11-button):*

Same as 2832BM except arranged for wall mounting.

(l) *2832EM Telephone Set (13-button):*

Same as 2832CM except arranged for wall mounting.

(m) *2833BM Telephone Set (20-button):*

Same as 833BM except equipped with a TOUCH-TONE dial.

(n) *2833CM Telephone Set (20-button):*

Same as 833CM except equipped with a TOUCH-TONE dial.

(o) *2833DM Telephone Set (20-button):*

Same as 2833BM except arranged for wall mounting.

(p) *2833EM Telephone Set (20-button):*

Same as 2833CM except arranged for wall mounting.

(q) *575AM Telephone Set (6-button):*

- For use at stations which are to access intercom lines only

- Can be wired for 2- or 3-path intercom.

(r) *2575AM Telephone Set (6-button):*

- Same as 575AM except equipped with a TOUCH-TONE dial.

TELEPHONE CONSOLES

(a) *128A3T or 128A3R Console* (Fig. 11):

- TOUCH-TONE (T suffix) or rotary (R suffix) dial.

- 3 intercom buttons, RECALL button, PRIV RLS button, and ring transfer button.

- 2 flexible buttons.

- Release button to release any line or intercom button to unoperated position.

- Handset cradle is not a functional switchhook.

- 20-type PBX console housing.

- Headset jack with amplifier.

- Built-in amplifier and loudspeaker.

- Handset jacks supplied with G15 handset.

- 14-line capacity (includes 2 flexible lines).

- Tandem trunk key field.

(b) *128A4T or 128A4R Console:*

Same as 128A3-type except

- 3-ring transfer buttons

- 21-line capacity (includes 2 flexible lines)

- No tandem trunk field.

(c) *138A4T or 138A4R Console* (Fig. 11):

- Similar to 128A4-type with addition of upper key field

- Separate tandem trunking key field with one button for each of the 21 lines and for each of the 3 intercom paths

- Used to couple any two pickups together without restricting use of associated 21-line telephone on other calls

- 30-type PBX console housing

- Supervision provided on CO/intercom conferences.

Note: No supervision or amplification provided on CO-to-CO calls.

SELECTOR CONSOLES

(a) *6C1 Selector Console (DSS With SB)* (Fig. 13):

- 17 station selection.

- DSS button field with SB lamps incorporated in DSS buttons.

- Dedicated intercom link allows signaling of other stations regardless of status of intercom selector circuit and common intercom paths.

- Automatic hold feature places incoming line on hold when attendant signals called station.
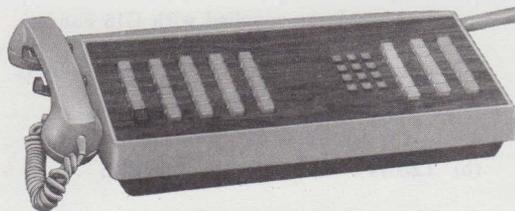
A. 128A3 TYPE CONSOLE
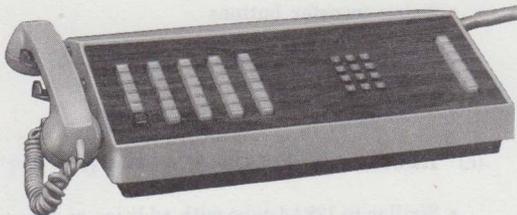
B. 128A4 TYPE CONSOLE
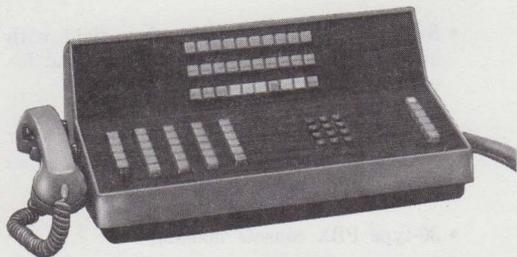
C. 138A4 TYPE CONSOLE

Fig. 11—128A3-, 128A4-, and 138A4-Type Consoles

- Does not tie up intercom selector circuit used by other stations.

- When station signaled from this console is receiving signaling from some other source, that source will be preempted by console signal.

- Chime signals sent to each preempted station (if system has HFAI).

- Same size housing as 830-type telephones.

- Built-in chime tone generator and amplifier.

- DND lamp signal superimposed on station busy lamps.

- One each paging, restore, and reenter buttons.

(b) **7C1 Selector Console (DSS With SB)** (Fig. 13):

- Similar to 6C1

- 34 station selection

- 3 paging buttons.

(c) **128A6Y Console (DSS With SB)** (Fig. 14):

- Features similar to 6C1 and 7C1

- 52 station selection

- 20-type PBX console housing.

(d) **6B1 Console (MW With SB)** (Fig. 12):

- 18 station selection

- MW button field with SB lamps incorporated in MW buttons

- Same size housing as 830-series telephones.

(e) **7B1 Console (MW With SB)** (Fig. 12):

- Similar to 6B1

- 34 station selection.

(f) **138A6Y Console (DSS and MW With SB)** (Fig. 14):

- Similar to 128A6Y with addition of upper key field

- Separate MW field without SB lamps

- 30-type PBX console.

5. **OPTIONAL APPARATUS**

5.01 **683A Transmitter:**

- Provides microphone and other circuitry required for hands free answering on intercom (HFAI) and the do not disturb (DND) function
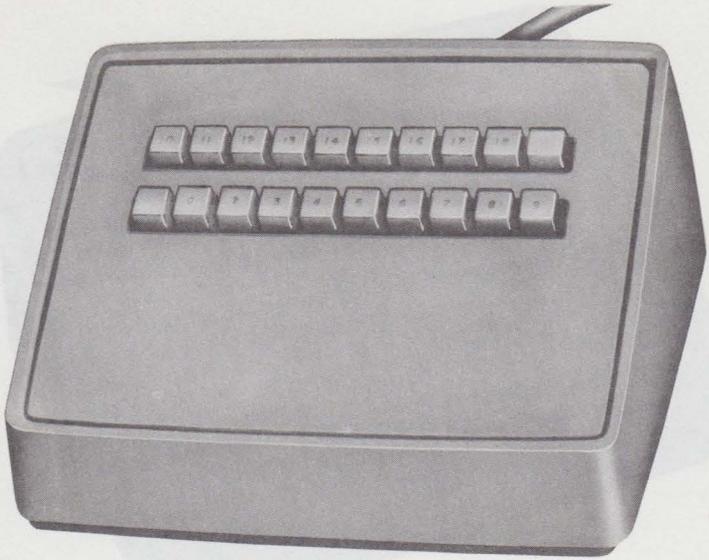
A.6BI CONSOLE

B.7BI CONSOLE

Fig. 12—6B1 and 7B1 Consoles

A. 6C1 CONSOLE

B. 7C1 CONSOLE

Fig. 13—6C1 and 7C1 Consoles
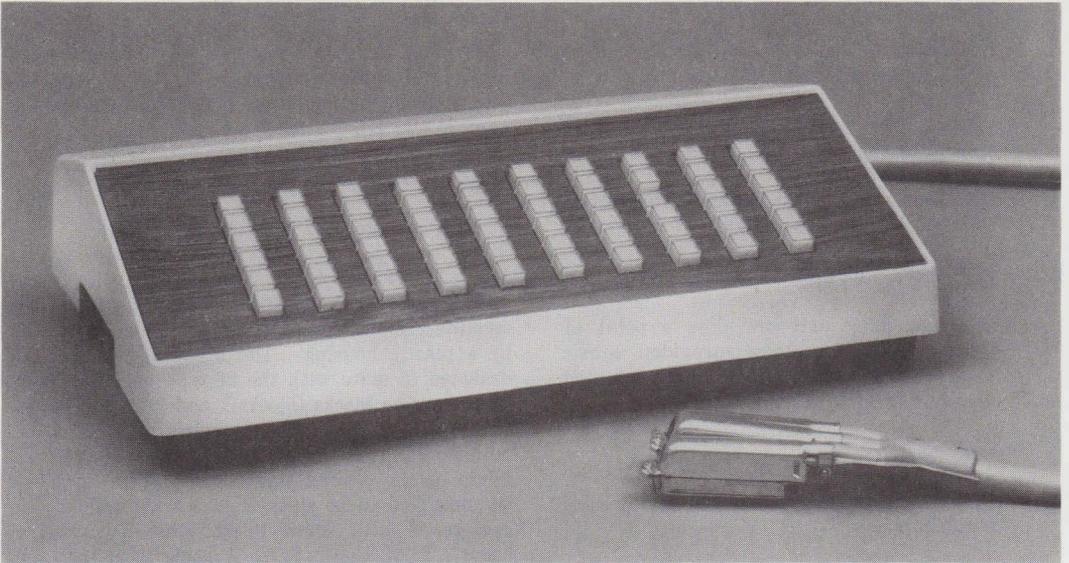
A. 128A6Y SELECTOR CONSOLE
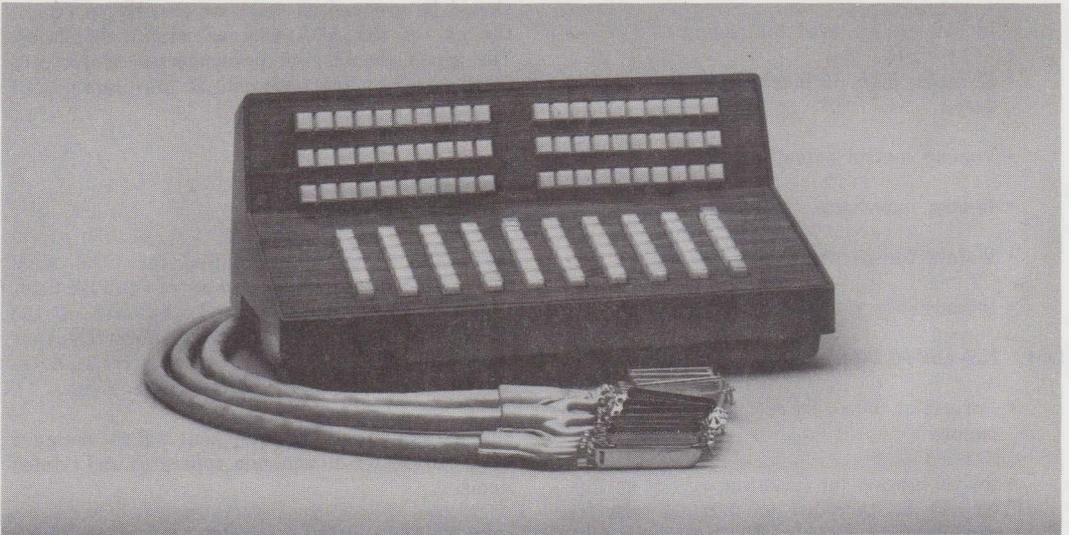
B. 138A6Y SELECTOR CONSOLE

Fig. 14—128A6Y and 138A6Y Consoles

- On-off switches for microphone and DND

- LED indicator that turns on when microphone amplifier is turned on by incoming call

- Freestanding, pedestal-type case similar to transmitter of 4A speakerphone

- Connects to terminals inside associated station telephone set by way of D8U-87 cord.

5.02   *33A Voice Coupler:*

- Interconnecting unit providing a point of connection for customer-provided music source used for music-on-hold and background music on paging system

- Wall mounted

- Potentiometer for adjusting background music level

- Two fuses for protection against hazardous voltages from music source.

5.03   *K8 Loudspeaker:*

- Indoor speaker used for paging

- 11 inches high, 10 inches wide, 6-1/2 inches deep

- Volume control potentiometer

- 45-ohm impedance

- Walnut finish cabinet

- Intended for wall mounting.

5.04   *KS-16846,L2 Loudspeaker:*

- For use at indoor or outdoor locations with paging

- Swivel bracket for mounting on flat surface or can be threaded on 1/2-inch pipe or conduit

- Pigtail leads provided for connections.

5.05   *20A Apparatus Unit:*

- Provides for connecting a customer-owned and maintained (COAM) or a separate telephone company paging system to the COM KEY 2152

- Mounted external to the system

- Potentiometer for volume control.

5.06   *260A Adapter:*   This adapter is a vertical jumper clip which consists of a series of 50 terminals connected in a vertical column and covered by a plastic housing.   The array of terminals is designed to mate with the 66-type terminals used on the option blocks (blocks 1 and 2) of the 100A1, 100B1, 101A1, and 101B1 connecting unit.   The adapter strip can be cut with standard diagonal pliers to any desired length.   If a given line is to be multipled to 10 stations, the system should be configured with those 10 stations in numerical order.   Then, the T, R, L, A leads from that line should be connected to the T, R, L, A leads of each of the 10 stations involved in the multipling. If the stations involved in a large line multiple cannot be arranged in numerical order, then they should be grouped as much as possible to permit the use of the 260A adapter within the group. The group should then be connected by jumpers from corresponding terminals at the beginning of one group to the other.

6.   ORDERING GUIDE

6.01   The components required for COM KEY 2152 depend on the number of CO/PBX lines, the number of stations and the size of the stations—that is, whether 10- or 20-button telephone sets.   Table D can be used as a general guide in determining the major components required.

6.02   Table E lists the equipment and the assigned USOC for all common apparatus and related items.

6.03   Table F lists the equipment that will be used at the station locations, such as telephone sets and consoles, and their related items.

TABLE D

**EXAMPLE OF SYSTEM COMPONENTS AS RELATED
TO SIZE OF SYSTEM (SEE NOTE)**

SYSTEM COMPONENTS	SYSTEM SIZE LINES/STATIONS							
	7/18	7/28	7/34	7/52	21/28	21/34	21/52	21/52
121B Apparatus Box or 34B Cabinet	1	1	1	2	1	1	2	2
154A Cover	1	1	1	2	1	1	2	2
Connecting Unit	100A1 or 101A1	101A1	100A1	100A1 or 100B1	101A1	100A1	100A1 and 100B1	101A1 and 101B1
Panel	702A	702A	702A	702A and 703A	702A and 703A	702A and 703A	702A and 703A	702A and 703A
Power Panel	2A	2B	2B	2C	2C	2B	2C	2C and 2D

Note: Exact system components required will be determined by the USOC codes listed on the service order.

TABLE E

ORDERING GUIDE FOR COMMON EQUIPMENT AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
K21	Basic Panel	Consists of one 702A panel. Also order 1 each 468A KTU (Voice and Tone Signaling) and 424C KTU (Intercom Selector)
	Box, Apparatus, 121B	Order 1 for each 100- or 101-type connecting unit to be wall or relay rack mounted. Also order one 197A backboard.
	Cabinet, 34B	Order 1 for each 100- or 101-type connecting unit to be floor mounted.
	Cover, 154A	Order 1 if required for each 121B apparatus box or 34B cabinet.
	Kit of Parts, D-180675	Order 1 for each 121B apparatus box to be relay rack mounted.
	Kit of Parts, D-180700	Casters for 34B cabinet. Order as required.
K2X	Panel, 703A	Order 1 per system to add 8 to 21 CO/PBX lines or when more than 34 stations are required.
K1Q	Unit, Connecting, 100A1	Order 1 for up to 21 CO/PBX lines and 34 station codes. Provides terminations for up to twenty-eight 7-line and six 14-line sets. Order one 444A KTU per connecting unit.
K1S	Unit, Connecting, 100B1	Order 1 to add up to eighteen 14-line sets to above. Order one 444A KTU per connecting unit.
K1U	Unit, Connecting, 101A1	Order 1 for up to 21 CO/PBX lines and 28 station codes. Terminations for up to twenty-eight 14-line sets. Order one 444A KTU per connecting unit.
K1V	Unit, Connecting, 101B1	Order 1 to add up to twenty-four 14-line sets to above. Order one 444A KTU per connecting unit.
K1A	Panel, Power, 2A	Order 1 to power 702A panel and 100A1 connecting unit. Capacity of 7 lines and eighteen 7-line sets.
K1B	Panel, Power, 2B	Order 1 to power 702A panel and 100A1 connecting unit. Capacity of 7 lines and up to twenty-eight 7-line sets and six 14-line sets.

TABLE E (Cont)

ORDERING GUIDE FOR COMMON EQUIPMENT AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
K1C	Panel, Power, 2B	Order 1 to power 702A and 703A panels and 100A1 connecting unit. Capacity of 21 lines; up to twenty-eight 7-line and six 14-line sets.
K1D	Panel, Power, 2C	Order 1 to power 702A and 703A panels and 100A1 and 100B1 connecting units. Capacity of 21 lines; up to twenty-eight 7-line and twenty-four 14-line sets.
K1E	Panel, Power, 2B	Order 1 to power 702A panel and 101A1 connecting unit. Capacity of 7 lines; up to twenty-eight 14-line sets.
K1F	Panel, Power, 2C	Order 1 to power 702A and 703A panels and either 100A1 and 100B1 or 101A1 and 101B1 connecting units. Capacity of 7 lines and either twenty-eight 7-line sets and twenty-four 14-line sets or fifty-two 14-line sets.
K1G	Panel, Power, 2C	Order 1 to power 702A and 703A panels and 101A1 connecting unit. Capacity of 21 lines; up to twenty-eight 14-line sets.
K1H	Panel, Power, 2D	Order 1 each to power 702A and 703A panels and 101A1 and 101B1 connecting units. Capacity of 21 lines; up to fifty-two 14-line sets. Used in conjunction with K1G.
	Unit, Key, 468A	Voice and Tone Signaling Circuit — order 1 per system.
	Unit, Key, 424C	Intercom Selector Circuit — order 1 per system.
	Unit, Key, 444A	Selector Extender Circuit — order 1 for each 100- or 101-type connecting unit.
K2H	Unit, Key, 454B	Order 1 per system equipped with 3-path intercom — intercom access circuit.
K2M	Unit, Key, 460B	Order 1 per system equipped with 2-path intercom — intercom access circuit.
K2N	Unit, Key, 457C	Order 1 per paging amplifier required; drives up to 7 paging loudspeakers.

TABLE E (Cont)

ORDERING GUIDE FOR COMMON EQUIPMENT AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
K2U	Unit, Key, 440A or 478B	Order 1 per system equipped with TOUCH-TONE dialing on intercom.
K3T	Unit, Key, 455A	Tone Ringing Generator — order 1 per system.
K5Z	Unit, Key, 471A	Order 1 per line to be toll restricted.
K20	Unit, Key, 481A	Order 1 per automatic signaling intercom. Maximum of 2 per system.
K22	Unit, Key, 400-type	Order 1 for each CO/PBX line.
K23	Unit, Key, 451B	Order 1 for each 7 CO/PBX lines equipped with music-on-hold.
K25	Unit, Key, 452A	Order 1 for each 7 CO/PBX lines equipped with power failure ringing.
K26	Unit, Key, 453B	Lamp Driver — order 1 for each 7 lines having more than 26 lamps per line.
K27	Unit, Key, 473A	Order 1 per system equipped with HFAI-voice operated switch.
K28	Unit, Key, 474A	Order 1 for each 18 stations when system has HFAI and DSS console/ DSS diode matrix and preempt tone generator.
K62		Common equipment for restricting first 8 lines — consists of one 620A modular panel, one 19B2 power unit, and one 92A connecting block.
K63		Common equipment for restricting 4 additional lines — consists of one 642A modular panel and one 92A connecting block.
FTP	Coupler, Voice, 33A	Order 1 per system equipped with music-on-hold and/or paging background music.
KPA	Unit, Apparatus, 20A	Order 1 per system when connecting customer-provided paging system to 21A.

TABLE F

ORDERING GUIDE FOR TELEPHONE SETS, CONSOLES, AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
K51†K	Set, Telephone, 832BM-50	Order as required — rotary desk-type tel set. Also order 1 Plate, Face, 832B-* and 1 Cable, Connector, A25B per tel set.
K53†K	Set, Telephone, 832CM-50	Order as required — rotary desk-type tel set. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A25B per tel set. Equipped with privacy/privacy release.
K51†B	Set, Telephone, 832DM-50	Order as required — rotary wall-type tel set. Also order 1 Plate, Face, 832B-* and 1 Cable, Connector, A25B per tel set.
K53†B	Set, Telephone, 832EM-50	Order as required — rotary wall-type tel set. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A25B per tel set. Equipped with privacy/privacy release.
K54†K	Set, Telephone, 833BM-50	Order as required — rotary desk-type tel set. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A50B per tel set. Equipped with privacy/privacy release.
K52†K	Set, Telephone, 833CM-50	Order as required — rotary desk-type tel set. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A50B per tel set.
K54†B	Set, Telephone, 833DM-50	Order as required — rotary wall-type tel set. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A50B per tel set. Equipped with privacy/privacy release.
K52†B	Set, Telephone, 833EM-50	Order as required — rotary wall-type tel set. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A50B per tel set.
K51†6	Set, Telephone, 2832BM-50	Order as required — TOUCH-TONE desk-type tel set. Also order 1 Plate, Face, 2832B-* and 1 Cable, Connector, A25B per tel set.
K53†6	Set, Telephone, 2832CM-50	Order as required — TOUCH-TONE desk-type tel set. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A25B per tel set. Equipped with privacy/privacy release.
K51†4	Set, Telephone, 2832DM-50	Order as required — TOUCH-TONE wall-type tel set. Also order 1 Plate, Face, 2832B-* and 1 Cable, Connector, A25B per tel set.
K53†4	Set, Telephone, 2832EM-50	Order as required — TOUCH-TONE wall-type tel set. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A25B per tel set. Equipped with privacy/privacy release.

TABLE F (Cont)

ORDERING GUIDE FOR TELEPHONE SETS, CONSOLES, AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
K54†6	Set, Telephone, 2833BM-50	Order as required — TOUCH-TONE desk-type tel set. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A50B per tel set. Equipped with privacy/privacy release.
K52†6	Set, Telephone, 2833CM-50	Order as required — TOUCH-TONE desk-type tel set. Also order 1 Plate, Face, 2833A* and 1 Cable, Connector, A50B per tel set.
K54†4	Set, Telephone, 2833DM-50	Order as required — TOUCH-TONE wall-type tel set. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A50B per tel set. Equipped with privacy/privacy release.
K52†4	Set, Telephone, 2833EM-50	Order as required — TOUCH-TONE wall-type tel set. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A50B per tel set.
K56†K	Set, Telephone, 575AM-50	Order as required — rotary desk-type tel set for intercom-only station. Also order 1 Cable, Connector, A25B per tel set.
K56†6	Set, Telephone, 2575AM-50	Order as required — TOUCH-TONE desk-type tel set for intercom-only station. Also order 1 Cable, Connector, A25B per tel set.
K57†K	Set, Telephone, 832CM-50	Order 1 for each rotary dial, 7-line answering position. Also order 1 Plate, Face, 833A-* and 1 Cable, Connector, A25B per tel set.
K57†6	Set, Telephone, 2832CM-50	Order 1 for each TOUCH-TONE, 7-line answering position. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A25B per tel set.
K58†K (Note)	Set, Telephone, 833CM-50	Order 1 for each rotary dial, 14-line answering position. Also order 1 Plate, Face, 833-* and 1 Cable, Connector, A50B per tel set.
K58†6 (Note)	Set, Telephone, 2833CM-50	Order 1 for each TOUCH-TONE, 14-line answering position. Also order 1 Plate, Face, 2833A-* and 1 Cable, Connector, A50B per tel set.
K5H	Console, Selector, 6B1-50	18-station MW console with station busy lamps. Also order 1 Plate, Face, 6A2-* and 1 Cable, Connector, A25B per console.

TABLE F (Cont)

ORDERING GUIDE FOR TELEPHONE SETS, CONSOLES, AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
K5L	Console, Selector, 6C1-50	17-station DSS console with dedicated attendant intercom link and station busy lamps. Also order 1 Plate, Face, 6A2-* and 1 Cable, Connector, A50B per console.
K5M	Console, Selector, 7B1-50	34-station MW console with station busy lamps. Also order 1 Plate, Face, 7A2-* and 1 Cable, Connector, A50B per console.
K5N	Console, Selector, 7C1-50	34-station DSS console with dedicated attendant intercom link and station busy lamps. Also order 1 Plate, Face, 7A2-* and 1 Cable, Connector, A100C per console.
K50	Console, Telephone, 128A6Y-50	52-station DSS/SB console with dedicated attendant intercom link. Also order 1 Plate, Face, 128C-*; 1 Cable, Connector, A75A; and 1 Cable, Connector, A100C per console.
K5Q	Console, Telephone, 138A6Y-50	52-station DSS/SB with dedicated attendant intercom link and MW. Also order 1 Plate, Face, 238D-*; 1 Plate, Face, 238E-*; 2 Cable, Connector, A75A; and 1 Cable, Connector, A100C per console.
K9G†K	Console, Telephone, 128A3R-50	Rotary dial, 14-line attendant console with tandem trunking. Also order 1 Plate, Face, 128E-* and 1 Cable, Connector, A50B per console.
K9G†6	Console, Telephone, 128A3T-50	TOUCH-TONE, 14-line attendant console with tandem trunking. Also order 1 Plate, Face, 128D-* and 1 Cable, Connector, A50B per console.
K5F†K	Console, Telephone, 128A4R-50	Rotary dial, 21-line attendant console. Also order 1 Plate, Face, 128B-* and 1 Cable, Connector, A75A per console.
K5F†6	Console, Telephone, 128A4T-50	TOUCH-TONE, 21-line attendant console. Also order 1 Plate, Face, 128A-* and 1 Cable, Connector, A75A per console.
K5G†K	Console, Telephone, 138A4R-50	Rotary dial, 21-line attendant console with tandem trunking. Also order 1 Plate, Face, 238B-*; 1 Plate, Face, 238C-*; and 1 Cable, Connector, A75A per console.
K5G†6	Console, Telephone, 138A4T-50	TOUCH-TONE, 21-line attendant console with tandem trunking. Also order 1 Plate, Face, 238A-*; 1 Plate, Face, 238C-*; and 1 Cable, Connector, A75A per console.

TABLE F (Cont)

ORDERING GUIDE FOR TELEPHONE SETS, CONSOLES, AND ASSOCIATED ITEMS

USO CODE	EQUIPMENT CODE	REMARKS
KMC	Kit of Parts, D-180656	Order 1 for each desk-type tel set to be wall mounted.
K29	Diode, 446F	Order 1 for each rotary tel set to be restricted from dialing.
K5U	Key, 6041G-50	Order 1 per location equipped with flexible night transfer.
	Ringer, E1C	Order 1 for each CO/PBX line to be equipped for power failure ringing.
K5Y	Loudspeaker, KS-16846, L2	Order 1 for each indoor or outdoor speaker location.
K5X	Loudspeaker, K8	Order 1 for each indoor speaker location.
K5S	Transmitter, 683A-50	Order 1 for each station including attendants to be equipped with HFAI. Also requires a 268A adapter when used with wall sets.
KAS	Unit, Apparatus, 22A-49	Order 1 for each location where signal devices external to the tel set are to be used. External signals and power supply must be separately ordered.
	Speakerphone 3B	Refer to Section 512-620-100 for ordering information.
	Speakerphone 4A	Refer to Section 512-700-100 for ordering information.
K5R	Block, Connecting, 66B3-50	Order as required for third answering position console capability.
KG5	Block, Connecting, 66B3-50	Order as required for third 52-station console capability.
K5V		Wiring modification for station line ringing.
K5W		Wiring modification for preset conferencing on intercom.

* Add color suffix from Table B.

† To be provided by Telephone Company Marketing.

Note: Order (1) D-180486 kit of parts for each tel set of this type when system is equipped with privacy.

7. BASIC FEATURES

Multiline Pickup

7.01 Each station will have either 7 or 14 buttons which may be used for line appearances. Button locations are given in Fig. 15 for telephone sets.

7.02 The station with 7 line buttons (832- or 2832-type) will have 5 buttons dedicated to common lines (square lines) and 2 buttons (7 and 8) called flexible buttons, which may be used for common lines, personal lines, private lines, or an automatic signaling intercom. Button 8 may also be used for a third intercom line, but only when all 832-type telephone sets in the system are so equipped. Buttons 9 and 10 of the 832- or 2832-type telephone set are dedicated to two common intercom paths, and the first button on the telephone set is the HOLD button. Some 832- or 2832-type sets are equipped with 13 buttons. Buttons 11, 12,

and 13 are dedicated to RECALL, PRIV RLS, and RING TR, respectively.

7.03 The stations with 14-line buttons (833- or 2833-type) will have 12 buttons (2 through 6 and 14 through 20) dedicated to common lines (square lines) and 2 buttons (7 and 13) called flexible lines. The flexible buttons may be used for common lines, personal lines, private lines, or an automatic signaling intercom. Button 7 can also be used as a multiple appearance of the third intercom path for conferencing purposes. Buttons 8 through 10 are dedicated to 3 common intercom paths. The first button is the HOLD button, and button 11 is dedicated to RECALL and button 12 to RING TRANSFER or PRIVACY RELEASE.

Hold and Illumination

7.04 COM KEY 2152 has the same CO/PBX HOLD operation and button illumination as a standard

(1) HOLD	(2) LINE 1	(3) LINE 2	(4) LINE 3	(5) LINE 4	(6) LINE 5	(7) FLEX 1	(8) FLEX 2	(9) IC 1	(10) IC 2

A. 832BM, DM, 2832BM, DM†

(11) RECALL	(12) PRIV RLS	(13) RING TR							

(1) HOLD	(2) LINE 1	(3) LINE 2	(4) LINE 3	(5) LINE 4	(6) LINE 5	(7) FLEX 1	(8) FLEX 2	(9) IC 1	(10) IC 2

B. 832CM, EM, 2832CM, EM

(11) RECALL	(12) *	(13) FLEX 2	(14) LINE 6	(15) LINE 7	(16) LINE 8	(17) LINE 9	(18) LINE 10	(19) LINE 11	(20) LINE 12

(1) HOLD	(2) LINE 1	(3) LINE 2	(4) LINE 3	(5) LINE 4	(6) LINE 5	(7) FLEX 1	(8) IC 1	(9) IC 2	(10) IC 3

C. 833BM, CM, DM, EM, 2833BM, CM, DM, EM TELEPHONE SET

* PRIVACY RELEASE (833BM, DM, 2833BM, DM) OR RING TRANSFER (833CM, EM, 2833CM, EM)
† THESE SETS ALSO EQUIPPED WITH SEPARATE RECALL BUTTON

NOTE:
NUMBERS IN PARENTHESIS INDICATE BUTTON NUMBER

Fig. 15—Button Locations and Designations, Telephone Sets

key telephone system, including wink hold. See 7.07 for intercom lamp signals.

Multipath Intercom

7.05 The intercom has either 2 or 3 paths. A path is selected by depressing one of the intercom buttons on the telephone set. There is no privacy on any path and any station may break into an existing conversation. Intercom is factory-wired and each intercom code is determined by the column on blocks 5 through 10 of the connecting units.

7.06 The intercom can individually signal up to 55 codes, 52 of which can be stations and 3 for paging or preset conferencing. The number of codes available for stations may vary; for instance, if 3 paging and 3 preset conferencing codes are both required, only 49 station codes are available. The system can also be equipped for configurations that permit 18 stations with one paging zone (424C selector only) or 34 stations with three paging zones (one 444A selector extender). If a third intercom link is installed, all telephone sets must be equipped with this feature.

7.07 The selector used to select and alert the called stations is shared by all intercom paths. The alerting signal at the called station is tone burst (500-Hz for approximately 1 second) followed by a voice signal from the calling station. The lamp signals on the intercom are as follows: When the selector has seized a path, the lamp associated with the path will flash on all telephone sets. No other station can seize the selector while the lamp is flashing. This shows the called party which path to answer. When the called party answers, the flashing intercom lamps change to steady. When an intercom path is idle, the associated lamp is off.

7.08 To place an intercom call:

(a) Select idle intercom and depress associated button. None of the intercom buttons can be flashing (only one selector is supplied for station-to-station intercom calls).

(b) Lift telephone handset.

(c) Listen for intercom dial tone.

(d) Dial selected station tone burst signals called station.

(e) Calling station makes announcement to called party. When called party answers by depressing flashing intercom button, the lamp associated with that button changes to steady.

7.09 Intercom is factory-wired and each intercom code is determined by the column on blocks 5 through 10 of the connecting units.

Tone and Voice Signaling

7.10 CO/PBX signaling is a distinctive warbling tone (900-1100 Hz) heard through a speaker in the telephone set. Voice signaling is used in conjunction with tone signaling (500 Hz—approximately 1 second) when calling a station on the intercom. When the attendant receives incoming CO/PBX tone signals and is simultaneously signaled on the intercom, the intercom signal is given preference (see Table G).

TABLE G

SIGNAL PRIORITIES IN STATION SPEAKERS

PRIORITY	TYPE CALL
First	Direct Station Selection (DSS)
Second	Automatic Signaling Intercom
Third	Dial Intercom
Fourth	CO Tone Ringing

Recall

7.11 Every telephone set used with COM KEY 2152, except intercom-only sets, is equipped with a RECALL button. The momentary operation of the RECALL button simulates the switchhook flash without restoring depressed line buttons to normal.

Multiline Conferencing

7.12 Two or more CO/PBX lines may be conferenced together by simultaneously depressing the line buttons of the lines to be conferenced. When

lines are conferenced using this manner of conferencing, distant stations may have trouble hearing each other and transmission is not guaranteed.

CO/PBX and the third intercom path can only be conferenced when the third intercom path appears on one of the flexible buttons or at an attendant's position with IC/CO conferencing. If the system is equipped with the third intercom path, it must appear at all stations.

7.13 All lines that are conferenced together may be put on hold simultaneously by depressing the HOLD button except when more than one station is off-hook on the same line.

Intercom lines cannot be placed on hold.

7.14 Conferencing is a mechanical function of the telephone set and requires no wiring.

7.15 To make a call during a conference:

(a) Depress HOLD button—all buttons restored.

(b) Select an idle line.

(c) Dial call.

(d) If it is desired to add this call to the conference, hold this CO/PBX line button down and depress the conference CO/PBX line buttons.

(e) To reenter conference again after call is completed, simultaneously depress conferenced line buttons again.

7.16 If it is desired to add another call to the conference, while holding the conferenced CO/PBX line buttons down, depress button of CO/PBX line to be added. To prevent dropping one of the participants when setting up a conference, ensure that the conference line buttons are held down when adding another line.

Automatic Button Restoration (ABR)

7.17 Automatic button restoration is a feature on all 832-, 833-, 2832- and 2833-type telephone sets used with COM KEY 2152. ABR is not available on the 128A3, 128A4 or 138A4 consoles, or intercom-only sets. When the handset is placed on the cradle, all depressed buttons return to the unoperated position. This prevents inadvertent intrusion on calls in progress and insures that multiple buttons will not be left depressed on a set causing an undesired conference from the idle set.

7.18 Automatic button restoration is a mechanical function of the telephone set; no wiring is required and field adjustment of the mechanism is not to be done.

The CO/PBX may be disabled if multiple CO/PBX buttons are depressed at an idle station.

Ring Transfer

7.19 Ring transfer permits switching the incoming CO/PBX signaling from the attendant station(s) to an alternate location(s). If an 832-, 833-, 2832-, or 2833-type telephone set or a 128A3-type console is used at the attendant position, one button is provided for ring transfer. If a 128A4- or 138A4-type console is used, up to three choices of ring transfer can be supplied.

7.20 To effect ring transfer, the ring transfer button on the attendant telephone set or console must be depressed. To transfer ringing back to the attendant station, the ring transfer button is depressed again, allowing it to return to normal. During the time the button is depressed, the button will be illuminated. More than one station can receive transferred calls as long as the total does not exceed ten.

7.21 Flexible ring transfer is also optionally available and is described under OPTIONAL FEATURES (8.56 and 8.57).

8. OPTIONAL FEATURES

Privacy

8.01 Privacy prevents a station from bridging into a CO/PBX call in progress. If a system has privacy, all stations must be equipped. Privacy is a station feature and each station that is to be excluded (locked out) must be equipped with a privacy circuit board.

8.02 The 832/2832CM, 832/2832EM, 833/2833BM, and 833/2833DM telephone sets are wired at the factory with the privacy circuit operational.

8.03 The privacy circuit operates only when the telephone set is off-hook. The circuit monitors the "A" lead to determine the status of the line. Ground (or positive potential) on the "A" lead indicates the line is busy, operates the privacy circuit, and the station attempting to bridge is excluded. A negative potential on the "A" lead causes the privacy circuit not to operate and the set is not excluded. There is no privacy on the intercom paths.

Privacy Release

8.04 Privacy release, when operated at a station already off-hook, releases the privacy circuit in a privacy equipped (locked-out) telephone, permitting the locked-out telephone to bridge into a call on a CO/PBX line.

8.05 The 832/2832CM, 832/2832EM, 833/2833BM, and 833/2833DM telephone sets are factory-equipped with a PRIV RLS button.

8.06 When a station is off-hook with CO/PBX line button depressed, any other station equipped with a privacy circuit will be locked out from that CO/PBX line. To permit a second station that is privacy-equipped to bridge into a call:

(a) Depress (and hold down) the PRIV RLS button at first station.

(b) Observe that line lamp changes from steady to wink (indicating the line has gone on hold). The privacy-equipped station may now bridge into the call.

(c) Observe the line lamp changes from wink to steady (indicating station has entered the call).

(d) Release the PRIV RLS button at the first station.

8.07 To allow a third privacy-equipped station to bridge into the call, both stations must depress their PRIV RLS buttons simultaneously. The line lamp will change from steady to wink. As the third station bridges into the call, the line lamp will become steady. The PRIV RLS buttons can then be released, and all three stations are bridged.

TOUCH-TONE® Dialing

8.08 If TOUCH-TONE dial sets are used with the 21A System, a 440A or 478B KTU (TOUCH-TONE adapter) must be supplied. Install the KTU in J12A and J12B of the 702A panel.

> *Note:* When supplying TOUCH-TONE adapter, the RS1-CG1 strap must be removed from between 36A and 37A on block 2 of the 100A1 or 101A1 connecting unit.

CO/PBX-Intercom Conferencing

8.09 CO/PBX-intercom conferencing is a feature of the telephone sets and answering positions used in the system. Since there is no amplification involved, this type of conferencing is limited. Distant parties on the CO/PBX lines may have difficulty hearing each other.

8.10 Conferencing is accomplished by simultaneously depressing the CO/PBX line button(s) and the third intercom path button.

CO/PBX lines and the third intercom path can only be conferenced when the third intercom path appears on one of the flexible buttons.

Personal Lines

8.11 This feature permits a personalized arrangement of nonsquare CO/PBX lines to flexible buttons. Refer to 2.04 for a full explanation of feature.

8.12 The T, R, L, and A leads of the 7th and 8th pickup buttons of the 10-button set, or

the 7th and 13th buttons of the 20-button set are terminated on block 1 of the 100A1, 100B1, 101A1, or 101B1 connecting unit, depending on the station code assigned. As factory-wired, there will be nothing wired to these buttons and they may be wired as required to pick up a personal line, square line, automatic signaling intercom, private line, or third intercom path.

8.13 If a personal CO/PBX line is to appear on one of the flexible buttons, the T, R, L, and A leads of the line appearance on block 1 of the connecting units must be cross-connected to the proper button(s) and code(s). Personal lines can appear on more than one telephone set. Where more than two stations are to be multipled, the 260A adapter may be used. The adapter can be cut to provide as many multiples as required.

8.14 At installations having only a 702A panel (7-line capacity), lines 6 and 7 may be used as personal lines. At installations also equipped with a 703A panel, lines 8 through 21 can be used as personal lines if the system is equipped with 10-button sets **only.** If **any** 20-button sets are used, only lines 13 through 21 can be personal lines because lines 1 through 12 appear on all 20-button sets as square lines.

Station Line Ringing

8.15 CO/PBX lines can be arranged to ring at one to four stations (maximum of two in addition to the attendant) by strapping the RC lead from the CO/PBX line to the station CO lead on block 2 of the 100A1, 100B1, 101A1 and/or 101B1 connecting unit. If two lines are to ring at a station other than the attendant, neither of the two lines can ring *alone* at another station, that is, both lines must also ring at the second station. Also, if it is desired that one of the two lines not ring at the attendant station, neither of the lines can ring at the attendant station; ie, both common audible diodes would have to be removed.

An example would be where a personal line is to ring at station codes 7 and 8 but not at the attendant. In this case, the RC lead of the CO/PBX line must be strapped to the CO lead of station codes 7 and 8 and the common audible diode for the CO/PBX line removed on block 4 of the 100A1 or 101A1 connecting unit.

8.16 If two personal lines are to ring at station codes 7 and 8 but not at the attendant, the above procedure must be completed for both lines.

Note: Both lines must ring at the attendant or neither line can ring at the attendant. Both diodes must be removed or both must be left in place.

Common Audible Ringing

8.17 The 21A system is factory-wired so that intercom code 0 receives tone ringing on all CO/PBX calls. The attendant answers all incoming calls and either takes a message or forwards the call to the desired party using the intercom or, if so equipped, on the console dedicated link.

8.18 Common audible is derived through diodes located on block 4 of the 100A1 or 101A1 connecting unit. There is one diode per CO/PBX line. To remove a CO/PBX line from the common audible group, remove the corresponding diode on block 4.

8.19 Other stations besides or rather than code 0 may be arranged for common audible ringing by running a strap from the common audible terminals (22F or 22G on block 2) to the station CO lead. Connections in the 101A1 or 101B1 connecting unit are made in a similar manner except the station code terminals appear in a slightly different manner. The maximum number of stations that can be signaled at the same time is 10. If code 0 is not to receive CO/PBX calls, remove the factory-wired strap. The limitations outlined under **Station Line Ringing** must also be observed.

Power Failure Transfer

8.20 This feature provides an audible indication of incoming CO/PBX calls any time commercial power is lost to the 21A System. The tip and ring of all CO/PBX lines are wired through normally made contacts of one of the 452A KTUs. The relays in the KTU are operated as long as power is being supplied by the power panel. If this power is lost, the relays are released and the CO/PBX line is cut through to an external ringer at the desired station(s). The ringer(s) (EIC) are not part of the station sets and must be externally provided.

8.21 To provide power failure transfer, a 452A KTU (one per 7 CO/PBX lines) is required. For lines 1 through 7, install in J5A of the 702A panel; for lines 8 through 14, in J5A of the 703A panel; and for lines 15 through 21, in J10A of the 703A panel. In addition, the EIC ringer must be connected to the EXT and EXR leads of the line involved using separately run quad wire or cable.

Hands-Free Answering on Intercom (HFAI)

8.22 This optional station feature requires the installation of a 683A transmitter at any station having the feature, including attendant stations. In addition, a 473A KTU must be installed in J10 of the 702A panel. It permits HFAI stations to:

- Answer incoming intercom calls without going off-hook with 2-way conversation

- Respond to intercom call while engaged in a CO/PBX call

- Disable the HFAI feature if desired

- Activate the do not disturb (DND) feature

- Answer dedicated link call.

8.23 Also required are the 474A KTUs installed as follows:

- 1st one in J8 of 702A panel for up to 18 stations

- 2nd one in J9 of 702A panel for up to 34 stations

- 3rd one in J12 of 703A panel for up to 52 stations.

This unit is the DSS diode matrix and preempts tone generator which allows the attendant to preempt an HFAI call with a dedicated link call.

8.24 HFAI is connected by terminating the cord from the 683A transmitter on the telephone set terminals and modifying the set.

☞ *Option strap on the 468A KTU must be removed.*

8.25 When an HFAI-equipped station is called over the intercom selector, the station is signaled by the normal tone burst, and the HFAI microphone and LED are activated. The called station can now hear over the set loudspeaker and answer "hands free" until the calling station goes on-hook or the called station goes off-hook. Operating the OFF control disables all HFAI features, and the station operates like any intercom station until the ON control is operated. If the DND control is operated, stations calling an HFAI station over the multipath intercom will receive the DND tone. The DSS console will receive a DND lamp indication on the busy lamp field. Releasing the DND control permits incoming calls and signals to be received in the normal manner (see 8.26).

Note: HFAI calls placed through the selector tie up the selector for the duration of the call.

Do Not Disturb (DND)

8.26 This feature prevents all incoming dial intercom and DSS signals from entering the speaker and from turning on the microphone. DND is available only on stations that are equipped for HFAI, as the DND activation button is located on the 683A transmitter unit. There are two DND signals in COM KEY 2152 as follows:

(a) The first is a visual signal on the DSS button on the attendant console. This permits the attendant to instantly see which station does not want to be disturbed.

(b) The second is an audible signal which is sent to any station that is calling another station that does not want to be disturbed. The audible signal is continuous 500-Hz tone which the calling party will hear in the telephone set receiver.

Intercom-Only Station

8.27 At locations that will only be making internal calls and do not require access to the CO/PBX lines, a 575AM or 2575AM telephone set may be installed. With this arrangement, only the two or three intercom paths can be accessed. All other buttons are mechanically blocked including the red one which is equipped with a lamp for message waiting where required. The 20-conductor mounting cord is equipped with a plug which permits mating

with a standard A25B connector cable. As supplied, the set is not wired for the third intercom path and the mounting cord leads must be terminated in the set to provide access. The pickup buttons and lamps operate in the same manner as for the intercom paths of a full service station.

Auxiliary Signal Activation

8.28 Where external signaling devices (such as bells, gongs, chimes, lights, or buzzers) are to be connected to the 21A System, a 22A-49 apparatus unit must be provided. The 22A-49 apparatus unit is externally mounted and connections are made to the 21A System with inside wire. Also, an external power supply must be provided to operate the signaling devices. The 22A-49 apparatus unit may be used to activate external signal devices that are operated by an open circuit (through a relay break contact) or that are operated by a circuit closure (through a relay make contact).

> *Caution: The 22A-49 apparatus unit contains a nonadjustable, mercury-wetted sealed contact relay and must be mounted in a vertical upright position.*

8.29 The 22A-49 apparatus unit is used to activate external signaling devices that are connected for:

- Station codes
- Common audible
- CO/PBX ringing
- Night transfer.

Note: When an external signaling device is operated by a station code, the device will sound continuously until the calling party hangs up or someone goes off-hook on the intercom path.

8.30 One 22A-49 apparatus unit is required for each station code or each CO/PBX line equipped with an external signaling device. The maximum resistance of each lead between the 21A System and the 22A-49 apparatus unit is 25 ohms.

8.31 The KS-16301 type auxiliary signals are recommended as external signaling devices for use with COM KEY 2152. Refer to Section

463-110-100 for identification, installation, operation, maintenance, and ordering information on the KS-16301 type signals.

8.32 The external power supply used to operate the signaling devices must be properly fused and have the capacity to adequately power the signaling devices.

8.33 Information found in Sections 167-416-201, 167-440-201, or 167-446-101 may be used as a guide toward selecting an appropriate power supply. Do not use a power supply that exceeds the contact rating of the 22A-49 apparatus unit which is 130 volts, 1.5 amp, 25 volt/amps.

Automatic Private Line

8.34 A 415A KTU can be used to supply private line circuits (with optional hold and visual indication) for appearance in the following CO/PBX line positions if the system is equipped with music-on-hold:

- 702A panel—J4A
- 703A panel—J1B, J2A, J2B, J3A, J3B, or J4A.

If the system does not have music-on-hold, the 415A KTU can be put in any connector used for a CO/PBX line. A 415A KTU or equivalent is required at the distant end.

8.35 To provide the private line circuit, install the 415A KTU in place of a 400D KTU in the proper jack and connect the T and R to the distant end on the normal CO/PBX incoming line termination. If the appearance is on one of the flexible buttons, cross-connection must be made on block 1 in the same manner as for a personal line appearance. The private line can appear at other stations by the use of vertical bridging on block 1 of the connecting units. In addition to these connections, the connection to the music-on-hold circuit, if so equipped, must be removed from the line position being used by the 415A KTU.

8.36 Line positions 7, 9, 10, 11, 12, 13, and 14 have provision for removing this circuit. If a 415A KTU is used in any one of these positions, the corresponding factory-provided strap on block 2 of the 100A1 or 101A1 connecting unit must be removed. It should be noted that if a block of 7 line positions is to be equipped with 415A KTUs,

Page 39

the music-on-hold feature can be eliminated by removing the 451B KTU associated with those 7 lines. Removal of the 451B KTU eliminates the requirements for removing any straps on block 2.

Music-On-Hold

8.37 Music-on-hold requires one 451B per each 7 CO/PBX lines, one 33A voice coupler per system, and a customer-provided music source. The customer-provided music source must have an output impedance low enough to drive an 8-ohm load without distortion. The music source must also be adjustable so the listening level of the music-on-hold may be adjusted.

> *Caution: The output of the CP music source must furnish ac coupling only, thus blocking all direct current to the input terminals of the 33A voice coupler. The CP music source should be able to deliver up to one watt into an 8-ohm load. The 33A voice coupler will accept input from any customer-provided apparatus that does not blow the fuses in the voice coupler. If the customer wants a copy of the technical reference covering the 33A voice coupler, contact the local Telephone Company Business Office or the Marketing Representative. If a service call is caused by a malfunction of the customer-provided equipment, billing should be made in accordance with Section 660-101-312.*

Paging and Background Music

8.38 Paging may be provided in up to three separate zones with each zone having up to seven indoor or outdoor speakers. The system has the flexibility of allowing all paging amplifiers or any combination of amplifiers to be activated by dialing one of the digits (37, 38, or 39). In an 18-station system, code 19 is used for paging. Only one paging call may be made at a time since paging uses the intercom selector. If any station picks up the intercom path, paging will be interrupted. The paging option straps must be placed before the amplifiers will operate.

8.39 A paging system should be loud enough to be heard, but not loud enough to annoy those working near speakers. The number and location of the speakers are influenced by the environment in which the speakers are used. Fig. 16 shows

several samples of speaker placement. It may be necessary to experiment with speaker placement on site for proper results. General information on loudspeaker paging systems can be found in Section 981-251-100.

> *Note:* To reduce feedback, no speaker should be closer than 60 feet to any station used for paging.

8.40 In COM KEY 2152, the paging amplifiers can be activated in three combinations as determined by the placement of the zone straps. Each amplifier can drive up to seven speakers. If more than seven speakers are required in a particular zone, additional amplifiers must be wired to be activated by that zone code. In addition, if combinations of zones are required to make up a zone, combinations of amplifiers must be activated by the same code. As an example, the first zone could include speakers 1 and 2 driven by the first amplifier and activated by dialing code 37. The second zone could include speakers 3, 4, and 5 driven by the second amplifier and activated by code 38. The third zone could include speakers 1, 2, 3, 4, and 5 driven by the first and second amplifiers and activated by code 39. Install the KTUs only in option slots J7A and J7B of the 702A panel and J10B of the 703A panel. *Do not use the other two option slots in the 703A panel* for a 457C KTU. Straps are factory-wired to the usable jacks for the PT, PR, PA and PC leads, but straps must be added to activate the desired zones. In addition, straps must be added to wire the PC1, PC2, and PC3 leads to the proper intercom code.

8.41 On a DSS console, if provided, the location of the paging button(s) will not change regardless of the code assigned. Paging code 1 (PC1) will always appear on the first paging button, paging code 2 (PC2) on the second, and paging code 3 (PC3) on the third. When paging is provided, the 812365948 button stop, if provided, must be removed from the associated paging button of the DSS console.

8.42 If a code other than 37, 38 or 39 (code 19 in an 18-station system) is assigned for paging, an 812365948 button stop must be placed in the corresponding button of the DSS console to prevent depression. For instance, if code 6 is assigned for paging, the DSS button assigned to code 6 must have a button stop.
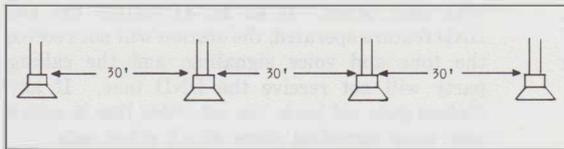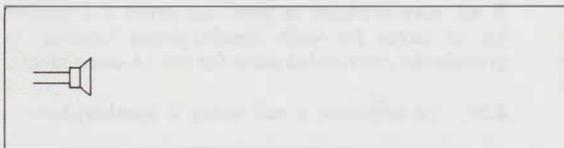
EXAMPLE A - SPEAKERS LOCATED ON ONE WALL OF ROOM (NOTES 1,2 AND 3)
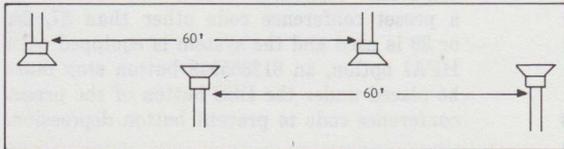
EXAMPLE B - SPEAKERS LOCATED ON OPPOSITE WALLS OF ROOM (NOTES 1 AND 2)

EXAMPLE C - SPEAKERS LOCATED IN INDIVIDUAL ROOMS (NOTES 1,2 AND 4)

EXAMPLE D - OUTSIDE SPEAKER (HORN) LOCATION (NOTES 2 AND 5)

NOTES:

1. EXAMPLES A, B AND C ARE FOR QUIET OR OFFICE TYPE ENVIRONMENTS, LESS THAN 65 DB SOUND PRESSURE LEVEL (SPL). ALL SPEAKERS SHOULD BE LOCATED AT LEAST 60 FEET FROM ANY STATION USED FOR PAGING.

2. SPEAKER WIRING SHOULD BE RUN SEPARATELY, NOT PART OF A VOICE CABLE. QUAD CABLE SHOULD BE USED WITH BOTH PAIRS CONNECTED. SPEAKERS SHOULD BE HUNG AS CLOSE TO THE CEILING AS POSSIBLE. MAXIMUM SPEAKER DISTANCE FROM THE UNIT IS 580 FEET.

3. SPEAKERS REACH A DEPTH OF 30 FT. IF ROOM IS OVER 30 FT. WIDE, FACING SPEAKERS SHOULD BE USED.

4. ONE SPEAKER WILL SERVE A ROOM UP TO 25 FT. BY 25 FT.

5. ONE SPEAKER (HORN) MOUNTED 20 FT. ABOVE GROUND LEVEL WILL COVER AN AREA APPROXIMATELY 80 FT. BY 100 FT. IF THE HORN IS MOUNTED LESS THAN 20 FT. ABOVE GOUND LEVEL, TWO HORNS MUST BE USED. HORNS SHOULD NOT BE MOUNTED LESS THAN 15 FT. ABOVE GROUND LEVEL. IF MORE THAN ONE HORN IS USED, THEY SHOULD BE MOUNTED VERTICALLY, RATHER THAN SIDE-BY-SIDE.

Fig. 16—Example of Paging Speaker Locations

8.43 When one or more of the paging buttons on a DSS console is depressed, those buttons will flash. This notifies other attendants in a system having multiple consoles that paging is in use. Only one DSS console may page at a time, even if the system has more than one paging zone. Simultaneous operation of paging buttons from one DSS console is permissible. This results in paging connections to the associated zones. A page from a DSS console will preempt a page originating over the intercom.

8.44 Speakers used for paging in the 21A System must be 45-ohm impedance. Use K8 loudspeaker for indoor locations and KS-16846,L2 loudspeakers for indoor or outdoor locations. The K8 can be wall mounted or hung over an outlet box. A mounting clip is furnished with the speaker which is fastened to the wall or outlet box. Speaker volume is adjusted by a potentiometer (with screwdriver adjustment slot) in the bottom of the speaker.

Speaker volume level will be affected by changes in room content. The addition of furniture, draperies, carpeting or wall covering may necessitate increasing speaker volume.

When using outdoor speakers, the speaker leads must be protected in accordance with local instructions or Section 460-100-100.

8.45 Background music requires the installation and connection of a 33A voice coupler. If music-on-hold is also provided, the same music source and coupler are used.

External Paging System Access

8.46 A COAM paging system or a separate telephone company-provided paging system is connected to the 21A System through a 20A-49 apparatus unit. The 20A-49 apparatus unit is mounted externally to the 21A System.

The 20A-49 apparatus unit provides a nominal 300-ohm output to a customer-owned paging system. It does not provide a means to activate the customer's equipment; therefore, customer equipment must be in the ON mode at all times.

Intercom Preset Conferencing

8.47 Intercom preset conferencing allows up to three groups of preselected stations (maximum of five stations per group) to be alerted simultaneously. Individual stations can appear in only one group. Normally, codes 37, 38 and/or 39 are used for conferencing; but, if these codes are used for paging, any other codes may be assigned but must be sacrificed for station use.

8.48 To connect preset conference, a strap must be run from the C1, C2, or C3 terminal to the preset conference terminal for the code assigned on block 2 in the 100A1 or 101A1 connecting unit. Another strap must be run from the PC1 to PC5 terminals to the preset conference terminals of the station codes in the group.

8.49 To use preset conference:

  (a) Lift handset.

  (b) Select idle intercom path and depress associated button.

  (c) Dial code assigned to signal desired group of stations.

  (d) Announcement is made to selected stations simultaneously. If stations are equipped with HFAI, they may reply to caller but other stations will not hear reply and cannot converse

with each other. If an HFAI station has the DND feature operated, the station will not receive the tone and voice signaling, and the calling party will not receive the DND tone. If any station goes off-hook, the intercom line is seized and voice signaling stops at all other sets.

Note: The attendant will **NOT** have preset conference capability from a DSS console. If a preset conference code other than 37, 38, or 39 is used and the system is equipped with HFAI option, an 812365948 button stop must be placed under the DSS button of the preset conference code to prevent button depression.

Speakerphone

8.50 Full speakerphone service can be provided at all stations in the system using either 3B or 4A speakerphone components.

Note: Speakerphone does not prevent normal operation of the telephone set for originating or receiving calls.

If 4A speakerphone is provided, order a D-180508 kit of parts for each speakerphone location to provide the color-coded parts for the 4A components.

8.51 To originate a call using a speakerphone:

  (a) Depress CO/PBX button associated with an idle line.

  (b) Momentarily depress transmitter ON button. ON lamp lights and dial tone is heard through the loudspeaker.

  (c) Dial number in normal manner.

  (d) When called party answers, transmitter and loudspeaker are used to carry on the conversation. Adjust volume level as desired.

8.52 To answer an incoming call using speakerphone:

  (a) When audible tone signals an incoming call, depress CO/PBX key associated with flashing lamp.

  (b) Momentarily depress transmitter ON button. Audible signal is silenced and the speakerphone is connected to the line.

(c) Answer call using transmitter and loudspeaker to carry on conversation.

8.53 To disable transmitter when it is desired not to transmit conversation from the surrounding area to the distant station:

(a) Depress transmitter ON button during entire period transmitter is to be disabled.

   Note: With transmitter disabled, conversation will not be transmitted to the distant station; however, the distant party may be heard over the loudspeaker.

(b) Release transmitter ON button and system is restored to hands-free operation.

8.54 To transfer from handset to speakerphone operation:

(a) Put line on hold.

(b) Hang up handset.

(c) Turn speakerphone on.

(d) Depress line button.

8.55 To transfer from speakerphone to handset operation, lift handset during speakerphone operation to automatically transfer to handset operation. When it is necessary to transfer back to speakerphone, refer to 8.54 to prevent disconnect. To terminate a call on speakerphone, momentarily depress transmitter OFF button. In the case of a 128A4 or 138A4 console, the release button must also be depressed.

   Note: Restore any depressed line buttons. While line switch flashing, hold line button depressed to avoid dropping the line. If sets are equipped with RECALL, it is not necessary to depress the line switch.

Flexible Ring Transfer

8.56 Flexible ring transfer employs the use of a separately mounted 6041G key in conjunction with the ring transfer button on the attendant position(s) telephone set or console. The 6041G can be wired to permit transfer of incoming CO/PBX calls to one of up to five choices of station(s).

The hold button of the key is used as a release button.

8.57 To effect flexible ring transfer, the preferred button on the 6041G is depressed, locking it down, then the ring transfer button on the attendant station telephone set or console is depressed which also locks down. To return calls to the attendant, the ring transfer button is again depressed, releasing it, and the hold button on the 6041G key is depressed, releasing its button.

Toll Restriction

8.58 The toll restriction circuit used (471A KTU) requires that the CO line reverse the battery on the tip and ring of the line when a toll call is attempted. Three arrangements can be provided:

- Restriction on a square line with all stations including attendants restricted

- Restriction on a personal line with some stations restricted and others unrestricted

- Restricted line at stations with attendant unrestricted.

8.59 Any of the above arrangements require a 471A KTU per restricted line and a suitable mounting external to the 21A Communication System. A 620A modular panel should be used to mount the first eight 471A KTUs and a 642A panel for each four additional KTUs. A 19B2 power unit and a 92A connecting block are required to power the panels, and additional 66-type connecting blocks may be required to provide sufficient multiples.

8.60 In all arrangements, the CO/PBX line is taken first to the T(CO) and R(CO) input of the 471A KTU and the T(STA) and R(STA) from the 471A KTU to the normal line input of the 21A System.

Automatic Signaling Intercom

8.61 Automatic signaling intercom supplements the dial intercom circuitry in the COM KEY 2152 to provide a private voice and tone path between two stations such as a boss and secretary. Where required, the arrangement can also serve several stations to one station, for instance, where more than one boss shares the same secretary. In this instance, however, the secretary can only signal

one boss. Signaling can optionally be one-way in either direction or two-way.

8.62 Installation of each of the automatic signaling intercoms requires use of one of the two flexible button positions at each of the stations involved and a 481A KTU per automatic signaling intercom circuit installed in one of the first three optional connectors of the 702A or 703A panel. If automatic signaling intercom is supplied, the factory-placed paging straps to the connector used must be removed and the wiring for the automatic signaling intercom placed.

8.63 The intercom operates as follows:

(a) The originating station goes off-hook and depresses the button associated with the automatic signaling intercom circuit.

(b) The associated button lamp will flash at all stations on the circuits and the called station will receive a tone alert in the set speaker the same as for dial intercom.

Note: Other stations calling the called station by dial intercom will receive a steady preempt tone.

(c) The calling station may now voice signal the call station. If 2-way conversation is required, the called station goes off-hook and depresses the flashing button which turns to steady. Conversation is now possible using the handsets.

Note: Automatic signaling intercom provides voice and tone signaling even if the station is equipped with HFAI.

(d) If only two stations are in the circuit, operation is exactly the same in the other direction.

Station Restriction

8.64 This feature prevents any outgoing CO/PBX calls from being made at a restricted station. The restricted station may receive CO/PBX calls or place and receive intercom calls, but cannot call out on CO/PBX lines. This is accomplished by adding a diode (rotary dial sets only) and reversing one or two leads in the telephone set.

Note: Station restriction and CO/PBX intercom conferencing cannot be provided at the same station.

Wall Shelf

8.65 The D-180656 kit of parts provides a method for wall mounting the 832-, 2832-, 833-, and 2833-type telephone sets. The D-180656 kit of parts consists of a shelf assembly (ivory colored) and a retaining clamp. The shelf will incline the telephone set 15 degrees from the horizontal to facilitate its use when wall mounted.

Answering Positions

8.66 The 21A System provides terminations for two designated answering or attendant positions. As factory-wired, intercom code 0 is the first attendant and code 10 would normally be the second. Other stations may be designated if desired. The telephone set or console to be used at these positions will be dependent on the capacity of the system and the system features required. Each of the attendant positions will require one of the following for handling CO/PBX lines:

• Maximum 7 lines—832C or 2832C telephone set

• Maximum 14 lines—833C, 2833C telephone set, or 128A3R, 128A3T console

• Maximum 21 lines—128A4R, 128A4T, 138A4R or 138A4T telephone console.

8.67 The 832C or 2832C telephone sets have a hold, 7 line pickups (2 flexible), 2 intercom pickups, recall, privacy release, and ring transfer. In systems without privacy, the privacy circuit must be disabled. The 833C or 2833C telephone sets have hold, 14 line pickups (2 flexible), 3 intercom pickups, recall, and ring transfer. In systems with privacy, a D-180486 kit of parts must be installed in the 833- or 2833-type telephone sets.

8.68 The 128A3-type console has the following (Fig. 17): hold, 12 line pickups, 3 intercom pickups, 2 flexible line pickups, a release button, ring transfer, recall, and privacy release on the left side of the faceplate. On the right side of the faceplate is a tandem trunking key field consisting of 12 line pickups, 2 flexible line pickups, 3 intercom pickups, and a status lamp which

indicates when a call set up through the tandem trunking field has been terminated. The consoles are provided with two sets of jacks for a head telephone set or handset which must be separately ordered. The handset cradle is inoperative. Also supplied is a privacy circuit which must be connected in systems with privacy.

8.69 The 128A4 console has the following (Fig. 17): hold, 21 line pickups, 3 intercom pickups, 2 flexible line pickups, a release button, 3 ring transfers, privacy release, and recall. The 138A4 has the same key layout on the lower portion but, in addition, has an upper tandem trunk key field

which contains 21 line pickups, 3 intercom pickups, and a status lamp which indicates when a tandem trunking call is completed. The consoles are equipped with jacks for a headset or handset which must be separately ordered. The handset cradle is inoperative. These consoles are supplied with a privacy circuit which must be connected in systems with privacy.

8.70 In addition to one of the line handling telephone sets or consoles listed above, another console may be required, the type depending on whether direct station selection with dedicated link (DSS/DL), station busy (SB), and/or message

A. 128A3

5	11	ICM 3	RECALL
4	10	ICM 2	
3	9	ICM 1	
2	8	FLEX 2	RING TR
1	7	FLEX 1	PRIV REL.
HOLD	6	12	REL,

DIAL

REL – RELEASE
RING TR – RING TRANSFER
PRIV. REL – PRIVACY RELEASE
ICM – INTERCOM

5	11	ICM 3							
4	10	ICM 2							
3	9	ICM 1							
2	8	FLEX 2							
1	7	FLEX 1							
LAMP	6	12							

138A4

12	13	14	15	16	17	18	19	20	21
2	3	4	5	6	7	8	9	10	11
ICM 1	ICM 2	ICM 3				LAMP			1

B. 128A4 OR 138A4

5	11	17	FLEX 2
4	10	16	FLEX 1
3	9	15	21	ICM 3
2	8	14	20	ICM 2
1	7	13	19	ICM 1
HOLD	6	12	18	REL

DIAL

REL – RELEASE
RING TR – RING TRANSFER
PRIV. REL – PRIVACY RELEASE
ICM – INTERCOM

RING TR 3
RING TR 2
RING TR 1
PRIV. REL.
RECALL
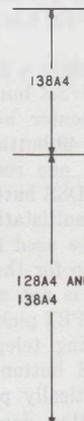
128A4 AND 138A4

Fig. 17—Button Locations, Telephone Consoles

waiting (MW) are to be supplied. One of the following should be used:

- 6B1 console—MW control and SB lamps, maximum 18 stations

- 7B1 console—MW control and SB lamps, maximum 34 stations

- 6C1 console—DSS/DL with SB, maximum 17 stations

- 7C1 console—DSS/DL with SB, maximum 34 stations

- 128A6Y console—DSS/DL with SB, maximum 52 stations

- 138A6Y console—DSS/DL and MW with SB, maximum 52 stations.

If there is only one DSS console in system, it must be cut down as console 1 on all cutdown blocks.

8.71 The 6B1 console (Fig. 18) contains a 20-button lamp field (two spare). The lamp under the buttons light when the associated station is off-hook. The locking type buttons are used to light the MW (Hold) lamp at the stations. The 7B1 console performs the same functions but has 40 buttons (six spare) for a system up to 34 stations.

8.72 The 6C1 console is a 20-button console made up of 17 DSS/SB buttons, one paging, one restore, and one reenter button (Fig. 13). The 7C1 console contains 40 buttons—34 DSS/SB, three paging, one restore, one reenter, and one spare. Any combination of DSS buttons may be depressed simultaneously for multistation signaling, but this feature should not be used for conferencing since the console is tied up for the duration of the call. Preset conferencing is not allowed from the DSS console. After a CO/PBX pickup button is depressed on the line answering telephone set or console, depressing any DSS button on the 6C1 or 7C1 console will automatically put that line on hold. The line pickup button does not restore and, if desired, the attendant can reconnect to the line by depressing the reenter button. When the attendant depresses a DSS button on a 6C1 or 7C1 console, the signaling path is over the dedicated link and does not involve the intercom selector,

leaving it available for station-to-station calls. The restore button is used to mechanically release any DSS button(s) locked down.

8.73 The 128A6Y console (Fig. 18) offers the same features as the 6C1 or 7C1 but has a capacity of 52 stations. The 138A6Y console has the same features as the 128A6Y and, in addition, has a field of 52 MW buttons. If both MW and SB are provided, the SB lamps are in the DSS field.

8.74 Terminations are provided in the 21A System for two attendant positions. These terminations appear on blocks 3, 4, 5, and 6 of the 100A1 and 101A1 connecting units, blocks 5 and 6 of 100B1 connecting unit, and blocks 3 and 4 of 101B1 connecting unit.

Caution: Since multiple connector cables may be involved in supplying consoles, care should be taken to identify binder groups to assure terminations in the proper order.

Third Attendant Position

8.75 Terminations are provided in the connecting units for two attendant positions (codes 0 and 10). One additional attendant position can be added but requires that the terminations be external to the connecting units. If a third console is required, the terminations for code 10 are used to provide the terminations for the cabling to the external connecting blocks. The connector cables from the second and third attendant positions are then terminated on the external blocks.

8.76 Any code may be assigned to the third attendant, but the code assigned will not be available as a station code.

8.77 As factory-wired, the 21A System furnishes common audible ringing at station code 0. All incoming lines will ring at that station unless otherwise arranged (see information on common audible and flexible station ringing). The calls are answered by lifting the handset (if using telephone set) and depressing the flashing line pickup button. The method of forwarding the call may vary depending on the equipment at the attendant station, as follows:

(a) With all arrangements, the answered call can be placed on hold using the HOLD key

10	11	12	13	14	15	16	17	18	
	0	2	3	4	5	6	7	8	9

A. 6B1 (MESSAGE WAITING)

RST	10	11	12	13	14	15	16	17	18
RE–ENT	PAGE	2	3	4	5	6	7	8	9

B. 6C1 (DIRECT STATION SELECTION)

30	31	32	33	34	35	36			
20	21	22	23	24	25	26	27	28	29
10	11	12	13	14	15	16	17	18	19
	0			4	5	6	7	8	9

C. 7B1 (MESSAGE WAITING)

RST	28	29	30	31	32	33	34	35	36
18	19	20	21	22	23	24	25	26	27
8	9	10	11	12	13	14	15	16	17
RE–ENT	PAGE 1	PAGE 2	PAGE 3		0	4	5	6	7

D. 7C1 (DIRECT STATION SELECTION)

RST – RESTORE

20	21	22	23	24	25	26	27	28	29
10	11	12	13	14	15	16	17	18	19
					0	6	7	8	9

50	51	52	53	54	55	56	57	58	59	
40	41	42	43	44	45	46	47	48	49	138A6Y
30	31	32	33	34	35	36				
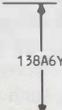
PAGE 3	10	16	22	28	34	43	49	55	
PAGE 2	9	15	21	27	35	42	48	54	59
PAGE 1	8	14	20	26	32	41	47	53	58
	7	13	19	25	31	40	46	52	57
	6	12	18	24	30	36	45	51	56
RE–ENT	0	11	17	23	29	35	44	50	RST

128A6Y AND 138A6Y

RST – RESTORE

E. 128A6Y OR 138A6Y

Fig. 18—Button Locations, Selector Consoles

on the telephone set or console at which time the steady lamp will change to wink. The attendant then selects an idle intercom path, dials the desired station, and voice signals that there is a call on a particular CO/PBX line. If necessary to reenter the conversation, the pickup button must be depressed again.

(b) If equipped with a DSS console, the attendant can voice signal the desired station by depressing the associated locking DSS button. When the DSS button is depressed, the CO/PBX line is automatically put on hold. Using the DSS does not require accessing an intercom path since the attendant uses the dedicated link which does not require the selector. If the intercom station is equipped with HFAI, 2-way conversation is possible. A call from a DSS console will preempt an automatic signaling intercom call, dial intercom call, or CO/PBX ringing. The attendant may then go back to the hold line by depressing the REENTER button on the DSS console, leaving the held line to be picked up by the station, or picking up another CO/PBX line by depressing the associated button after depressing RESTORE button to clear DSS console.

(c) At positions having a tandem trunking console (138A4), incoming calls are answered using the 21 line pickup buttons on the lower field. Calls can be forwarded in the usual manner by holding and using an intercom path or by DSS if equipped. In addition, the tandem field can be used to connect a line that does not appear at a station, such as a nonsquare line, as follows:

(1) Answer flashing line by depressing button on lower panel, place line on hold.

(2) Select idle intercom path (button dark) and signal desired station using dial intercom.

(3) When station answers, depress buttons in tandem field associated with held CO/PBX line and selected intercom link which will connect outside party with station.

(4) Operate RLS button on lower field to remove attendant from conversation.

(5) When the intercom station goes on-hook, the status lamp in the tandem field will light indicating the connection can be released by depressing the push-to-operate, push-to-release buttons. *Only one call at a time can be processed through the tandem field.*

8.78 The tandem field can also be used to set up a preset conference call. The procedure is the same as above except the attendant dials the preset conference code on the intercom. Once the conference stations are on the line, the CO/PBX line button in the tandem field is depressed. A third option permits the attendant to make a CO/PBX call for stations unable to do so, ie, an intercom-only station. To do this, the attendant first completes the CO/PBX call by depressing button in the lower field and dialing the desired number. The attendant then places that call on hold and calls the station on dial intercom using an idle path on the lower button field. The attendant then operates the intercom button, then the CO/PBX line button in the tandem field corresponding to the two parties. After operating the RLS button, the attendant is free to make other calls.

Station Telephone Set Options

8.79 All telephone sets used with the 21A Communication System are modular in design. Refer to Table B for faceplate colors.

8.80 The following sets can be used as station telephone sets:

- 832/2832BM, 832/2832CM, 832/2832DM, 832/2832EM

- 833/2833BM, 833/2833CM, 833/2833DM, 833/2833EM

- 575/2575AM.

8.81 The 10-button and 20-button telephone sets can be intermixed in COM KEY 2152, depending on the connecting unit(s) used as follows:

- 100A1—Up to 34 stations (twenty-eight 10-button and six 10- or 20-button)

100B1—Additional 18 stations (10- or 20-button)

101A1—Up to 28 stations (10- or 20-button)

101B1—Additional 24 stations (10- or 20-button)

Table C lists the features supplied with the telephone sets. All stations in a mixed system must have the same number of intercom paths.

8.82 Options for the station telephone sets should be provided as follows:

(a) *Recall*

- All 832-, 833-, 2832-, and 2833-type telephone sets are factory-wired for recall.

(b) *Privacy*

- 832/2832BM—not available

- 832/2832CM, 832/2832EM—factory-wired

- 833/2833BM, 833/2833DM—factory wired.

(c) *Privacy Release*

- 832/2832BM—not available

- 832/2832CM, 832/2832EM—factory-wired

- 833/2833BM, 833/2833DM—factory-wired.

(d) *Ring Transfer*

- 832/2832BM, 832/2832DM—not available

- 833/2833BM, 833/2833DM—not available

- 832/2832CM, 832/2832EM—factory-provided, field-wired

- 833/2833CM, 833/2833EM—factory-provided, field-wired.

(e) *Speakerphone*

- 832-, 833-, 2832-, and 2833-type telephone sets—require addition of separately ordered 3B or 4A speakerphone components.

(f) *HFAI*

- 832-, 833-, 2832-, and 2833-type telephone sets—refer to 8.22. Wall-type telephone sets also require use of a 268A adapter.

Satellite Wiring Plan

8.83 The 21A System is designed for Home Run Cabling (direct cabling) from each telephone set to the 100- or 101-type connecting unit. Where it is more practical to serve a group of stations from a secondary location, a satellite wiring plan can be used. The satellite wiring plan is a connecting block arrangement for station terminations and is served by a cable or cables from the 100- or 101-type connecting unit.

8.84 Cabling between the satellite location and the 100- or 101-type connecting unit should be sufficient to provide all leads necessary for operation of lines and optional features at each station being satellited.

Note: Leads that are not common to all stations must be brought to the satellite location. This includes individual station code control leads such as A1, A GRD, VS, -24C, CO, DNDL, SB, L-, ET and ER. In addition, each personal line involved in the satellited stations must be brought to the satellite location. If a personal line is multipled to more than one satellite station, only one appearance is necessary.

8.85 Lamp leads in the 21A System are wired as follows:

(a) 100A1 and 100B1—lamp leads for station codes 0 to 28 and the first five lines of codes 33 to 36 (1st binder group) are wired directly from the 400D KTUs. This is called group A. Lamp leads for codes 29 to 36, 42 to 59, and the balance of the leads for codes 33 to 36 are wired from the 453B KTUs. These are group B.

(b) 101A1 and 101B1—lamp leads for station codes 0 to 28 are wired from the 400D KTUs (group A). Codes 29 to 36 and 42 to 59 are wired from the 453B KTUs (group B).

(c) The lamp leads for the first two intercom paths are wired so that codes 0 to 28 are on one fuse and 29 to 36 and 42 to 59 are on a second fuse for each circuit. The third intercom path lamps are wired to terminals IL31 and IL32 on block 1 of the 100A1 and 101A1 connecting units.

Where possible, a station grouping arrangement should be used when satelliting. Station codes from group A and group B can be intermixed in the same satellite arrangement as long as the lamp leads from group A and B are brought out to the satellite location independently and the station codes are wired to the leads depending on their group assignment. For instance, station code 21 should have its lamp leads connected to the group A lamp leads.

8.86 The limiting factors of a satellite type wiring plan are keeping the voltage drop in the lamp loop to less than 2 volts and maintaining a low resistance A lead.

Adjunct Services

8.87 Miscellaneous services that can be provided at COM KEY 2152 stations include

SPOKESMAN®, telephone answering sets, and repertory dialers. For information on these services, refer to Section 518-450-111 and/or the sections listed below.

- SPOKESMAN—463-221-100

- Telephone Answering Sets—514 Division

- KS-16844 Rapidial*—512-115-100

*Registered trademark of McGraw-Edison Co.

- KS-19564 Magicall*—512-125-100, 512-125-200, 512-125-400, 512-125-410

*Registered trademark of DASA Corp.

- TOUCH-A-MATIC®—503-603-101, 503-603-102.