

EMERGENCY REPORTING SYSTEM

520-TYPE PBX

DIRECT LINE SYSTEMS

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operated PBX systems. The No. 520A system is designed for use in larger municipalities and the No. 520B system for use where a smaller reporting system will serve adequately.

1.02 Outdoor telephone sets (570 type) are located at strategic points on the streets and highways, and special subsets are put in public buildings such as schools and hospitals for placing emergency calls.

1.03 This system has several advantages in handling emergency calls. First, the caller can talk directly to a control point and be aided in transmitting the required information immediately. Second, a visual indication of the number of the telephone station where a call is originated appears at the reporting headquarters. Third, the control point can interpret the report and call for the minimum or maximum facilities to handle the emergency with the least loss in time. Fourth, it permits efficient dispatching of the emergency apparatus at all times. Fifth, the caller, after reporting the emergency condition, is not required to wait at the call box until help arrives.

1.04 Briefly, the sequence of operations in placing an emergency call from a reporting telephone station is as follows. The caller opens the door of the special telephone set and lifts the handset off the switchhook. The line equipment responds and provides a locked-in, flashing lamp display at dual appearances and an audible alarm which alerts the operator. An audible ringing tone is impressed on the line toward the calling party until the operator answers.

1.05 The operator, in answering the call, depresses the key associated with the flashing lamp and automatically establishes the talking connection. Simultaneously, the flashing lamp changes to a steady lamp and the audible alarm is retired. The calling telephone station is identified by designation strips located above the incoming line lamps.

1.06 After placing the emergency call with the operator, the caller replaces the handset on the switchhook and releases the self-closing door. Simultaneously, the common disconnect lamp appears in the switchboard as a disconnect

signal. The operator depresses a position release key, releasing the line equipment which retires the switchboard lamps and returns the line to fire stand-by condition.

1.07 While the line equipment is in fire stand-by condition, a continuous supervisory test maintains a constant check on the line. If the line goes open or is grounded because of trouble, a trouble lamp lights at the switchboard and an audible alarm sounds.

1.08 A special nonlocking key is added in the handset cabinet when the emergency reporting telephone system is used for fire and police reporting. This key, when depressed, controls switching equipment which routes the call to a police switchboard.

1.09 In general, police call operation is the same as described in 1.04 to 1.07, except that the key must be held operated a few seconds while the handset is lifted off the switchhook or the call will be routed to fire headquarters.

Field of Use

1.10 The emergency reporting telephone system can be used as a fire reporting system, a police reporting system, a combined fire and police reporting system, and a reporting system that combines fire, police, and other emergency reporting by the general public.

1.11 Fig. 1 and 2, respectively, show the relationship of major equipment elements when the system is used as a fire reporting system, and when it is used for combined fire and police reporting or as a common system for all types of emergency reporting.

1.12 A long line circuit can be provided, if the reporting telephone station requires a loop beyond normal range.

Principal Features

1.13 The principal features of the emergency reporting line equipment are as follows:

- (a) Locked-in line seizure with continuously flashing lamps and audible alarm indication at a switchboard.

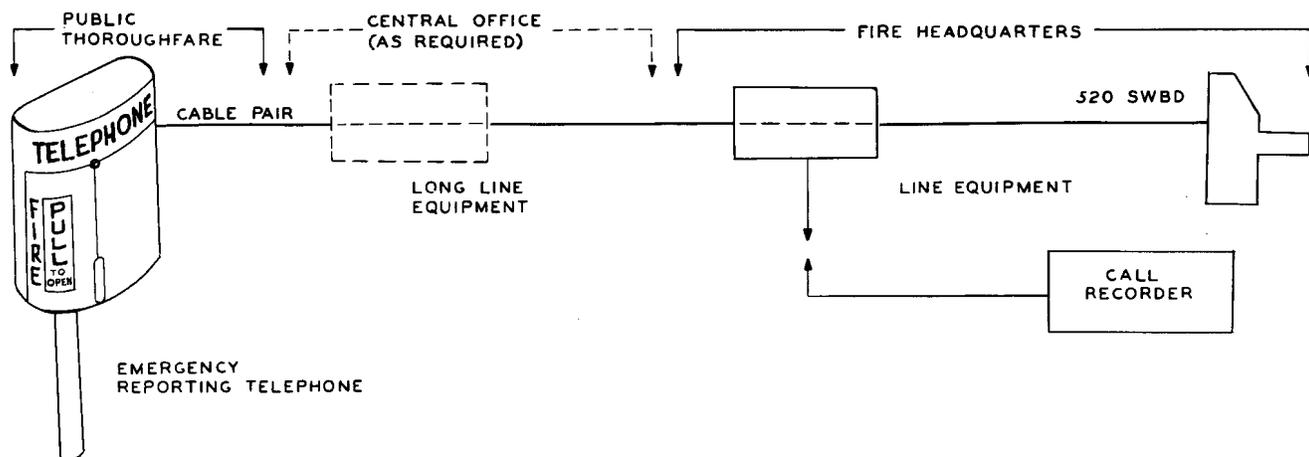


Fig. 1 – Block Diagram — Major Equipment Elements of a Fire Reporting System

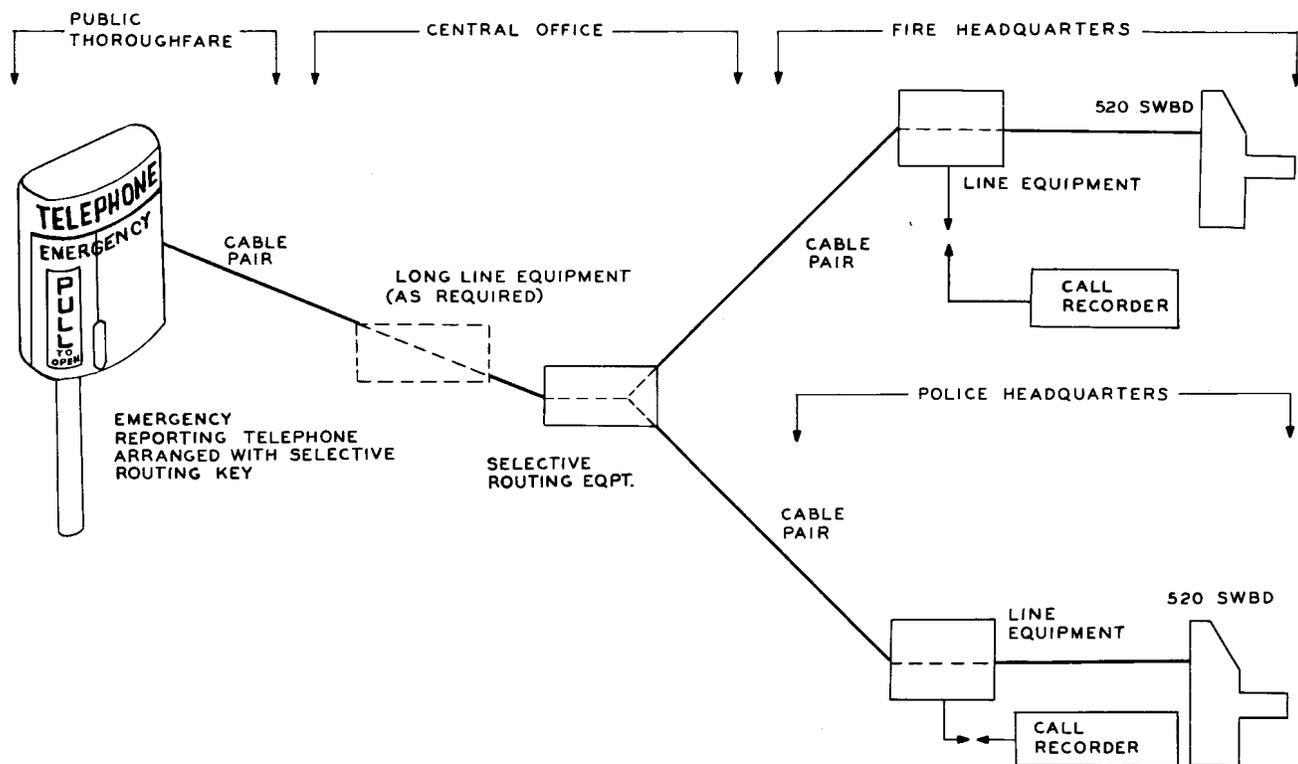


Fig. 2 – Block Diagram — Major Equipment Elements of a Combined Fire and Police Reporting System

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(b) Line and telephone station set under continuous test supervision with an individual trouble lamp and a common line lamp at a switchboard.

(c) A 0.5-second delay feature protects against false line seizures due to momentary shorts or grounds on the line.

(d) Dual appearances in the switchboard for key or jack and cord answer.

(e) Audible ringing tone provided to the reporting telephone station before the operator answers the call.

(f) A station conductor loop range of 1800 ohms provided.

1.14 The principal features of the No. 520A and 520B switchboards are as follows:

(a) Switchboards are metallic consoles, fire resistant, and designed for fast, easy operation.

(b) All incoming lines and outgoing lines terminated at the switchboard have dual appearances for key or cord and jack operation.

(c) A position grouping feature provides for 2-attendant operation, when desired.

(d) Duplicate control circuits and apparatus are provided.

(e) A nonlocking alarm release key is furnished to control the audible alarm.

(f) Suitable alarm lamps in the face of the switchboard provide visual indications of trouble to the operator.

(g) An emergency hand generator is provided for ringing during failures of the regular power supply.

(h) Cord circuits are provided for answering incoming calls, placing outgoing calls, and extending calls to other points.

(i) A dial is provided for dialing into the central office over central office trunks.

1.15 The following features are also included in this system.

(a) A selective routing feature allows switching of a reporting line termination to one of two headquarters. A nonlocking key at the reporting telephone station controls switching.

(b) A call recorder can be provided which will indicate the date, time, and reporting telephone code number on each call.

(c) Voice recording devices may be permanently connected to provide a means for recording conversation at the switchboard.

(d) Facility for selective and voice paging lines are provided.

(e) Equipment annunciator and status key and lamp units are provided.

(f) Duplicate alarm indicating and control circuits are provided.

Capacity and Planning

1.16 The No. 520A PBX has a capacity as follows:

Emergency Reporting Telephones	400*
Central Office Trunks (two way)	20
Tie Lines	20*
Paging Lines	36
Equipment Status Lines	40
Position Circuits	2
Cord Circuits	8
Hand Generator	1

*If reporting telephone line relay units are used as tie lines, the total number of reporting lines is reduced.

1.17 The capacity of the No. 520B PBX is as follows:

Emergency Reporting Telephones	100*
Central Office Trunks (two way)	20
Tie Lines (one way)	20*
Paging Lines	17
Equipment Status Lines	20

Position Circuits	2
Cord Circuits	4
Hand Generator	1

*If reporting telephone line relay units are used as tie lines, the total number of reporting lines is reduced.

1.18 A plan for a No. 520 PBX system for a municipality should allow for future growth. Face appearance space on the switchboard for additional reporting telephones and floor space for future relay racks to mount additional equipment should be provided.

1.19 Cables which interconnect the relay equipment and the switchboard normally terminate directly on the key and jack units. The equipment units have wire-spring relays and solderless-wrapped connections.

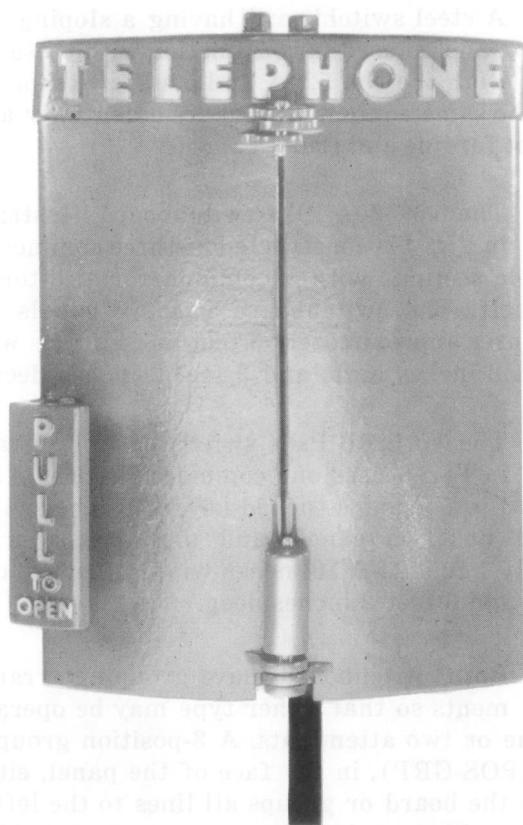


Fig. 3a

2. EQUIPMENT COMPONENTS

Station Apparatus

2.01 The 570-type outdoor telephone set is used with the No. 520 PBX systems. The set, shown in Fig. 3, has a cast aluminum housing with two doors hinged at the center.

2.02 The self-closing door to the handset compartment on the left has a handle with the words PULL TO OPEN cast into it. The door to the equipment section is locked with a special screw fastener.

2.03 A partition separates the handset compartment from the equipment section of the apparatus. The apparatus unit, which is removable for installation and maintenance, has a plastic shield formed around it as an additional waterproof shield and weather protector.

2.04 A selective routing key accessible from the handset compartment can be mounted inside the housing. This key can be either a push button or a tumbler type.



Fig. 3b

Fig. 3 — Emergency Reporting Telephone—570 Type

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2.05 Standard 500-type telephone components are used with this set to take advantage of the 1800-ohm conductor loop limit on the line circuit.

2.06 Mounting space is available on the apparatus unit for a No. 111A protector and a control relay for external signals. A C4A ringer may also be mounted on this unit.

2.07 The No. 570 set may be mounted on poles, pipe pedestals, or walls, by using a mounting bracket. Service wires enter the set through conduit openings at the top and bottom of the housing.

Relay Equipment

2.08 Relay equipment layout is arranged for mounting on standard 7-foot bulb-angle frames.

2.09 All equipment units mount on 2- by 23-inch mounting plates.

2.10 One frame will mount 60 line circuits and auxiliary equipment.

2.11 Two line circuits are mounted on one mounting plate. Every ten mounting plates are associated with a common auxiliary line unit.

2.12 Central office trunk units and auxiliary trunk units are mounted in the trunk and common equipment bay. Two trunk circuits are mounted on three mounting plates. The auxiliary circuits mount on one mounting plate and serve up to 20 trunks.

2.13 Paging units are mounted on four mounting plates which control up to 36 circuits.

2.14 Two common flash and wink units are provided, mounted together on three mounting plates.

2.15 The call recorder is comprised of a time-of-day circuit, a ticketer, and one or more connector units, each using a crossbar switch having a capacity of 100 lines. A recorder unit includes the time-of-day circuit, ticketer, and control. A 7-foot frame will mount one recorder unit and three connector units.

2.16 Selective routing circuits are mounted five circuits to a mounting plate. This equipment normally will be located in a central office selected for the most economical use of cable facilities.

2.17 Tie trunks use modified station line circuits and therefore require the same mountings as the station line equipment.

2.18 A long line equipment is used when the reporting telephone conductor loop exceeds the 1800-ohm limit. The long line circuit is designed to repeat the continuous line test feature and to work with conductor loops of 1800 ohms toward the station set and a trunk loop toward the PBX of 1800 ohms. When the selective routing feature is provided, the signal ground used for switching is repeated by this circuit to control the selective routing equipment.

Switchboard

2.19 A steel switchboard having a sloping face panel is used in conjunction with these systems. Both the No. 520A and 520B switchboards use the same equipment and are essentially alike except for line and trunk capacity.

2.20 The No. 520A PBX switchboard illustrated in Fig. 4 is constructed of three commercial console sections with a common formica-topped keyshelf. The switchboard has six panels and measures approximately 5 feet 5-3/4 inches wide, 4 feet 2 inches high, and 3 feet 2 inches deep.

2.21 The No. 520B PBX switchboard illustrated in Fig. 5 uses one commercial console section with a formica-topped keyshelf. The switchboard has two panels and measures approximately 1 foot 11-9/16 inches wide, 4 feet 2 inches high, and 3 feet 2 inches deep.

2.22 Both switchboards have grouping arrangements so that either type may be operated by one or two attendants. A 3-position grouping key (POS-GRP), in the face of the panel, either splits the board or groups all lines to the left or right position equipment, as required. Attendant telephone jacks are located in the front of the keyshelf. The keyshelf contains the cord units and dials, and provides a writing shelf for the attendant's use.



Fig. 4 – No. 520A Switchboard

2.23 Emergency reporting lines have two appearances on the face panel, (1) a key-ended appearance, and (2) a jack-ended appearance which provides for key answer or cord answer by the attendant. The key-ended appearance has associated with it a nonlocking key, a line lamp, and a trouble lamp. Ten key appearances with their trouble and line lamps provide a compact unit which is enclosed with a plastic

coverplate. A transparent plastic plate in the plastic coverplate provides a place to hold a 7/8- by 7-1/2-inch designation card. Fig. 6 illustrates a switchboard view of these units. The plastic key buttons mounted in the key strip reflect the light from the line lamps to provide an indicating key button display. The corresponding jack strip has a line lamp with a suitable designation strip.

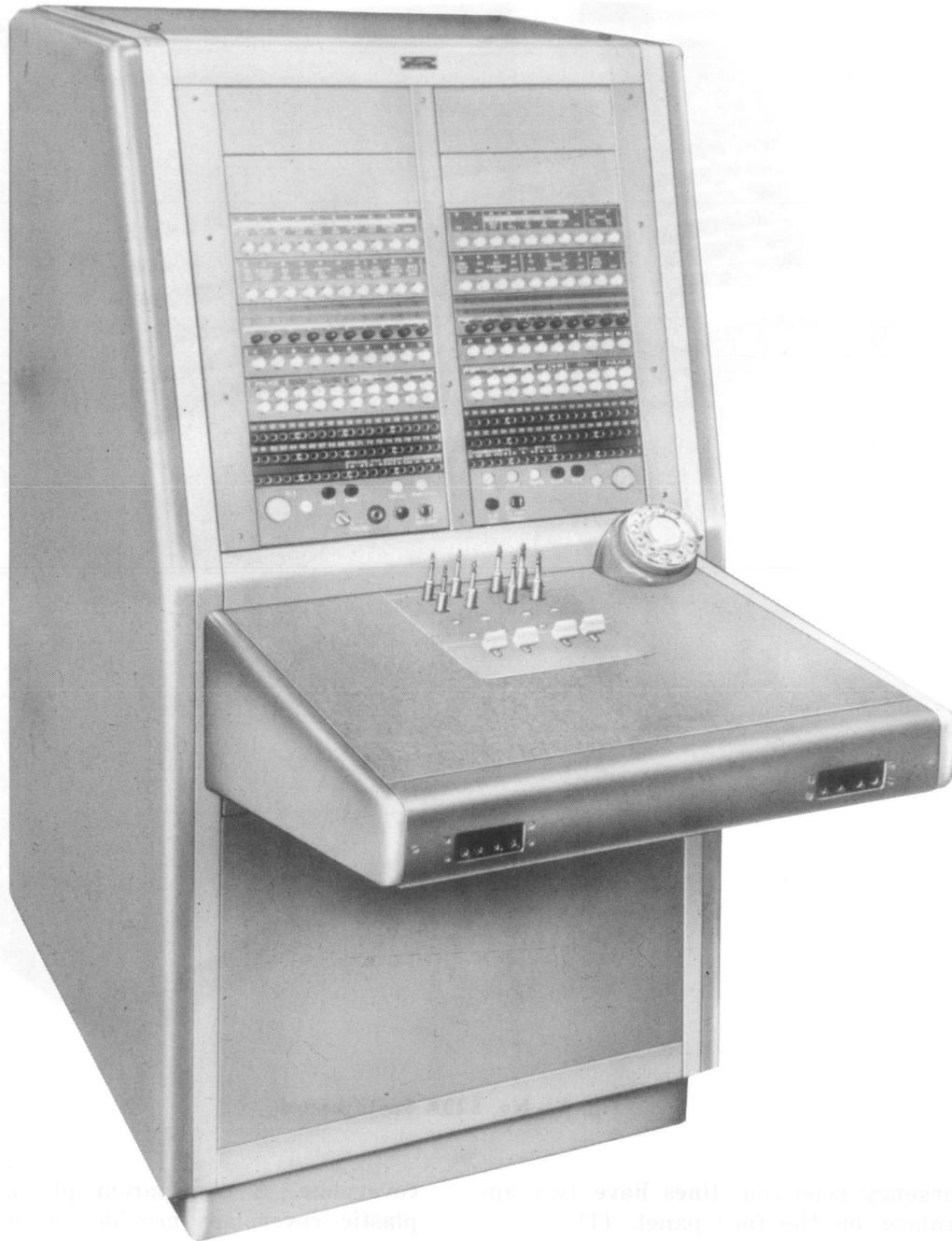


Fig. 5 - No. 520B Switchboard

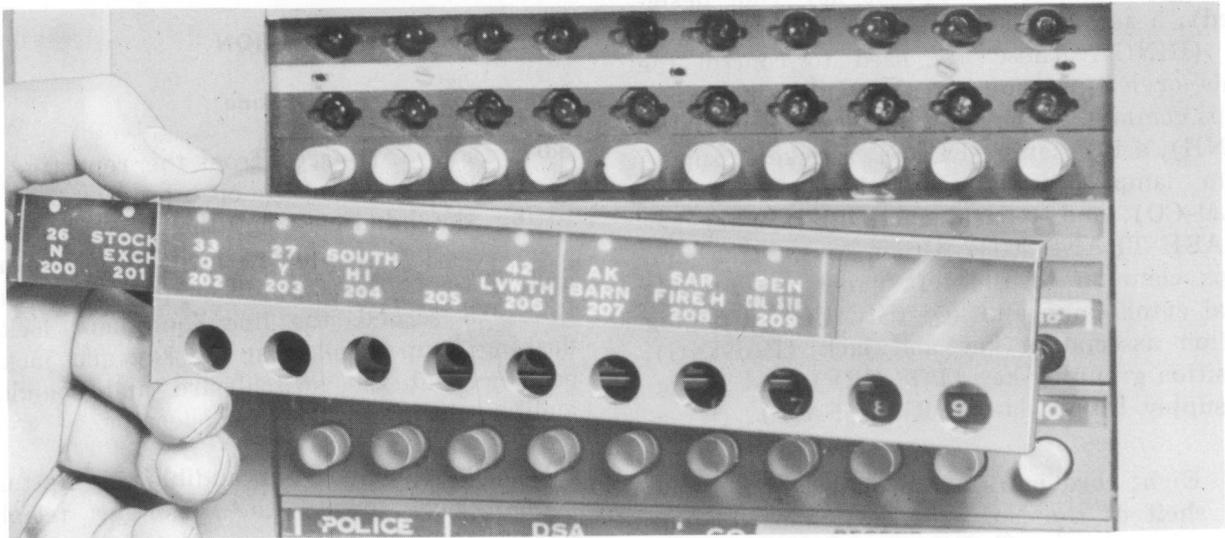


Fig. 6 – Switchboard View of Keys, Lamps, and Designation Strips With Plastic Coverplate Removed

2.24 Central office trunks are both jack and key terminated. The key appearance provides a lamp, a designation strip, and two nonlocking keys. The upper key is used for answering; the lower key enables the attendant to hold a trunk connection. Each key unit has space for ten central office trunks. The jack-terminated unit provides for the location of a maximum of 20 central office trunks. Located above these jacks are the individual line lamps, enclosed by a designation strip.

2.25 Tie trunks can be associated with either the emergency reporting line face equipment or the central office trunk face equipment, depending upon local arrangements. Tie trunks using reporting line equipment have the continuous line test, delay, and locked-in seizure features removed.

2.26 Paging lines are key controlled with suitable lamp indications. There are three control keys in the key layout; a “tone” (TONE), a “release” (RLS), and an “all call” (ALL CALL), thereby limiting the number of allowable paging stations in one strip of ten to seven. The distributing network and amplifier circuit required with the paging line switchboard ap-

paratus is not an integral part of the fire reporting system apparatus and must be supplied locally.

2.27 Annunciator and status controls can be provided in the face panel. These controls may be ordered in either of two arrangements; (a) a strip of ten keys with two lamp strips mounted one above the other or (b) a unit composed of ten keys and a strip of twenty lamps mounted above it. In a typical case, red- and green-colored areas in the designation strips are used to distinguish one lamp from the other. The red lamp, controlled by the fire station, indicates fire apparatus dispatched to an emergency point; the green lamp, controlled by the attendant, indicates fire apparatus available.

2.28 A full complement of line circuits is provided before each attendant when 2-attendant operation is used. The face panel is so arranged that the jack circuits located in the left panel are associated with the key appearance in the right panel, and the jack circuits in the right panel are associated with the key appearance in the left panel. This arrangement is provided for both the No. 520A and 520B switchboards.

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2.29 Mounted directly below the jack strips are control keys and lamps. Each panel has an individual release key (RLS), a disconnect lamp next to the release key (not designated), a recorder key (RCDR), and a ringing key (RING). These are used to control the right- or left-position circuits. Other keys and lamps common to the right panel are a line lamp (LINE), a fuse lamp (FUSE), a ticketer supply alarm lamp (TKTR), an alarm cutoff key (ALM-CO), and a flashing circuit transfer key (FLASH TRANS E-O). Other keys, jacks, and lamps common to the left panel are audible signal cutoff lamp and key (SIG CO), a paging position association key and jack (PAGING), a position grouping key (POS-GRP), and a ringing supply failure lamp (RING FAIL).

2.30 Eight cord pairs are provided in the keyshelf of the No. 520A switchboard; four cord pairs are provided in the keyshelf of the No. 520B switchboard. A cord pair is mounted on a reel-type cord unit; each cord unit also mounts the associated line lamps and key provided per cord pair.

2.31 The No. 520A switchboard has two dials mounted on the keyshelf for outdialing over central office trunks, one dial each for the left- and right-position apparatus. The No. 520B switchboard has one dial mounted on the keyshelf which is associated with trunks having jack appearances in the right section of the face equipment.

Power Supply

2.32 A suitable 48-volt power plant of adequate capacity with stand-by batteries is required.

2.33 Ringing current and audible ringing tone for these systems can be supplied over cable pairs from a local central office or by a ringing plant located at the headquarters. A stand-by hand generator is provided at the switchboard for use in case the normal ringing supply fails.

2.34 Tones, when required, can also be supplied at the headquarters by a local generator.

2.35 Failure of either the ringing plant or power supply gives both audible and visual alarm indications at the switchboard.

3. METHOD OF OPERATION

No. 570 Reporting Telephone

3.01 Calls are placed from the reporting telephone station by opening the door and lifting the handset from the switchhook. The associated line equipment momentarily operates and, if the off-hook condition persists for more than 0.5 second, the line equipment locks in flashing lamp displays at the key and jack appearances at the switchboard and sounds an audible alarm to alert the operator.

3.02 Simultaneously, an audible ringing tone is applied toward the reporting telephone station from the line equipment and remains connected until the operator answers the call.

3.03 If for any reason the calling party hangs up before the operator has answered, the line equipment will remain locked in to give the operator a visual indication of the telephone station number where the call was initiated. The number of the calling telephone is obtained from the designations strip associated with the incoming reporting line lamp.

3.04 With the selective routing feature provided for police reporting, the patrolman opens the door and operates the nonlocking key before lifting the handset. Holding the key momentarily while the handset is lifted signals the selective routing equipment and switches the reporting line telephone station from the fire headquarters equipment to the police headquarters equipment. As no delay is provided in the police headquarters line equipment, connection is made to the switchboard immediately. Locked-in flashing lamps and audible alarm alert the police operator when the line circuit is seized. An audible ringing tone is applied toward the reporting telephone station from the police equipment until the operator answers.

3.05 Under this condition, if the fire headquarters operator tries to seize the line with a police call in progress, the selective routing equipment gives the fire operator an audible busy signal.

3.06 If the patrolman replaces the handset on the switchhook before the police operator has answered, the police line equipment will restore to normal and immediately the selective routing equipment will automatically place the line on fire reporting stand-by condition. The patrolman must restart his call, as described above; otherwise, as he lifts the handset a second time without operating the key, the line equipment at the first headquarters will be seized.

3.07 Under normal operation with the handset in the on-hook condition the line is under continuous line test as explained in 4.01.

Switchboard

3.08 As the operation of the No. 520A and 520B PBX is essentially the same, the following description will apply to both switchboards. Where differences occur, they will be mentioned specifically and described individually.

3.09 Two sets of attendants telephone jacks are mounted below the keyshelf facing the front of the board. Insertion of an operator telephone set in the right- or left-hand jack will be associated with the right- or left-position circuit, respectively.

3.10 A position grouping key (POS-GRP) located on the lower left-hand side of the left panel controls the position grouping. With the key in the vertical position, the position circuits are split for individual control for 2-attendant operation. Each attendant has access to half of the cord circuits, either the right or left set.

3.11 With the position grouping key in the left or right position, the left or right-position apparatus is associated with the left- or right-operator telephone jack, providing for one-attendant operation.

3.12 With the position key in the left or right position for one-attendant operation, the common control keys (RLS, RCDR, RING) associated with the left- or right-position grouping circuit are used.

3.13 The rear or answering cords (cords closest to the face panel) located on the keyshelf are used for answering all incoming lines. The

front or calling cords (cords closest to the operator) are used to extend calls or to initiate calls over outgoing central office trunks or tie trunks.

3.14 Each cord has a supervisory lamp associated with it. A cord pair (answering cord and call cord) has a talk key associated with it. Placing the key in the forward position (or operated away from the operator) associates the cord pair with the position circuit and establishes a talking connection. Operating the key toward the operator places ringing current across the tip and ring of the call cord. There is no provision for ringing on the answer cord.

Emergency Reporting Lines

3.15 Operation of the line equipment on an incoming call from an emergency reporting station causes line lamps to flash at a key and jack appearance, and the audible signal to sound. Dual appearances of line lamps provide a safety factor against a line lamp burnout.

3.16 The call may be answered by (a) pressing the key button or (b) plugging into the answering jack with the switchboard cord.

(a) **Key Answer:** Momentary operation of the key button connects the line equipment to the position equipment and establishes the talking connection. The flashing line lamp changes to a steady lamp.

(b) **Cord Answer:** Insertion of the rear cord into the associated line jack, with the talk key operated to the front position, connects the line equipment to the position equipment and establishes the talking connection. The flashing line lamp changes to a steady lamp.

3.17 Calls can be extended to another station or to other trunk equipment when the station has been cord answered by inserting the plug of the associated cord pair into the jack associated with the line to be called. Operating the talk key to the rear provides ringing generator toward the called point. Lamp supervision is provided with the cord pair.

3.18 After the call is completed the operator can release the line equipment by pressing the position release key (RLS) located in the face

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panel, if key answered, or by removing the answer cord, if cord answered. The right or left release key is operated, depending upon the position circuit in use.

3.19 With selective routing and the emergency reporting station cut through to the police PBX, busy tone is supplied to the fire PBX switchboard.

3.20 Emergency reporting stations can be provided with a rering feature. This allows the attendant to call these lines by ringing on the line with the call cord inserted in the calling line jack or by operating the station key and depressing the position ring key.

Central Office Trunk

3.21 Fire and police calls from the central office telephone network can be received over central office equipment. Outgoing calls from the PBX can be placed over the same equipment if arranged for 2-way operation.

3.22 An incoming call causes the associated line lamp to flash. The operator can either key answer or cord answer, as described in 3.16 for reporting lines.

3.23 A hold key located below the associated answer key in the face panel allows the attendant to hold the connection to a central office trunk, if desired. Momentary operation of the hold key disengages the relay equipment from the position circuit, holds the central office connection, and provides a transfer from a steady lamp to a flashing lamp. Momentary operation of the answering key reconnects to the trunk equipment and re-establishes the talking connection.

3.24 After the call is completed, the operator can release the trunk equipment by pressing the position release (RLS) key, if key operation is used, or by removing the cord, if cord operation is used.

3.25 To establish an outgoing call, the operator inserts a front cord into the central office jack associated with an idle trunk and operates the talk key. After receiving dial tone, the op-

erator dials into the central office equipment. To release the connection, the cord must be removed from the jack, returning the equipment to normal.

Tie Trunk

3.26 Operation of the relay equipment on an incoming call causes the line lamp to flash and the audible signal to sound.

3.27 The call may be answered by key or cord, as described in 3.16 for reporting lines.

3.28 The call can be released by operation of the release key (RLS) or by removing the answering cord.

3.29 Outgoing calls can be originated by key or cord, as follows:

(a) **Key:** Momentary operation of the key button connects the tie trunk equipment to the position equipment and establishes the talking connection. With ring down operation, the position ring key is momentarily pressed, sending ringing current on the line toward the called point. With automatic operation, the equipment provides signaling.

(b) **Cord:** The insertion of the front cord in a tie line jack connects the tie trunk equipment to the position equipment and establishes the talking connection. With ringdown operation, the talk key is momentarily pressed toward the attendant, sending ringing current on the line toward the called point. With automatic operation, the equipment provides signaling. The operator operates the talk key forward to establish the talking connection.

Paging Feature

3.30 By placing the paging button on the left panel in the proper position, the left- or right-position equipment can be connected to use the paging feature.

3.31 To page a particular fire house, the operator depresses the proper paging line key and the common tone key. The tone key sends a suitable calling tone as an audible signal to the line selected. With the release of the tone key the operator can speak through the paging system.

3.32 To call all paging stations at one time, the operator depresses the ALL-CALL key and depresses the tone key momentarily, giving all stations an indication of an incoming call. Communication over the paging system is then possible through the operator headset.

3.33 To release the paging lines from the position equipment the operator presses the release (RLS) key mounted adjacent to the tone and call keys.

3.34 To patch a remote station to a paging line the operator inserts the call cord into the paging jack, depresses the paging line key, and operates the tone key momentarily. Communication between the remote station and the called station is now possible. After the message is passed, the operator depresses the release key and pulls down the call cord.

Annunciator and Status Feature

3.35 The annunciator and status feature is used to notify the operator of the operational condition of fire units or other emergency apparatus for effective dispatching of emergency equipment.

3.36 When fire apparatus leaves its home station, a switch is manually or automatically actuated, lighting the red lamp associated with this station's appearance on the face panel of the switchboard.

3.37 After being notified by radio that the fire apparatus is returning to the fire house, the switchboard attendant operates the status key which lights a green lamp. The red and green lamp indication informs the operator that the unit designated is available for further dispatching.

3.38 The red lamp is retired automatically or manually when the fire apparatus returns to the fire house. The operator then retires the green indicator by placing the corresponding status key in its normal position.

3.39 The signal which controls the annunciator lamp may be transmitted over the same lines used for paging.

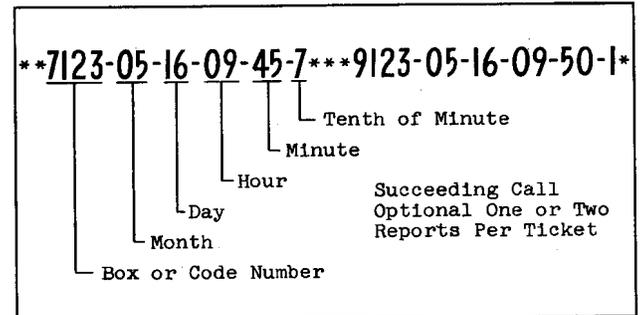


Fig. 7 — Sample Ticket From Ticketer

Call Recorder

3.40 The call recorder provides a printed record of all calls received over the emergency lines, showing for each call the code number of the reporting telephone station, and the month, day, and time. Fig. 7 shows the information printed on a paper ticket. Fig. 8 shows the ticketer that prints the ticket.

3.41 An incoming call on the emergency reporting line engages the call recorder equipment which identifies the reporting line and controls the ticketer.

3.42 The call recorder equipment can store a maximum of ten simultaneous calls for ticketing. Each call will be printed separately in a prearranged pattern depending upon equipment arrangements.

3.43 Approximately 4 seconds are required to print a report. The printing continues to repeat until the call is answered by the operator. However, if other calls simultaneously seize the equipment, each call will be printed before a repeat printing is made.

3.44 If the code number of the reporting telephone is not the same as the reporting telephone number, a cross-reference chart can be drawn up locally to translate from the printed code number to the reporting line number.

3.45 If the reporting telephone code number is to agree with the reporting telephone number, the boxes should be consecutively as-

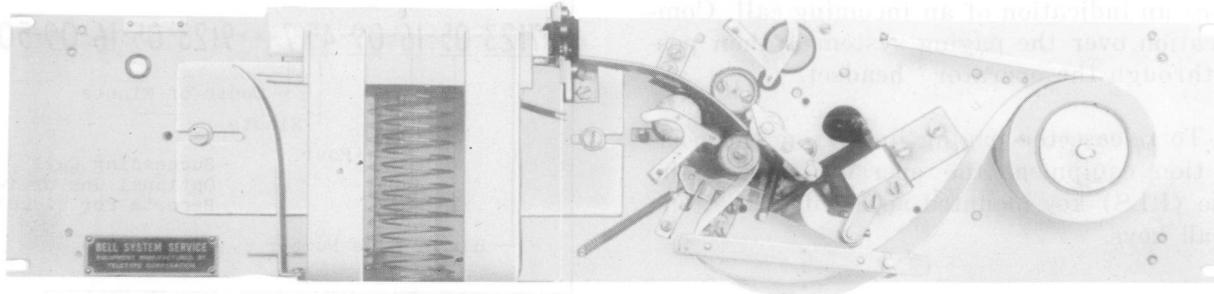


Fig. 8 – Call Recorder Ticker

signed to the line equipment. The thousands and hundreds digit of the assigned number series will be obtained by a suitable cross-connection option at the connector. However, to provide a manual test feature with the call recorder, the first terminal on the first crossbar switch should not be assigned to a line equipment. It will be necessary therefore to use the line equipment associated with this terminal as a tie trunk or some other facility which does not require a printed call record.

3.46 A suitable equipment option can enable the call recorder to print one or two reports on one ticket, depending upon local arrangements.

3.47 A suitable equipment option can enable the call recorder to correlate dates for a leap year as well as for a regular year.

3.48 An alarm lamp (TKTR) in the right panel face equipment and an audible alarm will indicate when the supply of ticket paper is low.

Voice Recorder

3.49 A permanent voice record of all calls is possible by connecting automatic voice recorders of suitable design to the switchboard with a standard No. 50B recorder connector.

3.50 The voice recorder is started automatically on each incoming call to the switchboard when the operator answers and is stopped when the position circuit is released.

3.51 A RCDR nonlocking key in the face of the panel can be operated to disengage the voice recorder when call recording is not desired.

Traffic Requirements

3.52 Due to the nature of this service the calling rate is normally expected to be low.

3.53 When the system is used in conjunction with police reporting, the selective routing feature must be included. This requires duplicate switchboard and line equipment at a second remote headquarters location.

Transmission Aspects

3.54 The emergency reporting line loops should be designed to meet at least the average transmission requirements of subscriber loops, as detailed in exchange transmission design practices covering resistance design. Where emergency reporting telephones are located at business intersections and other localities of high street noise, special attention should be given to the transmission design. For example, advantage should be taken of existing course gauge cable or relocation of long line equipment to improve the battery supply.

3.55 The following loop arrangements between the emergency reporting telephone and the switchboard are possible. (1) Loops directly terminated at the switchboard, (2) loops terminated in a central office on long line equipment and trunked to the emergency reporting switchboard, and (3) loops switched at a central office through

selective routing equipment and trunked to the fire and police headquarters. With arrangements (2) and (3) above, the trunk between the long line equipment and the PBX should not exceed existing trunk design objectives.

4. ALARMS

Continuous Line Test

4.01 Without Selective Routing: The continuous test relay releases whenever the tip or ring of a reporting telephone line becomes open or grounded. This condition lights a red lamp at the switchboard appearance of the line in trouble. The common audible alarm sounds and the LINE trouble lamp lights. If the ring is grounded, a regular flashing lamp indication may also appear. The attendant upon answering this signal or one caused by a shorted line receives no voice response. If the RLS key is operated, a line seizure immediately reoccurs, indicating a line trouble or receiver off hook. An answer cord can be inserted into the line jack associated with the line in trouble to retire the audible and the flashing line signal. The telephone maintenance department should be notified if the receiver off hook is not suspected and there is trouble on the line.

4.02 With Selective Routing: An open, short, or tip ground will be indicated as in the preceding paragraph. A ring ground will operate the selective routing circuit causing the line to be transferred to the police headquarters. A regular call indication will appear on the police switchboard. The police attendant should suspect trouble on the line when he receives no response to his answer and should notify the fire attendant since there will be no indication on the fire switchboard. The fire attendant will take appropriate action for this trouble display. An answer cord left in the line jack associated with the line in trouble will prevent re-entry of this trouble condition and will hold the line equipment with a steady lamp at the line appearance.

Miscellaneous Alarm Circuits

4.03 A miscellaneous alarm circuit is contained in the PBX with associated lamps and keys located on the panel in the head position. There are five alarm lamps located below the jack strips in the face panel of the switchboard.

An alarm bell is mounted on the switchboard equipment rack. The lamp designations and their functions are as follows:

- (a) The line lamp (LINE) lights when a trouble condition appears on the emergency reporting lines.
- (b) The fuse lamp (FUSE) will be lit by the operation of any protective fusing of the line equipment, trunk equipment, switchboard equipment, etc.
- (c) The signal cut-off lamp (SIG CO) lights when any call is incoming to the board.
- (d) The ring failure lamp (RING FAIL) lights when a normal ringing supply fails.
- (e) The ticketer supply alarm lamp (TKTR) lights when the supply of paper for the ticketer is low.

4.04 The audible alarm sounds when any alarm lamp lights. An alarm cut-off key is provided to silence the alarm.

Alarm Extension

4.05 An alarm extension circuit is available which can extend the PBX equipment alarms to an attended central office to provide the following alarm indications.

- (a) **Major Alarm:** Line failure, certain fusing failure conditions, power supply failures, and other conditions requiring a major alarm will sound the major alarm at the central office.
- (b) **Minor Alarm:** Ring failures, minor fusing, the ticketer alarm, and other conditions requiring a minor alarm will sound the minor alarm at the central office.

5. MAINTENANCE

5.01 The nature of this service requires the telephone company to correct abnormal conditions immediately.

5.02 In some cases, the use of a tie trunk between the switchboard and the local telephone company test center is suggested to pro-

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vide a communication channel for maintenance and trouble report dispatching.

5.03 Cable terminals, distributing frame terminations, and equipment fusing should be provided with suitable central office markings or protector guards.

5.04 All central office records on the system should be designated with suitable and appropriate notations.

Switchboard

5.05 Cord relay units have plug-in connectors to facilitate replacement for maintenance.

5.06 Plastic covers held with friction retaining pins which can be easily removed for lamp and designation strip replacement are supplied over key and lamp units.

Ticketer

5.07 Switchboard operators or other personnel can add new rolls of ticket tape to the ticketer, as necessary.

6. GLOSSARY

Annunciator

Red lamp appearances for indicating fire equipment temporarily not available. Controlled by a switch at the fire station.

Answering Cord

The rear cord (cord near the face panel) of a cord pair used to answer incoming lines.

Call Recording

The feature by which a printed record is made of each reporting telephone call incoming to the switchboard.

Calling Cord

The front cord or cord nearest to the operator of a cord pair used to initiate calls over the switchboard jacks.

Central Office Trunk

A 2-wire talking channel used to provide incoming and outgoing communication with the telephone company's network.

Continuous Line Test

Feature used to monitor emergency reporting lines and to indicate automatically lines disabled due to troubles.

Cord Unit

A device mounted below the keyshelf to house cords, supervisory lamps, and talking keys. The unit houses two cords, two lamps, and a talk and ring key. The cords are mounted in retractile cord reels.

Dial

A device associated with outgoing central office trunks to provide means for dialing into the central office.

Double-ended Cord

The cord pair, terminated at the switchboard jacks, used for answering or initiating a call and to provide a common talking channel. The front cord is designated the calling cord; the rear cord is designated the answering cord.

Emergency Hand Generator

Induction coil that generates a 20-cycle tone by the manual rotation of a retractile lever. Located on the keyshelf and used when the regular ringing supply is disabled.

Emergency Reporting Telephone

The outdoor 570-type telephone set developed for and restricted to the use of emergency reporting systems.

Flash and Wink Unit

The common control equipment unit used for alarm indicating.

Operator

A police officer, fireman, dispatcher, or any municipal or industrial employee designated as the official operator at the switchboard to receive and dispatch emergency reports from emergency reporting lines or other incoming channels.

Paging

One-way voice and signaling feature for dispatching voice communication to other designated points.

Panel

The switchboard proper which houses reporting line lamp, keys, jacks, central office trunks, annunciator and status lamps, alarm lamps and keys, control keys, etc. The panel is composed of the left and right face panel units.

Position Grouping Key

A key which can be set at the switchboard to associate 1- or 2-operator telephone sets with the switchboard.

Selective Routing

A circuit feature which provides for switching of emergency reporting telephone calls over reporting lines to either of two reporting centers. Switching is controlled by operation of a non-locking key at the reporting telephone set.

Status

Green lamp appearances for indicating fire equipment available for dispatching but not at its regular firehouse.

Tie Trunk

A 2-wire talking channel providing a communication link between the No. 520 switchboard and remote locations independent of the telephone network.

Voice Recorder

A device used to record voice communication received over the switchboard talking channels.