

## 293 One-Way Alerting System Description

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### 1. general description

1.01 The Tellabs 293 One-Way Alerting System (figure 1) is a multistation ringdown telephone circuit used in emergency-alerting applications. With the 293 System, large numbers of people can be simultaneously alerted via their telephones when emergencies such as fires, industrial accidents, or threatening weather conditions occur. Thus, the 293 System can serve small communities, hotels, motels, apartment buildings, condominiums, high-rise buildings, hospitals, department stores, shopping malls, schools, campus facilities, factories, chemical and nuclear facilities, and numerous other applications where personnel require immediate notification of emergency and/or evacuation procedures when disaster threatens or strikes.

1.02 In the event that this Practice section is reissued, the reason for reissue will be stated in this paragraph.

#### system configuration

1.03 The 293 System is modular in design and configured in 100-station increments. Each fully autonomous 100-station increment is subdivided into 10-station increments, 10 stations being the number accommodated by each line-circuit module in a 293 Mounting Assembly. A minimum-size 293 System consists of one 293 Mounting Assembly equipped with 2 common-control modules and 1 to 10 line circuit modules, a ringing generator, and a power supply. Optional backup batteries, a message-announcement device, a wall-mounted activation panel, and a cabinet that houses all of the above equipment (except the activation panel) can be provided if required. This equipment is described in section 2 of this Practice. The 293 System is designed to operate in conjunction with a wide range of other standard Tellabs modules for added System flexibility. Section 3 of this Practice describes some of these modules and the various applications in which they can be used.

#### system application

1.04 The 293 System can be used with any conventional PBX switching system; maximum length of each station loop is 1000 ohms. Generally, the 293 System is used in either of two on-premises applications. Specifically, the System can be in-

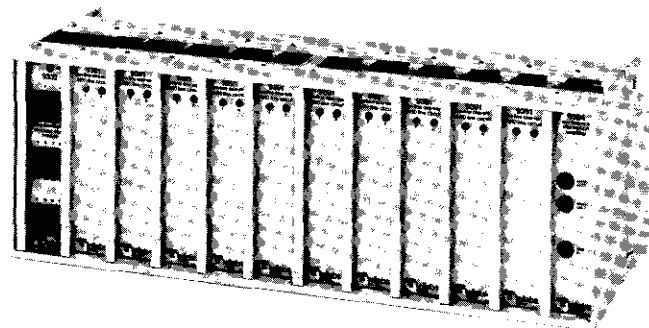


figure 1. 293 One-Way Alerting System

stalled in series with station telephones served by a PBX, such as in a hotel or office building, or the System can be installed in series with CO lines, such as in an apartment complex.

#### 293-to-PBX interconnection

1.05 The 293 System is easy to install because it is compact in size, does not require extensive wiring, and features connectorized shelves. When the 293 System is located near the switching equipment, connectorized cables permit quick interconnection between the 293 System and the switching-equipment cross-connect frame. Station and switching-equipment connections to the 293 System are made via Universal Service Order Code (USOC) RJ71C connectors. This arrangement allows bridging plugs to take the place of the 293 System connectors, allowing normal telephone service both before the System is installed and after the 293 System is taken out of service.

#### system features

1.06 The 293 System uses standard telephone sets to convey emergency information, and alerting is accomplished via the existing telephone ringer. By utilizing the telephone sets and station wiring already in place, the 293 System eliminates the need to install, test, and maintain special alerting and signaling devices such as speakers and transducers.

1.07 In an emergency, the station telephones ring at a distinctive rate of 0.5 second on, 2 seconds off (other ringing rates are available), until the stations are answered or the System is reset. Stations that are off-hook when the System is activated are automatically transferred into a prerecorded message or live broadcast. This feature ensures that a person will not miss the emergency message due to a conversation in progress.

1.08 In an emergency, most PBX systems will experience an overload condition (due to heavy call traffic) which renders them inoperative. Because the 293 System removes all nonessential traffic from the PBX, availability of the PBX for official

calls can be ensured. Unlike bells or buzzers, which can cause mass confusion and even panic, the 293 System gives people verbal information on the nature of the alarm. When the emergency situation is resolved, the System can then be used to signal the "all clear" condition to prevent further problems.

#### **activation and zoned alerting**

1.09 In its basic form, the 293 System is activated by depressing one pushbutton on its activation panel, which immediately alerts all stations served by the System. With zoned alerting, one pushbutton per zone is depressed in the desired alerting order. When used properly, the 293 System can orchestrate an orderly evacuation of people by floors or zones. Zones closest to the fire (or other hazard) are evacuated first; zones further away are evacuated in an order corresponding to their distance from the hazard. This evacuation procedure can prevent overcrowded stairwells and emergency exits.

1.10 The 293 System can be activated in a number of additional ways by using various types of optional peripheral equipment. Examples of optional activation equipment include a multiline key telephone console, DTMF decoder modules (which can also provide zoned alerting), or interface to sensors ranging from units that provide a contact closure to an elaborate computerized system that automatically monitors a fire-annunciator panel and activates the 293 System according to software-determined zones. The emergency announcement can be transmitted by one or more dedicated recorders, by live announcement, or by a combination of the two methods.

#### **peripheral equipment**

1.11 The 293 System provides a basic framework that can interface a variety of peripheral equipment. Optional equipment includes an answer-lamp field, a multiline key telephone console, and a number of Tellabs support modules. These modules include certain individual modules of the Tellabs 292R Conference/Alerting System (or an entire 292R System), the 9398 Five-Line One-Way ARD Line Circuit Module, DTMF decoder modules, and additional special-purpose modules. Please refer to section 3 of this Practice for detailed information. In addition, larger cabinets, and higher-capacity ringing generators and power supplies are available for larger systems.

#### **reliability**

1.12 In emergency-alerting applications, system reliability is of utmost importance. The 293 System features a very reliable, straightforward design. The 293 is powered down in its idle state and therefore draws very low idle current (to conserve energy and extend component life), while nevertheless maintaining constant System readiness. The System monitors the power supply and ringing voltages, and a visible/audible trouble indication on the activation panel is activated if either should fail. The System has distributed control; it is configured in 100-station increments, which are further divided

into increments of 10 stations per line circuit module. Each 100-station increment is fully autonomous, thus eliminating the possibility of a failed module or component rendering the entire System inactive. Also, spring-loaded card-edge connectors in the System's Mounting Assembly maintain circuit continuity and, therefore, normal telephone service if a module is removed for repair.

#### **installation and power**

1.13 The standard 293-System Mounting Assembly is a prewired Tellabs Type 10 Mounting Shelf with a connectorized backplate. This connectorized configuration allows quick interconnection to the cross-connect frame and associated peripheral equipment. The Mounting Assembly or Assemblies mount in a standard 19-inch or 23-inch relay rack or in a cabinet, either of which is optionally available with the System. The System is powered from -48Vdc filtered, ground-referenced power supply or battery. This voltage source can be provided via a standard telephone-type power supply or by sharing the PBX's battery, as desired.

#### **system purpose**

1.14 The 293 System is designed to bridge the gap between the two existing methods of hotel/motel evacuation: bells/buzzers and room-to-room searches. The 293 System should not replace either of these methods; instead, the System provides a third method which augments the two traditional methods and helps to ensure an orderly and controlled evacuation in an emergency situation.

## **2. system components**

2.01 The 293 System is modular in design and is configured in 100-station increments, each fully autonomous. A typical (100-station) 293 One-Way Alerting System consists of one 293-1 Mounting Assembly (one for every 100 stations), 2 common-control modules (9332 Ringing Interrupter and Fuse Module and 9394 Conference Distribution Amplifier), and 10 line circuit modules (9391 Ten-Line One-Way ARD Line Circuit Module, one module for every 10 stations). The System also requires a power supply and ringing generator; these are supplied with the System based on requirements of the application. This System requires one or more 8007 Power Supplies (one 8007 Power Supply for every 300 stations) and 8108 Ringing Generators (one 8108 for every 100 stations). In addition, other equipment available in the 293 System include a backup battery pack, a recording device, a wall-mounted activation panel, and a cabinet that mounts all of the above equipment (except the activation panel).

2.02 Larger Systems require the same items for each 100-station increment. In addition, a larger cabinet is needed and possibly a power supply with greater capacity. All 293 System modules are Type 10 modules. All modules and other System equipment operate on nominal -48Vdc power supply. Figure 2 shows a front view and figure 3 shows

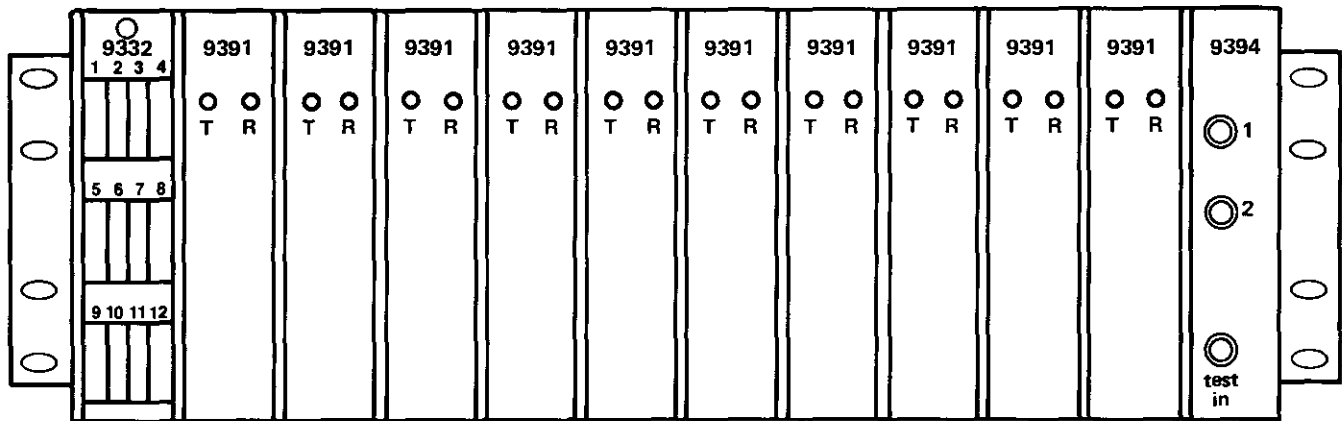


figure 2. Front view of 293 System

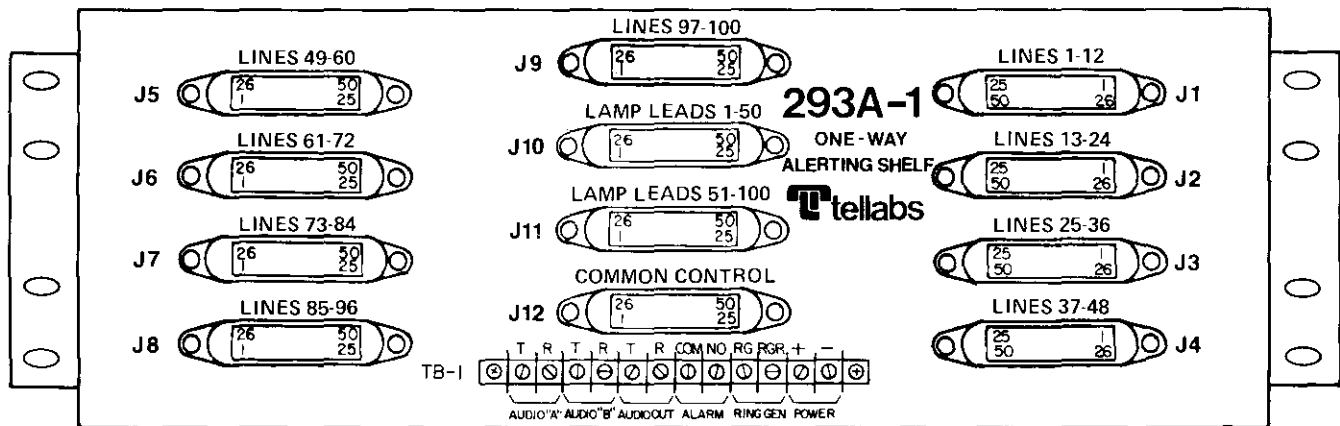


figure 3. Connectorized backplate of 293-1 Mounting Assembly

the connectorized backplate of a 100-station 293 System. Each of the 293 System components is described individually in the following paragraphs.

### 293-1 Mounting Assembly

2.03 The 293-1 One-Way Alerting System Mounting Assembly is a prewired Tellabs Type 10 Mounting Shelf with a connectorized backplate that allows quick interconnection to the cross-connect frame and associated peripheral equipment. The 293-1 Assembly is available in two versions: the 293A-1, which mounts in a 19-inch relay rack, and the 293B-1, which mounts in a 23-inch relay rack. Each version occupies 6 inches of vertical rack space. For smaller 293 Systems, a similar shelf can be mounted in a 16C, 6A, or 6AW Apparatus Case.

2.04 Screw terminals are provided on the 293-1 Assembly's backplate for power connections, ringing input, audio output, two isolated high-impedance audio inputs, and System alarm outputs. All other connections to the 293 backplate are made via twelve 25-pair Amphenol-type female cable connectors. Nine of these connectors accommodate the System's tip and ring input and tip and ring output leads as wired in accordance with Universal Service Order Code (USOC) RJ71C. The tenth and eleventh connectors accommodate 100 off-hook status leads. The twelfth connector accommodates 10 group leads, an all-call lead, a 2-wire loop interface for direct connection to a 2-wire telephone or multiline key console, and other miscellaneous

control-signal leads. Please refer to table 5 in the installation section of the 293 System Installation Practice, section 8X293-2, for more information.

2.05 Cut-through card connectors at each module position of the 293-1 Assembly prevent disruption of normal telephone service whenever a line circuit module is removed from the System. Because external connections to the 293-1 Assembly are made via cable connectors instead of wire wrapping, no special tools are required for installation, and installation time is minimized.

2.06 One 293-1 Mounting Assembly accommodates 100 stations (ten 9391 modules) and the associated common-control modules (one 9332 and one 9394). Module position 1 of the Assembly is prewired to accommodate the 9332 Ringing Interrupter and Fuse Module, position 12 is prewired to accommodate the 9394 Conference Distribution Amplifier, and positions 2 through 11 accommodate one to ten 9391 Line Circuit modules. The only wiring between adjacent 293-1 Assemblies is for power distribution and audio input multiples when required. The first audio input per shelf is for stations 1 through 50, and the second input is for stations 51 through 100.

### 9332 Ringing Interrupter and Fuse Module

2.07 The 9332 Ringing Interrupter and Fuse Module (please refer to figure 4) provides 12 distribution fuses to separately fuse each of the ten

9391 Line Circuit Modules as well as the 9394 Distribution Amplifier and the ringing generator input. One 9332 module is required with each 293-1 Mounting Assembly. A front-panel fault LED on the 9332 provides a local visible indication of a blown fuse. A fault relay provides contact closure for a remote indication of either a blown fuse or loss of System input power. Fuses in the 9332 are Buss GMT-type fuses. Located on the front-panel of the module, these fuses can be replaced without removing the module from service. A detection circuit provides an alarm indication in the event that ringing generator voltage falls below a preset level.

2.08 The 9332 module also provides a phasing circuit and zero-crossing switch to divide the ringing load into five groups. When one group is connected to the ringing source, the other four groups are connected to battery for ring trip during the non-ringing interval. This configuration is repeated for each output once every 2.5 seconds in response to control signals supplied by the phasing circuit. Each of the five generator outputs is connected to two 9391 modules. Each output is 0.5 second on and 2 seconds off, allowing a 20-watt ringing generator to alert 100 stations. The zero-crossing detector is used with the phasing circuit to switch the ringing generator at the minimum voltage level to avoid generator switching transients. The phasing circuit is active only when a group lead is grounded.

### 9394 Conference Distribution Amplifier

2.09 The 9394 Conference Distribution Amplifier module (please refer to figure 5) provides two isolated high-impedance audio inputs for bridging two or more 293-1 Mounting Assemblies to one or more message sources. One 9394 module is required with each 293-1 Mounting Assembly. A compression amplifier is used in each audio input path to maintain constant output levels to all stations regardless of the number of off-hook stations and differing System input levels, thereby eliminating the need to perform alignment or make level adjustments. Each compression amplifier output is connected to its own distribution buffer that provides a low output impedance capable of driving five 9391 modules (50 stations for each buffer circuit).

2.10 A two-position switch on the 9394 provides either a  $-6\text{dBm}$  or  $-12\text{dBm}$  level to the stations when the audio input signal is between  $-5\text{dBm}$  and  $-25\text{dBm}$ . For testing purposes, 310-type monitor jacks are used for audio input/output connections and for activating the System via an associated station instrument.

2.11 The 9394 also provides battery feed for direct connection to an alerting telephone or multi-line key telephone console (both optional) for live broadcast. An option switch can connect the all-call lead to the battery-feed circuit for alerting all

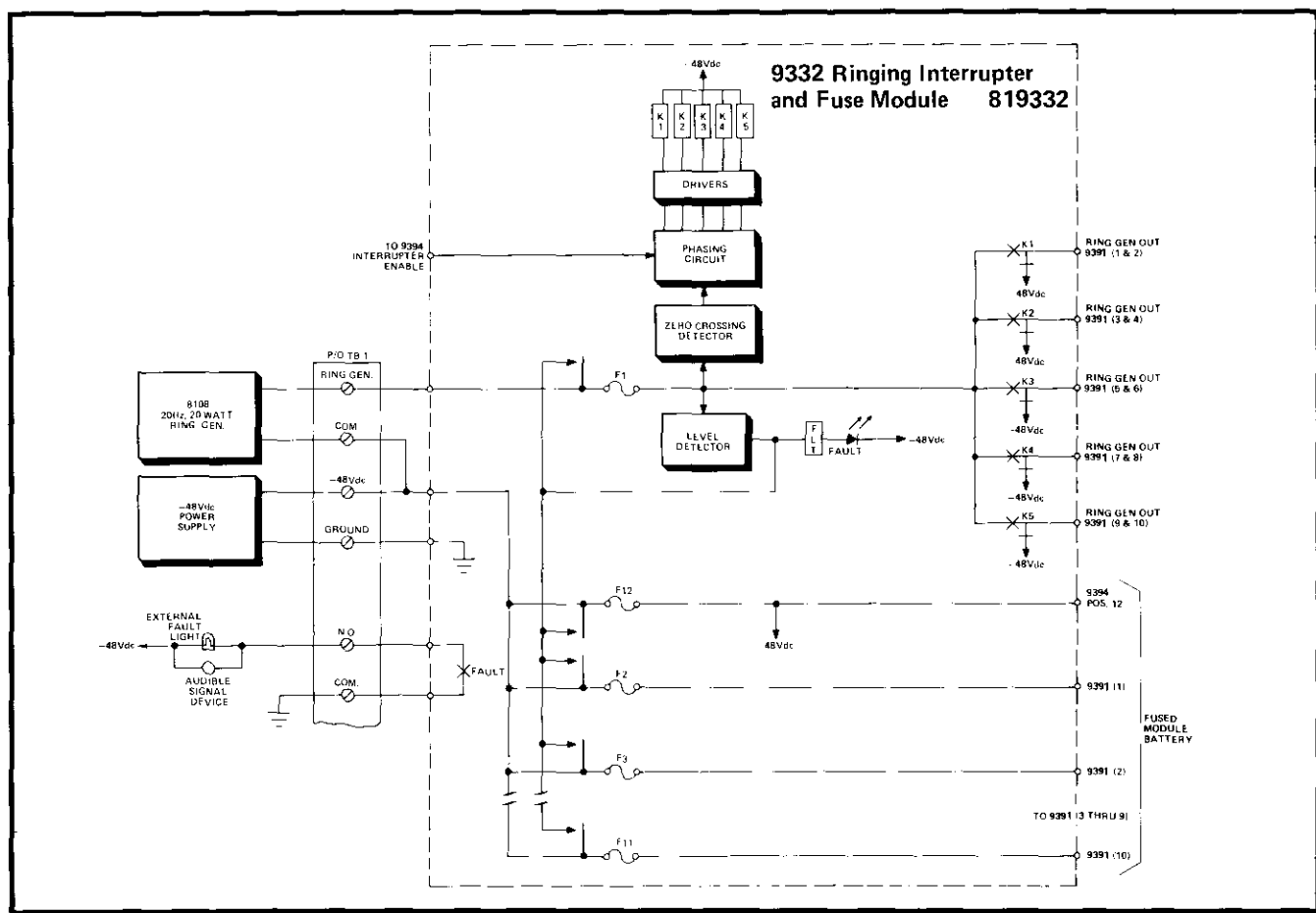


figure 4. 9332 Ringing Interrupter and Fuse Module (819332) block diagram

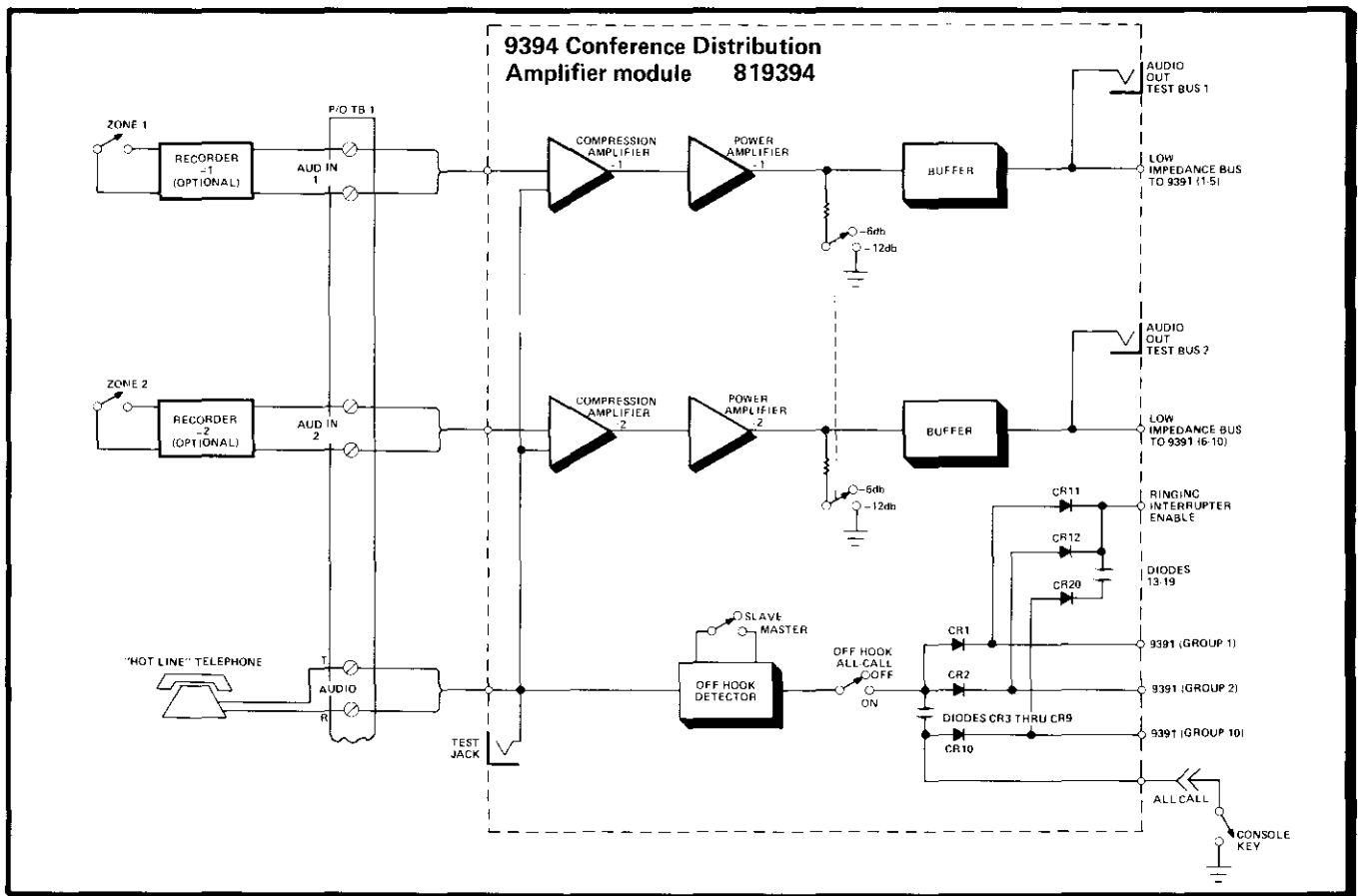


figure 5. 9394 Conference Distribution Amplifier module (819394) block diagram

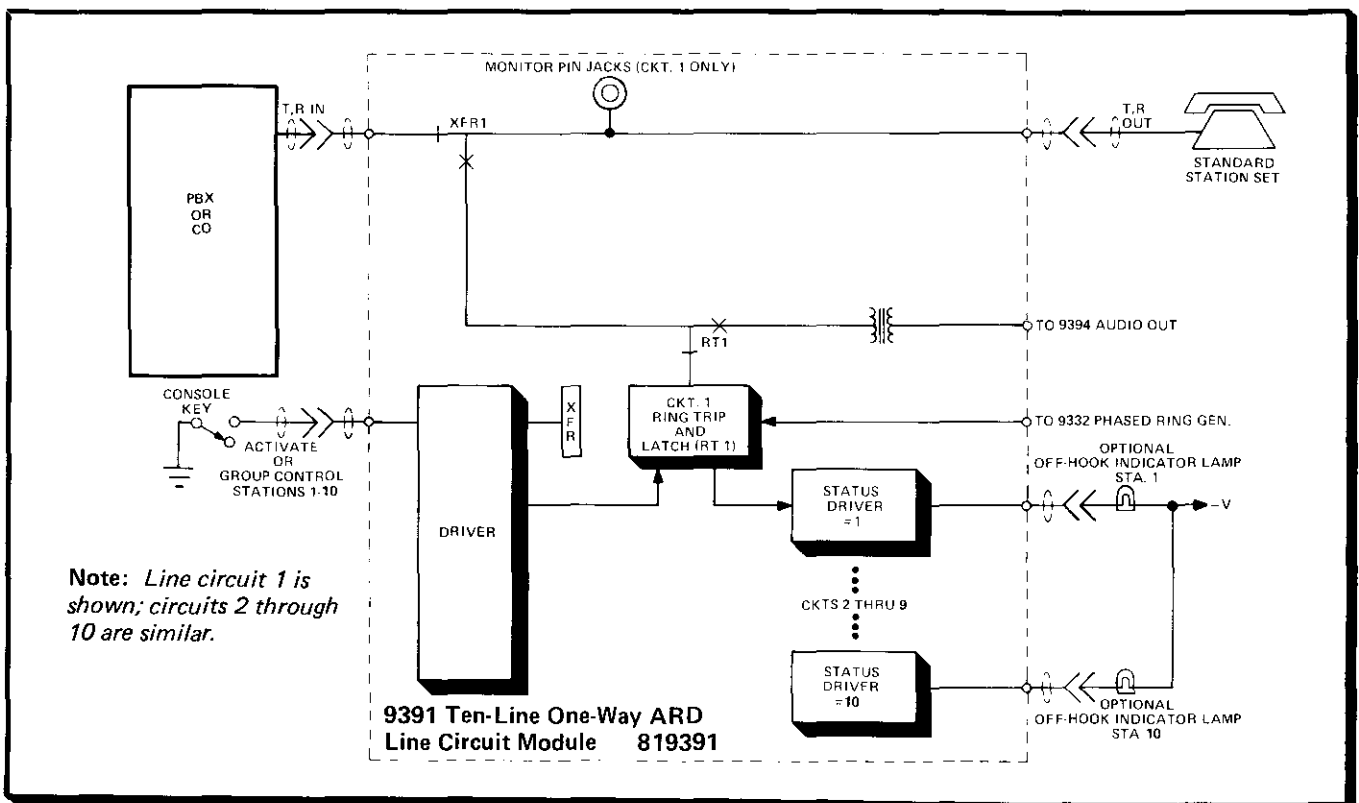


figure 6. 9391 Ten-Line One-Way ARD Line Circuit Module (819391) block diagram

stations when the telephone or console goes off-hook. An audio output pair is used to distribute the live broadcast to other 293 Shelves. The 9394 contains isolation diodes that provide for the all-call feature and enabling of the 9332 module if any zone is alerted.

#### **9391 Ten-Line One-Way ARD Line Circuit Module**

2.12 The 9391 Ten-Line One-Way ARD Line Circuit Module (please refer to figure 6) provides for the transfer of 10 stations between the PBX and the 9394 Distribution Amplifier. The transfer of all 10 lines is initiated by applying ground to the driver circuit of the transfer relay (group lead). The driver circuit keeps input current to a minimum and allows direct interface with existing automatic fire control panels, telephone keys, recorders, etc.

2.13 Each of the 10 lines is provided with ring trip and a latching circuit that identifies off-hook status when the station answers an emergency call. Ring trip is initiated either during the ringing or silent interval of an emergency call. When a station answers, the ring-trip circuit sets the latch that provides both station cut-through to the 9394 Distribution Amplifier and ground for off-hook status. This latch remains set until the System-activate or group-activate ground is removed.

2.14 An isolation transformer on each 9391 prevents a short circuit on a station telephone or cable pair from disrupting audio signal transmission to the remaining station modules. In the event a 9391 module is removed from its position for servicing, cut-through connectors in the 293 Assembly maintain circuit continuity between the stations and switching equipment for normal service.

2.15 Front-panel pin jacks are provided for testing the tip and ring leads (station 1 only). One 9391 module is required for every 10 stations (ten 9391's is the maximum for one 293-1 Assembly).

#### **8108 Ringing Generator**

2.16 The 8108 Ringing Generator provides tapped 80, 90, 100, and 110Vac outputs, all at 20Hz, from -48Vdc input. The 8108 is rated at 20 watts of ringing power with a maximum full load input current of 900mA.

2.17 Designed for KTU apparatus case installation, the 8108 measures approximately 4.75 x 7.0 x 7.25 inches and is UL recognized. Nineteen-inch mounting bars, Tellabs part number 14-9002, can mount three 8108 Ringing Generators across a 19-inch relay rack. Twenty-three-inch mounting bars, Tellabs part number 14-9003, can mount four 8108 Ringing Generators across a 23-inch relay rack.

2.18 Normally, one 8108 Ringing Generator is required for each 100-station shelf of the 293 System. However, when less than 100 stations comprise a System, a smaller ringing generator can be supplied. In installations where battery-biased (-48Vdc) ringing is externally available, the need for the 8108 Ringing Generator is eliminated.

**Note:** One 8108 Ringing Generator provides ringing for 100 ringers. This must be taken into account

when two or more telephones share the same extension number.

2.19 The ringing supply is continually monitored, and an alarm indication is provided by the 9332 module if the ringing voltage drops below a preset threshold. The ringing generator output and each System module are fused and alarmed to provide failure indications in the event of a circuit malfunction.

#### **8007 Power Supply**

2.20 The 8007 Power Supply provides a -48Vdc, filtered, ground-referenced output with a maximum full load output current of 10 amperes. This regulated power supply consists of a constant-voltage transformer, rectifiers, and a filter circuit. Within the limits of its specifications, the 8007 can deliver regulated voltage despite changes in input line voltage, line frequency, load impedance and temperature variations.

2.21 Designed for installation at the bottom of a cabinet (or relay rack), the 8007 measures approximately 5.25 x 19 x 9.75 inches. The Power Supply screws into place on the mounts in the bottom of the System's cabinet.

2.22 Normally, one 8007 Power Supply is required for 293 Systems comprising 100 to 300 stations. However, a power supply of lesser or greater capacity can be supplied, if required.

#### **battery backup**

2.23 A Lorain RJ-Series Flotrol power supply with integral battery charger and two 80-0040 Standby Power Assemblies (equipped with four 79-0057 batteries) provide the 293 System with a -48Vdc battery backup power source for uninterrupted system operation. The power supply/battery charger keeps the batteries fully charged during normal operating conditions. The length of time that the 293 System remains functional during a power outage depends upon the number of shelves and the types of peripheral equipment used. Typically, a 500-line 293 System equipped with two 80-0040 Standby Power Assemblies (each providing -24Vdc) can remain operational for approximately 24 hours.

2.24 The Standby Power Supply and the Lorain power supply/battery charger are both designed for relay-rack or cabinet installation.

#### **use of existing power supply and battery backup**

2.25 In some applications where the switching equipment is distant from the stations, it may be advantageous to use the switching equipment's power supply and battery backup system to power the 293 System. Transfer panels are available that make efficient use of the switching equipment's power supply in certain alerting applications. The 293 System operates from -48Vdc filtered, ground-referenced input power.

#### **recording devices**

2.26 Two Recorders are available for the 293 System:

(1) Code-A-Phone unit, Model 111-1 (Tellabs part number 79-0123): This is a tape-drive-type unit with capability for a 0 to 6-minute message length. The unit's continuously variable recording and message-verification capability must be established at the unit's location. The Model 111-1 operates from a 110Vac source and **cannot** operate from the Standby Power Assembly (-48Vdc). Two Cable Adapters (Tellabs part number 79-0124) are also required for each 111-1 unit.

(2) Audichron unit, Model 220: This is a digital-storage-type unit with capability for a 2 to 20 second message length, variable in 2 second increments. The unit has both local and remote message-recording capability. The Model 220 unit operates from -48Vdc and is compatible with the Standby Power Assembly.

2.27 The Model 111-1 and Model 220 Recorders allow the 293 One-Way Alerting System to have a prerecorded alerting message available for immediate playback in the event of an emergency. Either Recorder allows the operator to record a test message or special broadcast message, verify its contents, and then use it as an alerting message for actual zone alerts.

2.28 Front-panel controls provide off-line testing capability for both Recorders. By using a standard telephone handset, announcements can be recorded and then played back to verify proper operation of the recorder. Front-panel LED indicators on both units display the changing operational modes while the Recorder is operating. The Model 111-1 Recorder is designed for desktop operation and measures approximately 3.75 x 13.75 x 9.0 inches. The Model 220 Recorder is designed for relay-rack or cabinet installation and measures approximately 1.75 x 17.75 x 11.5 inches.

2.29 Normally, one Model 111-1 or Model 220 Recorder is used with the 293 System. However, in applications that require several different messages

to be transmitted simultaneously during an emergency alert, additional Recorders can be supplied.

#### activation panel

2.30 The 293 System Activation Panel provides the activation control for the 293 System in the event of an emergency or for routine testing (please refer to figure 7). This wall-mounted panel features a key lock to ensure controlled access to the activation controls. However, this panel also allows emergency access via a key obtained by breaking the small glass cover in the lower right corner. The Activation Panel is made up of the following sections:

(1) *Standard telephone* section: This section contains a standard telephone that provides recorded-message monitor capability with record control. This telephone is also used to override a recorded message and broadcast a live message to the selected zones.

(2) *Zone select* pushbutton section: These locking pushbuttons (with mechanical status indicators) control the activation of the 293 System's associated zones. The size and configuration of a particular zone are determined by installation wiring (please refer to section 2 of the 293 System Installation Practice, section 8X293-2, for specific installation procedures.) In addition, an all-call pushbutton is provided that can activate all zones simultaneously.

(3) *Annunciator* display section: This optional section of the activation panel consists of 40 LED's that can be configured to indicate the answer status of all or selected telephones in the 293 System.

(4) *Common trouble indicator* section: This section provides visible and audible indications of a fault in the System. A reset pushbutton is provided to silence the audible fault indicator while maintaining the visible indication until the fault condition is cleared. A "power on" indicator is also provided; it lights continuously when the System is powered up.

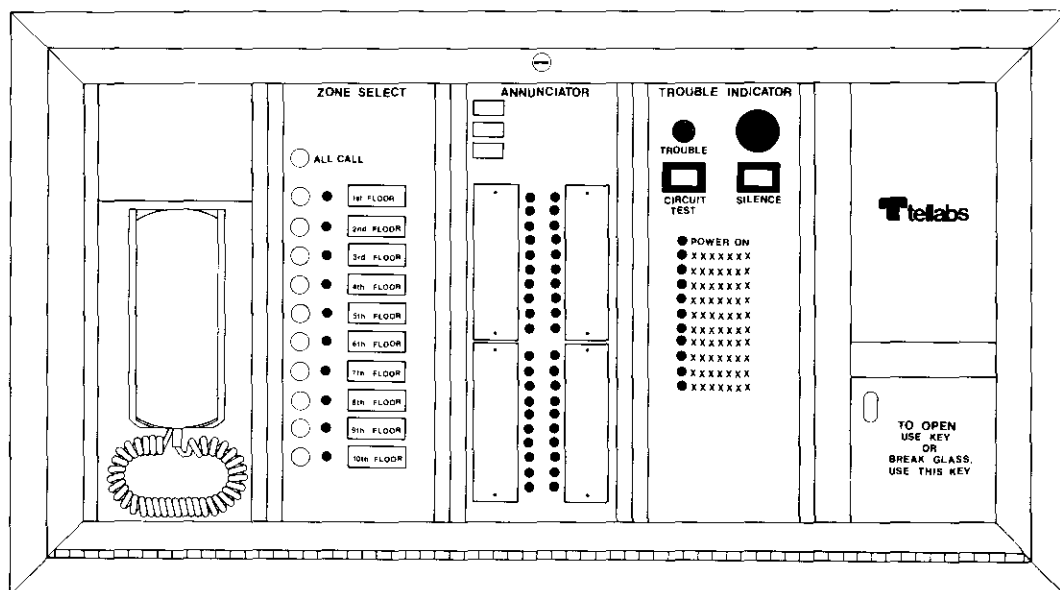


figure 7. 293 System Activation Panel

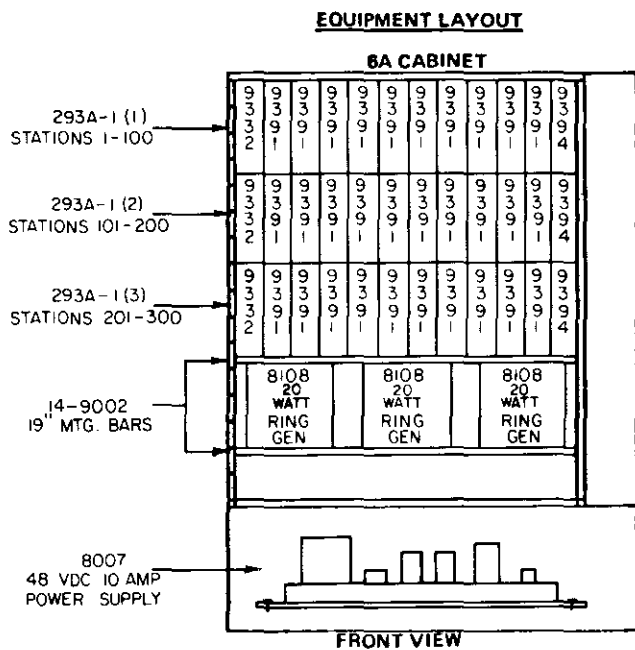


figure 8. Typical 300-line apparatus-case-mounted 293 System

2.31 The modular construction of the System Activation Panel allows it to be custom built to accommodate the exact requirements of a particular installation. For example, when recorded messages are always used (instead of a live broadcast), an additional *zone select* section can be installed in place of the *standard telephone* section. Wider panels that can accommodate additional sections are also available.

2.32 The wall-mounted Activation Panel measures approximately 29.5 x 20.25 x 8.0 inches. It is recommended that the Panel be mounted in a relatively restricted area (e.g., behind the front desk in a hotel lobby). This type of location allows quick access to the panel in an emergency while providing security to discourage vandalism.

### larger systems

2.33 Larger 293 Systems are made up of additional 100-station increments (which make up a basic 293 System) with appropriate ringing generators and power supply. Figure 8 shows the equipment layout of a typical 300-line 293 System (minus the backup battery pack, recording device, and Activation Panel). Figure 9 shows the equipment layout of a typical 1000-line 293 System (minus the power supply, backup battery pack, recording device, and Activation Panel).

## 3. peripheral equipment

3.01 Because requirements for alerting systems are extremely varied, the 293 One-Way Alerting System is designed with maximum adaptability for interfacing peripheral equipment. The 293 System provides a basic framework that can interface a variety of other equipment, including a number of Tellabs support modules. Tellabs' Applications

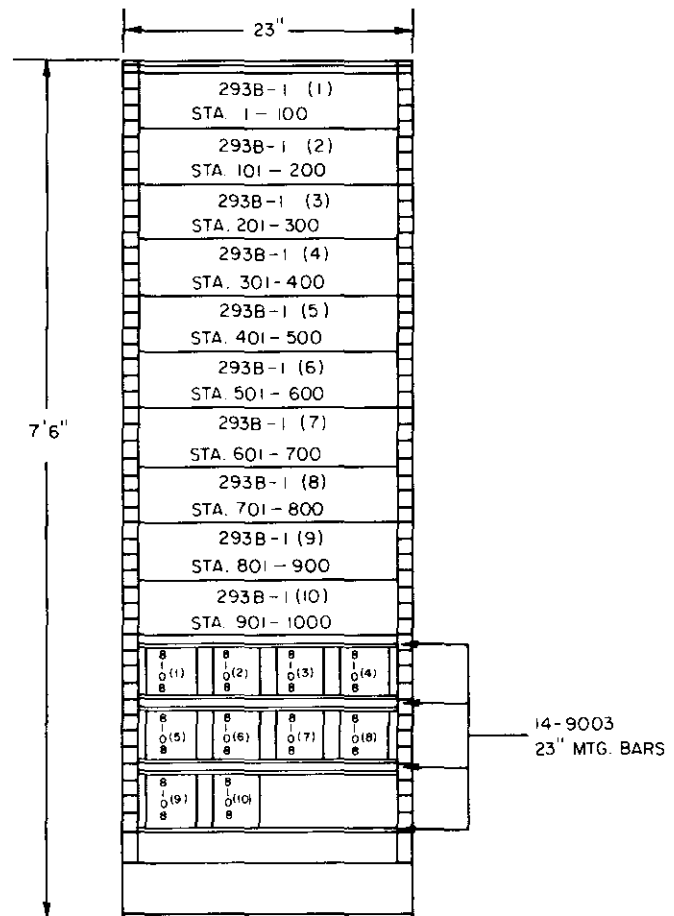


figure 9. Typical 1000-line relay-rack-mounted 293 System

Engineering Group can specify the required peripheral equipment for your particular application. This allows maximum flexibility in System design so that all your requirements can be met without any unnecessary equipment being included. Please call Tellabs Customer Service at one of the telephone numbers listed in paragraph 6.02 for a specific System design proposal. Figure 10 shows one possible 293 System application with various peripheral equipment.

3.02 Optional peripheral equipment includes an answer-lamp field, a hot-line telephone, a multiline key telephone console, and a number of Tellabs support modules. These modules and other peripheral equipment are described in the paragraphs that follow.

### multiline key telephone console

3.03 Multiline key telephone consoles are available for special-purpose applications. This equipment is used in lieu of the wall-mounted Activation Panel.

3.04 A number of multiline key consoles are available to interface the 293 System in the manual, automatic, or combined mode of operation. Since the 9394 supplies the necessary talk battery to power the console, no special interface equipment is required.



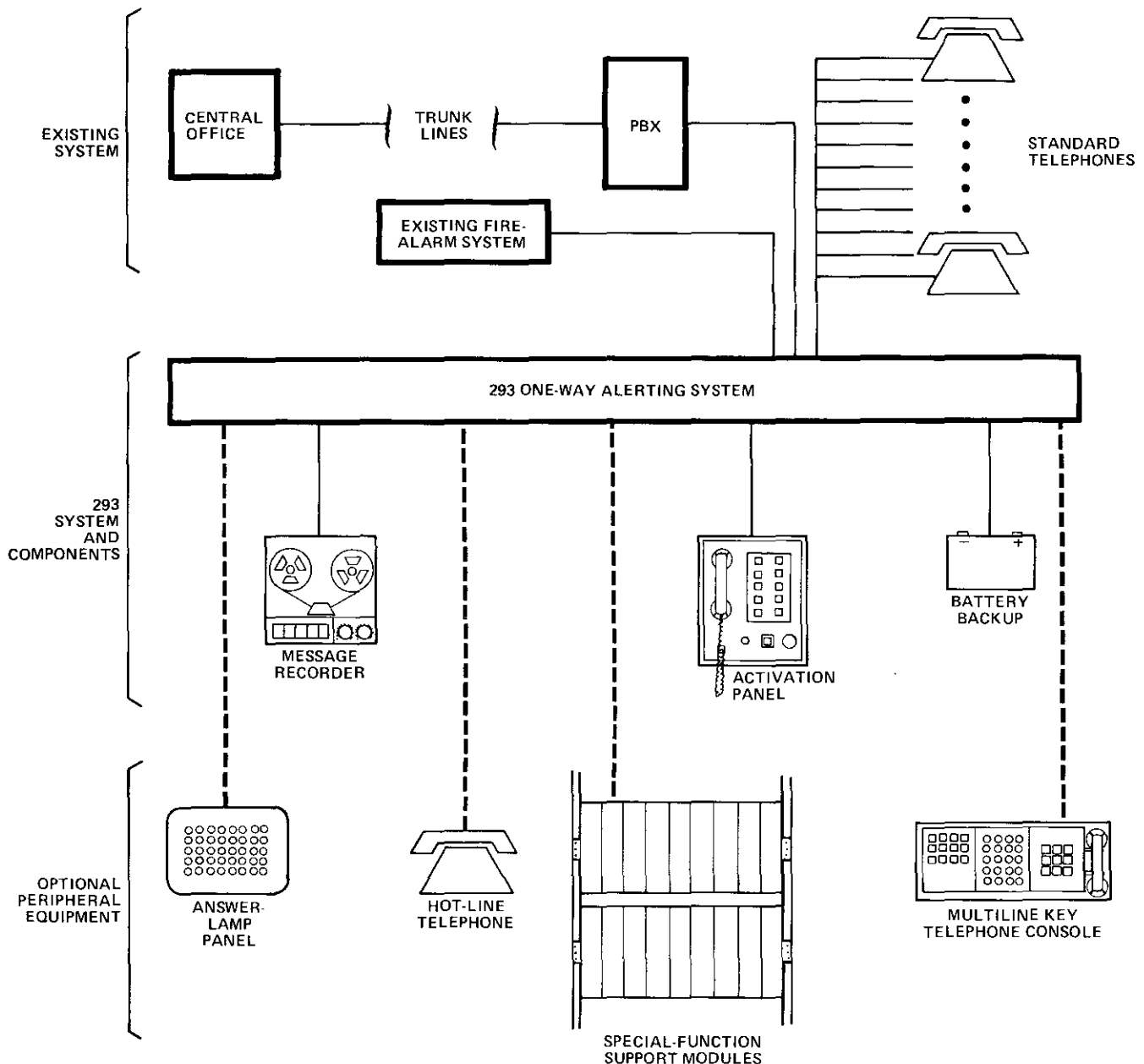


figure 10. 293 System with peripheral equipment and existing fire-alarm system

3.05 Each key on the multiline console represents one zone. In addition to the zone keys, one button is designated all-call. If recording devices are used, specific keys can be designated to activate multiple announcers for different messages with each zone.

#### answer-lamp panels

3.06 Answer-lamp panels are available to indicate which lines have answered the emergency call. Each 293 prewired equipment shelf provides 100 connectorized lamp leads (two 50-pin Amphenol-type connectors). Each lamp lead provides a ground whenever an individual station goes off-hook during an emergency message. Lamp status is latched into the 293 System until the System returns to the idle condition. The connectors on the 293 System shelf allow direct connection to the answer-lamp panels. For large installations, preassigned keys on a con-

sole can be used to connect the answer lamps to different groups of stations. This arrangement reduces the number of lamps required and greatly extends the System's operating time in backup battery applications.

#### hot-line telephone

3.07 A hot-line (dedicated) telephone can be used to activate the 293 System. In small applications, this may be used in lieu of, or in addition to, the wall-mounted Activation Panel provided with the System. Since the 9394 module supplies the necessary talk battery to power the telephone, no special interface equipment is required. In these applications, going off-hook with the hot-line telephone activates the entire 293 System (all call).

#### automatic timeout feature

3.08 The 9133 Long Interval Timer module and the 9131 Universal Timer module are Type 10

modules that can be used to automatically reset the System after a predetermined timeout interval. The 9133 has one timeout circuit adjustable from 1 second to 26 minutes. The 9131 has two timers that are independently adjustable for timeout periods of up to 2 minutes.

### 9091 Matrix Module

3.09 In applications where zone overlap or adjacent-zone alerting is required, the 9091 Matrix Module can be used. This module is used to design a custom diode matrix network and provides a convenient mounting vehicle for this circuitry. The matrix is arranged in intersecting rows and columns. A common pinout is provided for each row and column.

### zone selectivity via DTMF decoders

3.10 The 6071A Three-Digit and 6072 Single-Digit DTMF/Dial Decoder modules can be used to provide selective zone alerting where multiline key consoles are not required. The 6071A, when equipped with a Tellabs 9971 DTMF Receiver plug-on subassembly, provides three-digit decoding with up to 20 output codes on a single module. Up to five 6071A's can be connected together with one 9971 subassembly to provide 100 output codes for zoning and recorder control. The 6072 Single-Digit Decoder can be used in installations where the zoning and control requirements do not exceed 12 codes.

3.11 Both the 6071A and 6072 operate with standard DTMF or rotary-dial telephones. Normally, the telephone used in this application is accompanied by a busy-lamp field to indicate zone status and which stations have answered the emergency call.

### 9196 2Wire ARD Loop Start Trunk Circuit Module

3.12 The 9196 2Wire ARD Loop Start Trunk Circuit Module is an automatic answering device that is connected to an unpublished PBX number to provide for automatic and/or remote access to the 293 System. The 9196 module can be used with

either of the above decoder modules to provide for selective system activation from any DTMF telephone connected to the switching system.

### 79-0098/99 50-Pair Type 66 Quick-Connect Blocks

3.13 The 79-0098 and 79-0099 50-Pair Type 66 Quick-Connect Blocks are each equipped with two 25-pair female connectors and can be used as frame blocks for terminating the 293 System. Quick interconnection is therefore made possible because both the Quick-Connect Blocks and the 293 System Shelf are connectorized. The 79-0098's two connectors are mounted on the right side of the Block to allow for bottom cable entry. The 79-0099's connectors are mounted on the left side of the Block to allow for top cable entry.

### 9398 Five-Line One-Way ARD Line Circuit Module

3.14 The Tellabs 9398 Five-Line One-Way ARD Line Circuit Module can be used in certain applications to enable selected stations to be disconnected from the emergency message and restored to normal telephone service via a hookswitch flash. The 9398 module can also provide alerting tone to stations that are busy when the 293 System is activated. Either or both of these features can be disabled via option switches on the module's printed circuit board. A Type 10 module, the 9398 is pin-for-pin compatible with the 9391 module. However, when the 9398 module is installed in a 293 System, the number of circuits served (5) is half that of the 9391 module (10). Please refer to the 9398 Module Practice for additional information.

### remote status multiplexer

3.15 In applications that require answer-lamp indications at a remote location or require the answer-lamp information to be analyzed by data-processing equipment, Tellabs can supply a remote status multiplexer (RSM) system. Figure 11 shows a typical application of this system. The RSM system can also be used to activate the 293 System if the System is equipped with a two-way communication

port. One RSM system can provide a direct data-processing interface for up to 1000 status lamp outputs from a 293 System. These outputs are then scanned by the RSM system, converted to a serial format, and outputted on an RS-232-C data port, allowing direct connection to computers, modems, terminals, or other peripheral equipment. For applications larger than 100 lines, multiple RSM systems can be used.

### miscellaneous applications

3.16 The aforementioned modules are designed with specific features for specific applications. Other ap-

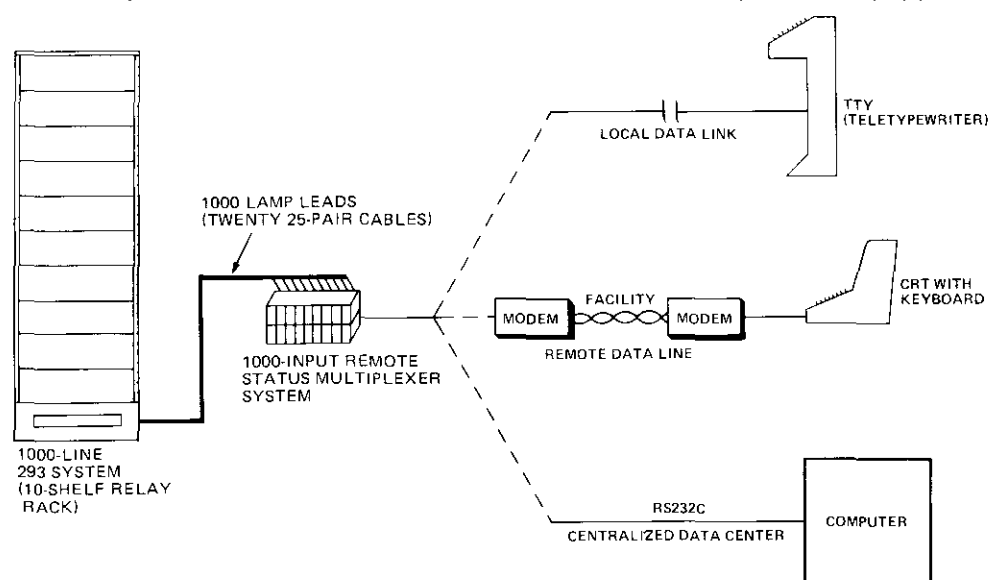


figure 11. Three typical remote status multiplexer applications

plications can be accommodated by combining the decoders, timers, relay modules, and other Type 10 modules into various application packages.

3.17 The 293 System is capable of interfacing modules of the Tellabs 292R System (or an entire 292R System). For details on this application or for any other application not covered in the above paragraphs, please contact Tellabs' Applications Engineering Group at your Tellabs Regional Office or our U.S. or Canadian Headquarters for further assistance. Telephone numbers are listed in paragraph 6.02.

#### **4. operation**

4.01 The 293 One-Way Alerting System has two main on-premises emergency-alerting configurations. The 293 System can be installed between a PBX and existing on-premises stations. This arrangement is common in hotel/motel environments. The 293 System can also be installed in series with CO lines and existing on-premises stations. This arrangement is common in high-rise apartment environments. The 293 System can be used in other applications as well. This section, which describes the operation of the 293 System for emergency alerting in hotel and motel applications involving a PBX, provides a basic understanding of the System and can be easily extended to other applications.

##### **station instructions**

4.02 Tellabs recommends that telephones connected to the 293 System be provided with a printed message such as the following: "This telephone is connected to our one-way alerting system. If an emergency occurs, it will ring at a distinctive rate. In that case, please answer the telephone and listen for the alerting message. Please note the following also:

- (1) Do not leave the telephone off the hook or you will not be notified if an emergency occurs.
- (2) If you hear a distinctive ringing signal, answer the telephone and listen to the instructions being given.
- (3) Please note that this is a one-way system; thus, the person broadcasting the message cannot hear you.
- (4) If you need assistance, wait until the alerting system is deactivated; your normal telephone service will then be restored.
- (5) This system is tested periodically for your protection. You will be notified before a test is conducted."

##### **system idle**

4.03 In the idle state, station telephones are connected to the local PBX, and normal PBX service is provided. The PBX supplies station loop current and ringing, and functions exactly as if the 293 System were not connected.

##### **system activation**

4.04 When an emergency occurs, the 293 System's activation panel is normally used to initiate

the alerting procedure. The activation panel contains pushbuttons corresponding to zones within the facility. Zone control gives the operator the ability to alert specific zones (or groups) of telephones within a building. For example, if the 293 System is being used to evacuate hotel guests in the event of a fire, zones closest to the fire are evacuated first, and zones further away are evacuated in an order corresponding to their distance from the hazard.

4.05 Zoned alerting is accomplished via the push-buttons on the activation panel which activate the group leads on the line circuit modules. Each line circuit module controls 10 stations which are alerted when its group lead is grounded. One zone lead per line circuit module allows flexibility in zone selection (zones can be floors, buildings, key personnel, etc.). These zone leads may also be multiplied together or wired to a diode matrix module to implement overlapping zones in special applications. An all-call feature integral to the 293 System permits single-lead (ground) activation of an entire 100-station mounting assembly or group of multiplied assemblies.

4.06 When the System is activated, on-hook stations ring at a distinctive rate of 0.5 second on, 2 seconds off, permitting the called party to distinguish between a normal call and an emergency call. Stations that are off-hook when the System is activated are automatically transferred from the PBX to the recorded or live message. Stations that have not answered the emergency call will continue to ring until the zone is deactivated or the System returns to idle. This allows a called party who may be in the shower or is a heavy sleeper to receive the emergency call.

4.07 The emergency announcement can be transmitted by one or more dedicated message-announcement devices, by live announcement, or by a combination of the two methods. The System's activation panel contains pushbuttons for either a recorded or a live announcement. A maximum of two separate messages per 293 Mounting Assembly can be transmitted simultaneously if required (1 message for every 50 stations). A single message source can be connected to all shelves with practically no limitations.

##### **system reset**

4.08 The 293 System is reset by deactivating the group-call or all-call leads on the 293 assembly. This is normally accomplished by resetting the zone or all-call activation buttons on the Activation Panel. The System can be optionally configured for automatic reset after a predetermined time interval or arranged for coded reset.

##### **optional activation methods**

4.09 The 293 System can be activated by means other than the Activation Panel. Listed below are a few of the methods by which the 293 System can be activated via optional equipment:

A. Dedicated DTMF Telephone. Alerting is accomplished by going off-hook with the dedicated telephone and alerting the appropriate zone by dialing a one-digit or three-digit DTMF number. The call initiator then transmits the appropriate message to the alerted stations. If multiple recorders are used for the announcements, a code for each recorder is assigned and is activated prior to dialing the alerted zone. The System is reset either by dialing a reset code or by going on-hook with the dedicated telephone.

B. Dedicated Multiline Key Telephone Console. With this method, the operator selects the prerecorded message if recording devices are used, and selects the appropriate zone to be alerted by depressing the designated keys. If the System is not equipped with recorders, the operator need only go off-hook and transmit the message live to the selected zones. The lamps beneath the console keys light when the message and zone keys are depressed. The System resets when the key console returns to the on-hook condition.

C. Any DTMF Telephone Connected to the PBX Switching System. With this method, an unpublished PBX extension number is connected to a decoder package provided with the 293 System. Personnel aware of the remote-activating number can go off-hook with any DTMF telephone connected to the PBX and dial the decoder port. After the call is automatically answered, the person dials the appropriate one-digit or three-digit code to activate the 293 System. This person can then activate recorders or, unless the telephone being used is within the alerted zone, broadcast a message live. The System automatically resets after a predetermined time interval, or it can be arranged for coded reset.

4.10 Any of the above methods can be combined in a single System or used independently. For some applications, such as in a chemical or nuclear plant, a lamp panel can be used to provide individual line status, indicating which stations have answered the emergency call or which zones were selected. The answer-lamp display can be manually switched from zone to zone to eliminate the need for large display panels required in massive alerting applications. As each station answers, the off-hook status lead remains at ground, lighting the answer lamp for that station. The lamp remains lighted even if the station returns to the on-hook position. All off-hook status leads return to idle when the System is reset. Please call the Tellabs Application Engineering Group at one of the telephone numbers listed in section 6 of this Practice for additional information.

## 5. system specifications

### *system capacity*

10 stations per 9391 module; 100 stations per 293 Mounting Assembly; any size system can be configured by using multiple shelves

### *transmission*

idle System has no effect on normal telephone service (because of direct metallic connection through module and lack of bridging elements in System)

### *ringing*

ring trip loop limit: 1000-ohm loop between module and telephone set

interruption rate: 0.5 second on, 2.0 seconds off,  $\pm 10\%$  (others optionally available)

voltage output: 90Vac  $\pm 15\%$ , negatively biased at -48Vdc

frequency: 20Hz  $\pm 0.2$ Hz

harmonic distortion: less than 5%

ringing capacity: 1 watt per station average; 100 stations total per 293 Mounting Assembly

### *audio*

compression range: -25 to -5dBm

output level: -6dBm or -12dBm, switch selectable

frequency response:  $\pm 1.0$ dB, re 1000Hz, 300 to 3000Hz

### *answered-call loop current*

approximately 5mA

### *lamp-lead drive current*

50mA maximum to a negative-dc voltage return

### *power requirements*

dc input voltage: -44 to -56Vdc, filtered, positive-ground-referenced

dc input current: (per 100-station Mounting Assembly and ringing generator) system idle, 0.25 amperes maximum; system active, 3 amperes maximum

### *operating environment*

32° to 122° F (0° to 50° C), humidity to 95% (no condensation)

### *dimensions*

#### Mounting Assembly:

5.92 inches (15.04cm) high

17.5 inches (44.45cm) wide (excluding mounting ears)

9.5 inches (24.1cm) deep

#### ringing generator:

4.75 inches (12.07cm) high

7.0 inches (17.78cm) wide

7.25 inches (18.42cm) deep

### *weight*

approximately 19 pounds (8.7kg) (for a 100-line System with no ringing or power)

### *mounting*

prewired 293 Mounting Assembly: 19-inch or 23-inch relay rack and 6 inches of vertical rack space

ringing generator: KTU apparatus case or relay rack via mounting bars

## 6. warranty information

6.01 Tellabs warrants the 293 One-Way Alerting System to be free of defective components, workmanship, and design for a period of two years from the date of manufacture, when applied as outlined in our Practices, subject to handling and installation commensurate with industry standards for solid-state electronic equipment. If the 293 System does

not prove to be free of defective components, workmanship, and design under these criteria, Tellabs will replace or repair it free of charge.

**Note:** *Warranty service does not include removal of permanent customer markings on the front panels of Tellabs modules, although an attempt will be made to do so. If a module must be marked defective, we recommend that it be done on a piece of tape or on a removable stick-on label.*

**6.02** For additional information on the 293 System, please contact Tellabs Customer Service at your Tellabs Regional Office or at our Lisle, Illinois, or Mississauga, Ontario, Headquarters. Telephone numbers are as follows:

US central region: (312) 969-8800  
 US northeast region: (412) 787-7860  
 US southeast region: (305) 645-5888  
 US western region: (702) 827-3400  
 Lisle Headquarters: (312) 969-8800  
 Mississauga Headquarters: (416) 624-0052

## 7. FCC registration information

**7.01** The Federal Communications Commission (FCC) has established through Part 68 of its Rules and Regulations that FCC-registered terminal equipment may be directly connected to the telephone network through standard plugs and jacks. This section documents the customer's responsibility to the serving telephone company when a Tellabs 293 One-Way Alerting System is connected to the terminal side of a PBX, or to central office (CO) lines.

**7.02** Paragraph 7.11 of this section contains two sample tables which give examples of the type of data that the customer must supply to the serving telephone company regarding installation of the 293 System. Paragraph 7.11 also contains two typical System equipment configurations incorporating the data in tables 1 and 2.

**7.03** Registered terminal equipment cannot be connected to coin lines or party lines.

**7.04** Customers directly connecting this equipment to the telephone network shall, before such connection is made, give notice to the telephone company of the particular PBX or CO lines to which such connection is to be made, and shall provide to the telephone company the FCC Registration Number of this equipment. The customer

shall also give notice to the telephone company upon final disconnection of this equipment from a particular line.

**7.05** Customers directly connecting systems consisting of combinations of individually registered terminal equipment (e.g., a PBX, the 293 System, and telephone sets) shall, before such connection is made, provide to the telephone company the following information:

- For each line, the FCC Registration Numbers for all equipment dedicated to that line, the largest ringer equivalence to be presented to that line, and any information required for the compatible operation of this equipment with telephone company communications facilities (e.g., type of service required).
- A list of FCC Registration Numbers for equipment to be used in the system. (See sample tables in paragraph 7.11).
- The quantities and Universal Service Order Code (USOC) numbers of the required standard jacks.
- For each jack, the sequence in which lines are to be connected, technical description codes by position, and service code by position. (See sample tables in paragraph 7.11).

**7.06** The standard registered 293 System (including cables) is considered a fully protected system. As such, all connections between the 293 System and the telephone network are to be made via fully protected on-premises wiring. Standard 293 Systems will typically be connected to a local PBX at the serving telephone company's demarcation point by means of a cable less than 25 feet in length and terminated with a USOC RJ71C plug. This standard plug is then inserted into a telephone company-supplied USOC connector, which should represent a registered port and be, in effect, fully protected on-premises wiring.

**7.07** All other connections to the 293 System are "connections to non-registered equipment" as defined in Part 68 of the FCC Rules. These connections provide the required electrical isolation between the peripheral equipment and the telephone network. The peripheral equipment will differ based on system size, configuration, and features, and does not fall under the requirements of Part 68.

information supplied to the telephone company for 293 System (FCC Registration Number BPX826-69545-OT-N)					
circuit ID	type service	REN (ringer equivalence number)	USOC	circuit number cable pair (T, R)	required registration numbers
EXT. AAA	2wire loop	293-0.0A plus tel set	RJ71C	1 (26, 27 in: 1, 2 out)	293, PBX and tel set
EXT. BBB	2wire loop	293-0.0A plus tel set	RJ71C	2 (28, 29 in: 3, 4 out)	293, PBX and tel set
EXT. CCC	2wire loop	293-0.0A plus tel set	RJ71C	3 (30, 31 in: 5, 6 out)	293, PBX and tel set
Information for all stations must be supplied.					
EXT. ZZZ	2wire loop	293-0.0A plus tel set	RJ71C	(last circuit assigned)	293, PBX and tel set

table 1. Sample information table for 293 System  
configured as shown in figure 12

information supplied to the telephone company for 293 System (FCC Registration Number BPX826-69545-OT-N)					
circuit ID	type service	REN (ringer equivalence number)	USOC	circuit number cable pair (T, R)	required registration numbers
TEL A NNX-XXXX	2wire loop	0.0A plus tel set	RJ71C	1 (26, 27 in: 1, 2 out)	293 and tel set
TEL B NNX-XXXX	2wire loop	0.0A plus tel set	RJ71C	2 (28, 29 in: 3, 4 out)	293 and tel set
TEL C NNX-XXXX	2wire loop	0.0A plus tel set	RJ71C	3 (30, 31 in: 5, 6 out)	293 and tel set
Information for all stations must be supplied.					
TEL Z NNX-XXXX	2wire loop	0.0A plus tel set	RJ71C	(last circuit assigned)	293 and tel set

table 2. Sample information table for 293 System  
configured as shown in figure 13

7.08 Should the registered equipment cause harm to the telephone network, the telephone company shall, where practicable, notify the customer that a temporary discontinuance of service may be required; however, where prior notice is not practicable, the telephone company may temporarily discontinue service forthwith, if such action is reasonable under the circumstances. If the telephone company temporarily discontinues service, the customer must be promptly notified of the discontinuance. The customer must also be provided with an opportunity to correct the problem that caused the discontinuance, and the customer must be informed of the right to bring a complaint to the FCC.

7.09 When trouble is experienced, the customer shall disconnect the registered equipment from the telephone line to determine if the registered equipment is malfunctioning. If the registered equipment is malfunctioning, the use of such equipment shall be discontinued until the problem has been corrected. No repair work (other than those routine troubleshooting procedures prescribed in the testing and troubleshooting section of the 293 System Installation Practice, section 8X293-2) is authorized to be performed by the user. Part 68 of the FCC Rules prescribes that all repairs of registered equipment be made by the manufacturer or his authorized agent.

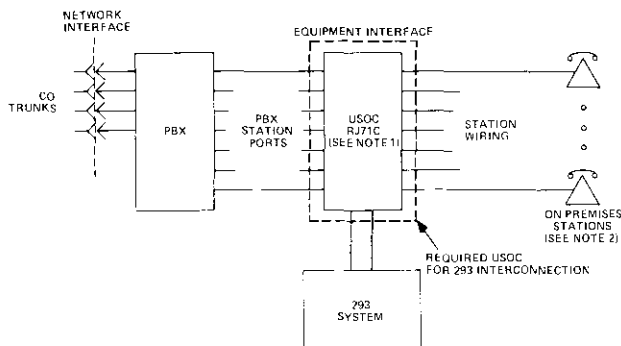


figure 12. Typical 293 System arrangement with PBX interface

**Note 1:** One RJ71C connector is required for every 12 PBX lines.

**Note 2:** If on-premises stations are used behind an unprotected PBX, wiring to these stations is considered unprotected on-premises wiring and must be installed under the unprotected on-premises wiring provision (Section 68.215) of FCC Part 68. If this is the case, the customer should consult the manufacturer of the PBX for information regarding compliance with Section 68.215 of FCC Part 68.

7.10 The telephone company may make changes to its communications facilities, equipment, operations or procedures, where such action is reasonably required in the operation of its business and is not inconsistent with the rules and regulations of Part 68. If such changes can be reasonably expected to render any customer's terminal equipment incompatible with telephone company communications facilities, or require modification or alteration of such terminal equipment, or otherwise materially affect its use or performance, the customer shall be given adequate notice in writing, to allow the customer an opportunity to maintain uninterrupted service.

7.11 Figures 12 and 13 in this section show typical 293 System equipment configurations, while tables 1 and 2 provide a sample information table for each. These sample tables are representative of the information that the customer must supply to the serving telephone company in regard to installation of registered 293 Systems. Be aware that it is the responsibility of the customer at the time USOC's are ordered to specify the sequence in which CO or PBX lines are to be connected. To determine the exact cable pair assignments, use table 1, the "293 USOC Assignment Worksheet" supplied in section 2 of the 293 System Installation Practice. For 293 Systems larger than 100 stations, multiple sheets are required.

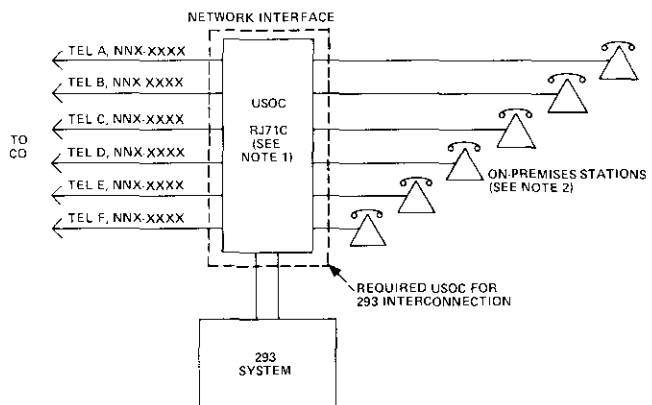


figure 13. Typical 293 System arrangement with CO interface

**Note 1:** One RJ71C connector is required for every 12 CO lines.

**Note 2:** Station wiring is considered unprotected on-premises wiring and must be installed under the unprotected on-premises wiring provision (Section 68.215) of FCC Part 68.



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