

# 294 Community Alerting System Description

FCC Registration Number BPX826-69545-OT-N

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## 1. general description

1.01 The Tellabs 294 Community Alerting System (figure 1) is a multistation ringdown telephone circuit used in emergency-reporting and disaster-alerting applications. With the 294 System, large numbers of individuals can be simultaneously alerted via their telephones when emergencies such as train derailments, floods, or dangerous weather conditions occur or threaten. Thus, the 294 System finds application serving small communities, hotels, motels, apartment buildings, condominiums, high-rise structures, hospitals, department stores, shopping malls, schools, factories, chemical and nuclear plants, and numerous other facilities whose personnel require immediate notification of emergency and/or evacuation procedures when disasters occur. Another application of the 294 System is for emergency notification of key individuals via their residential telephones. For example, police, fire department, medical, and civil defense personnel can quickly be notified at home in the event of an emergency at any time of the day or night.

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 294 System is modular in design and configured in 50-station increments. Each fully autonomous 50-station increment is subdivided into 5-station increments, 5 stations being the number accommodated by each line-circuit module in a 294 Mounting Assembly. A minimum-size 294 System consists of one 294 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 294 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

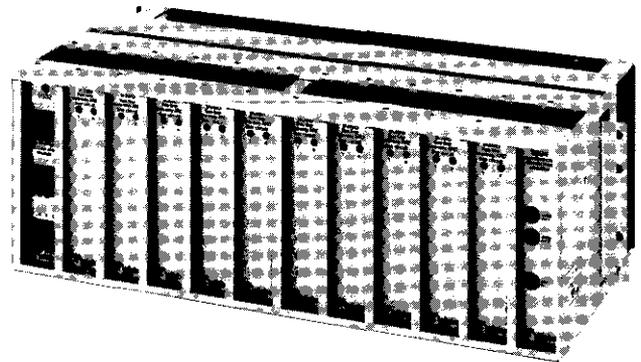


figure 1. 294 Community Alerting System

describes some of these modules and the various applications in which they can be used.

### system application

1.04 The 294 System can be used with private (non-party) lines served by any conventional Class 5 central office or PBX switching system. Generally, the 294 System is used in any of three applications. Specifically, the System can be installed in series with station telephones served by a PBX, (such as in a hotel or office building), in series with CO lines (such as in an apartment complex), or in series with lines in a community's central office. The 294 System components are compatible with a wide variety of applications and outside-plant facilities. The System operates with subscriber loops of up to 2000 ohms and can be used with loop-treatment equipment such as loop extenders, dial long line modules, and the like.

### 294-to-switching-equipment interconnection

1.05 Installation of the 294 System is simplified because the System is compact in size, does not require extensive wiring, and uses connectorized mounting shelves. Generally, the 294 System is located near the switching equipment, and connectorized cables permit quick interconnection between the 294 System and the switching-equipment distributing frame. Station and switching-equipment connections to the 294 System are made via Universal Service Order Code (USOC) RJ21X connectors. This arrangement allows bridging plugs to take the place of the 294 System connectors, allowing normal telephone service both before the System is installed and after the 294 System is taken out of service.

### system features

1.06 The 294 System uses existing telephones 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 294 System eliminates the need

to install, test, and maintain special alerting and signaling devices such as bells, horns, 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. An option switch allows selection of either automatic transfer or tone alerting for stations that are off-hook when the System is activated. A second option switch allows the station either to remain connected to the alerting message until the System is deactivated or to be restored to normal telephone service via a hookswitch flash.

1.08 In an emergency, most switching systems experience an overload condition (due to heavy call traffic) that renders them inoperative. Because the 294 System removes all nonessential traffic from the switching equipment, when optioned for service lockout, availability of the switching equipment for official calls can be ensured. Unlike bells or buzzers, which can cause mass confusion and even panic, the 294 System gives people verbal information on the nature of the alarm. When the emergency no longer exists, 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 294 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. In both cases an appropriate verbal or recorded message must be transmitted. When used properly, the 294 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 help to prevent overcrowded stairwells and emergency exits.

#### **peripheral activation equipment**

1.10 The 294 System can be activated in a number of additional ways by using various types of optional peripheral activation equipment. Examples of this equipment include a multiline key telephone console, DTMF decoder modules (which can also provide zoned alerting), or interface with sensors ranging from units that provide a contact closure to an elaborate computerized system that automatically monitors a fire-annunciator panel and activates the 294 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.

#### **other peripheral equipment**

1.11 The 294 System provides a basic framework that can interface a variety of peripheral equipment in addition to the peripheral activation equipment

described above. Optional equipment includes an answer-lamp field, 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), 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 294 System features a very reliable, straightforward design. The 294 is powered down in its idle state and therefore draws very low idle current. This conserves energy and extends component life while maintaining constant System readiness. The System monitors the power supply and ringing voltages, and visible and audible trouble indicators on the activation panel are activated if either should fail. The System has distributed control; it is configured in 50-station increments, which are further divided into increments of 5 stations per-line circuit module. Each 50-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 294-System Mounting Assembly is a prewired Tellabs Type 10 Mounting Shelf with a connectorized backplate. This connectorized configuration allows quick interconnection to the distributing frame and associated peripheral equipment. The Mounting Assembly(s) mounts in a standard 19-inch or 23-inch relay rack or in a cabinet, all of which are optionally available with the System. The System is powered from -48Vdc filtered, ground-referenced power supply or battery. This voltage source can be provided by a standard telephone-type power supply or by sharing the switching equipment's battery, as desired.

## **2. system components**

2.01 The 294 System is modular in design and is configured in 50-station increments, each fully autonomous. A typical (50-station) 294 Community Alerting System consists of one 294 Mounting Assembly (one for every 50 stations), 2 common-control modules (9332 Ringing Interrupter and Fuse Module and 9394 Conference Distribution Amplifier), and 10 line-circuit modules (9398 Five-Line One-Way ARD Line Circuit Module, one module for every 5 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 150 stations) and 8108 Ringing Generators

(one 8108 for every 50 stations). In addition, other equipment available with the 294 System includes a backup battery pack, a recording device, a wall-mounted activation panel, and a cabinet that houses all of the above equipment (except the activation panel).

2.02 Larger Systems require the same items for each 50-station increment. In addition, a larger cabinet and possibly a power supply with greater capacity are needed. All 294 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 the connectorized backplate of a 50-station 294 System. Each of the 294-System components is described individually in the following paragraphs.

**294 Mounting Assembly**

2.03 The 294 Community Alerting System Mounting Assembly is a prewired Tellabs Type 10 Mounting Shelf with a connectorized backplate that allows quick interconnection to the distributing frame and associated peripheral equipment. The 294 Assembly is available in two versions: The 294A, which mounts in a 19-inch relay rack and the 294B, which mounts in a 23-inch relay rack. Each version occupies 6 inches of vertical rack space. For smaller 294 Systems, a similar shelf can be mounted in a 16C, 6A, or 6AW Apparatus Case.

2.04 A barrier-type terminal strip on the 294 Assembly's backplate accommodates power connections, ringing input, audio output, two isolated high-impedance audio inputs, and System fault outputs. All other connections to the 294 backplate are made via six 25-pair Amphenol-type female cable connectors. Two of these connectors accommodate the System's 50 tip and ring input leads (wired to the switching equipment). Two other connectors are used for the 50 tip and ring output leads (wired to the subscriber's telephones). The fifth connector accommodates 50 off-hook status leads. The sixth connector (used in special applications) accommodates 10 active (group) leads, an all-call lead, a 2wire loop interface for direct connection to a 2wire telephone or multiline key console, and other miscellaneous control signals.

2.05 Cut-through card connectors at each line-circuit module position of the 294 Assembly prevent disruption of normal telephone service whenever a line-circuit module is removed from the System. Because external connections to the 294 Assembly are made via cable connectors or terminal strips instead of wire wrapping, no special tools are required for installation, and installation time is minimized.

2.06 One 294 Mounting Assembly accommodates 50 conference-station line circuits (ten 9398 modules) and the associated common-control

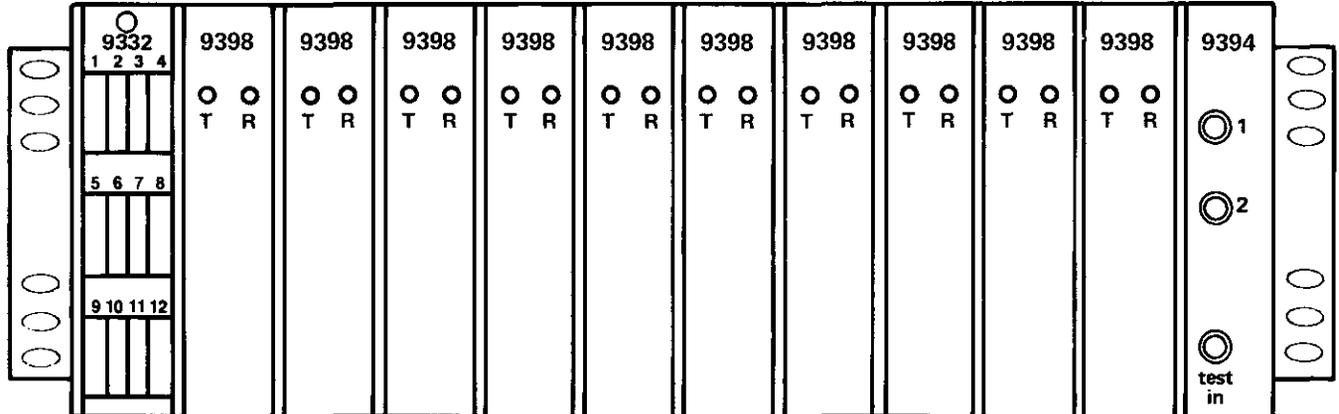


figure 1. Front view of 294 System

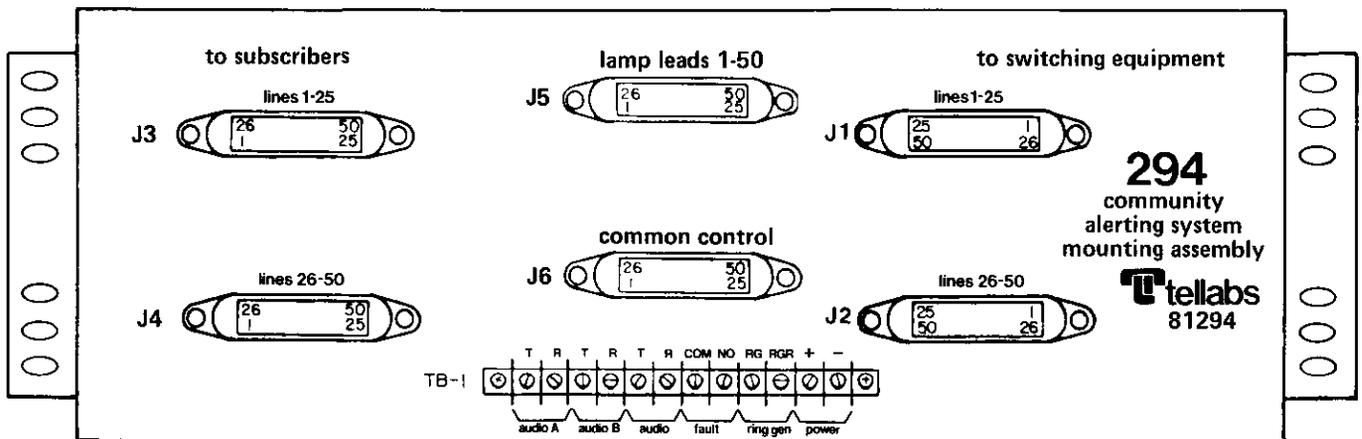


figure 2. Connectorized backplate of 294 Mounting Assembly

equipment (one 9332 and one 9394 module). Module position 1 of the Assembly is prewired to accommodate the 9332 Ringing Interrupter and Fuse Module; position 12, to accommodate the 9394 Conference Distribution Amplifier; and positions 2 through 11, to accommodate the one to ten 9398 Line Circuit Modules. The only wiring between adjacent 294 Assemblies is for power distribution, ringing, and audio input multiples when required. The first audio input per shelf is for stations 1 through 25, and the second input is for stations 26 through 50.

### 9332 Ringing Interrupter and Fuse Module

2.07 The 9332 Ringing Interrupter and Fuse Module (see figure 4) contains 12 distribution fuses to separately fuse each of the ten 9398 Line Circuit Modules as well as the 9394 Distribution Amplifier, the ringing generator input, and the 9332 itself. One 9332 module is required with each 294 Mounting Assembly. A front-panel *fault* LED provides a local visible indication of a blown fuse or loss of ringing voltage. A fault relay provides contact closure (or open) for a remote indication of a blown fuse, loss of ringing voltage, or loss of System input power. Fuses in the 9332 are Buss GMT-type 0.25-ampere fuses. Located on the front panel of the module, these fuses can be replaced without removing the module from service. A fault-detection circuit provides a trouble indication in

the event that ringing generator voltage falls below a preset level.

2.08 The 9332 module also contains a phasing circuit and a 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 silent (non-ringing) interval. This configuration is reversed 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 9398 modules. Each output is on for 0.5 second and off for 2 seconds, allowing a 20-watt ringing generator to serve 50 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 (see figure 5) provides two isolated high-impedance audio inputs for bridging two or more 294 Mounting Assemblies to one or more message sources. A compression amplifier in each circuit ensures a constant output level for a wide range of input levels, thereby eliminating the need to perform alignment or make level adjustments. The output of each compression amplifier is

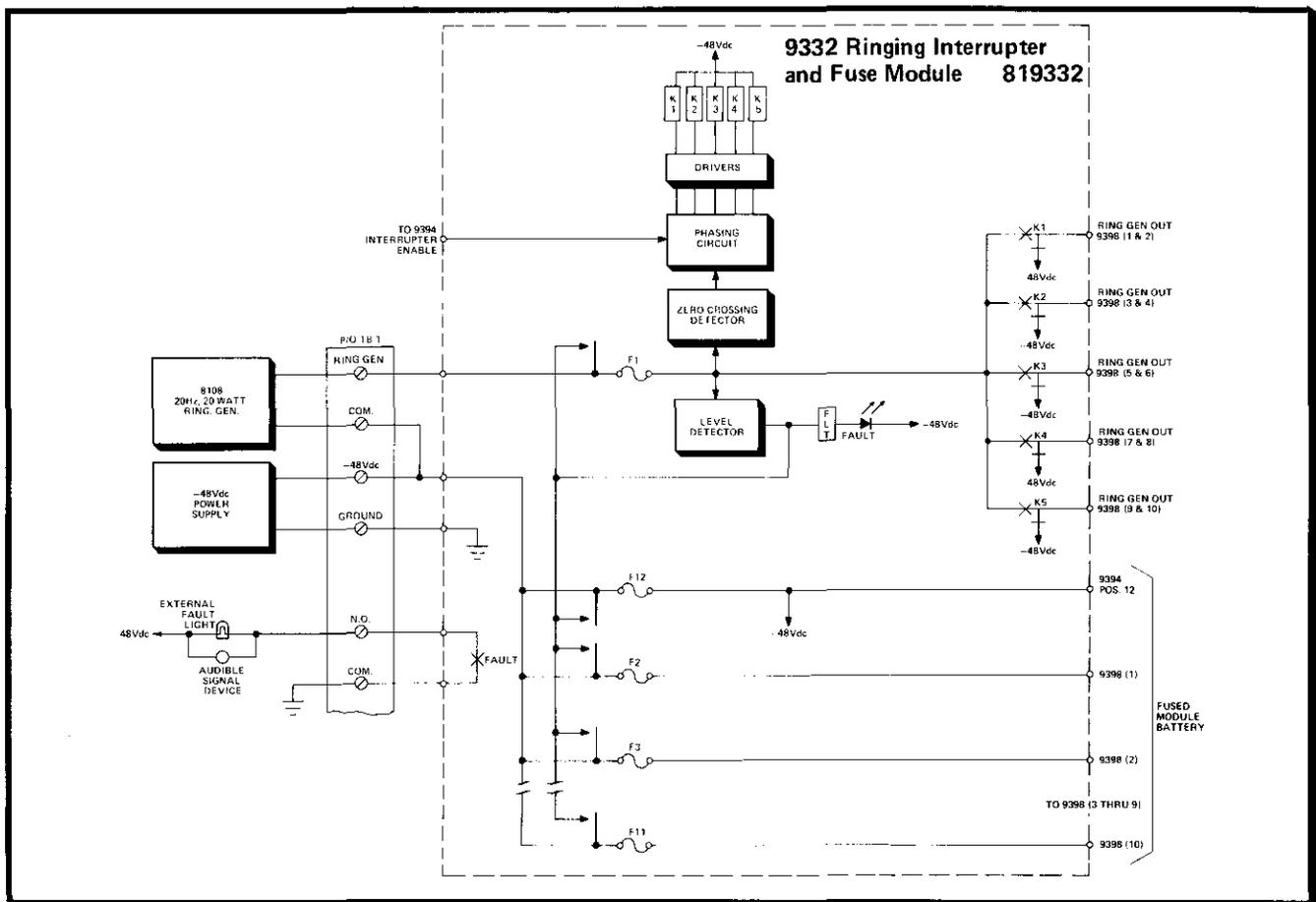


figure 4. 9332 Ringing Interrupter and Fuse Module (819332) block diagram

connected to its own distribution buffer, which provides a low output impedance capable of driving five 9398 modules (25 stations for each buffer circuit). Specifically, 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  $-25\text{dBm}$ .

2.10 During testing, two 310-type monitor jacks on the module's front panel 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 multiline key console for live broadcast. An option switch can connect the all-call lead to the battery-feed circuit for alerting all stations when the telephone or console goes off-hook. An audio output pair is used to distribute the live broadcast to other 294 Shelves. The 9394 contains isolation diodes that provide for the all-call feature.

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

2.12 The 9398 Five-Line One-Way ARD Line Circuit Module (see figure 6) provides for the transfer of 5 stations between the serving CO (or PBX) and the 9398 Distribution Amplifier. The transfer of all 5 lines is initiated by applying ground to the driver circuit of the transfer relay (activate or group lead). The driver circuit keeps input current to a minimum and allows direct

interface with existing automatic control panels, telephone keys, recorders, etc.

2.13 Each of the five 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.

**Note:** Each 9398 module in the 294 System can deliver ringing power to 10.0A REN (ringer equivalence number) as defined in Part 68 of FCC Rules and Regulations. When planning an installation, the REN for all lines to be rung must be totaled and this total (for each 9398) must not exceed 10.0A REN.

2.14 The 9398 module contains two option switches that select the operational characteristics of its five line circuits. Each of these two-position switches is described below.

2.15 Switch *S1* selects either of two possible methods of handling a call that is in progress when the System is activated. With *S1* set to position *A*, a call in progress (loop current flowing) is automatically transferred to the alerting message. Position *B* of this switch provides a low-level alerting

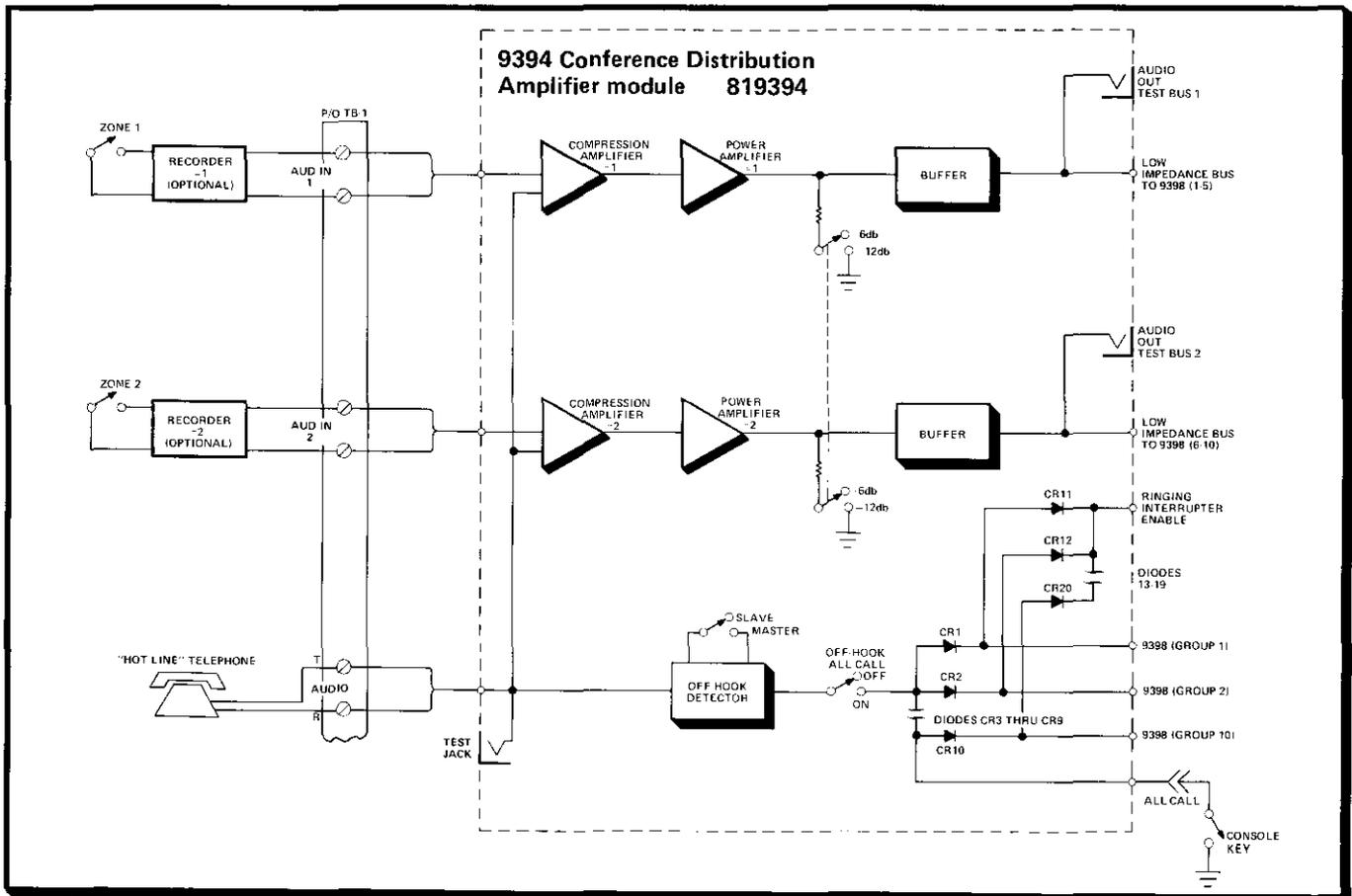


figure 5. 9394 Conference Distribution Amplifier module (819394) block diagram

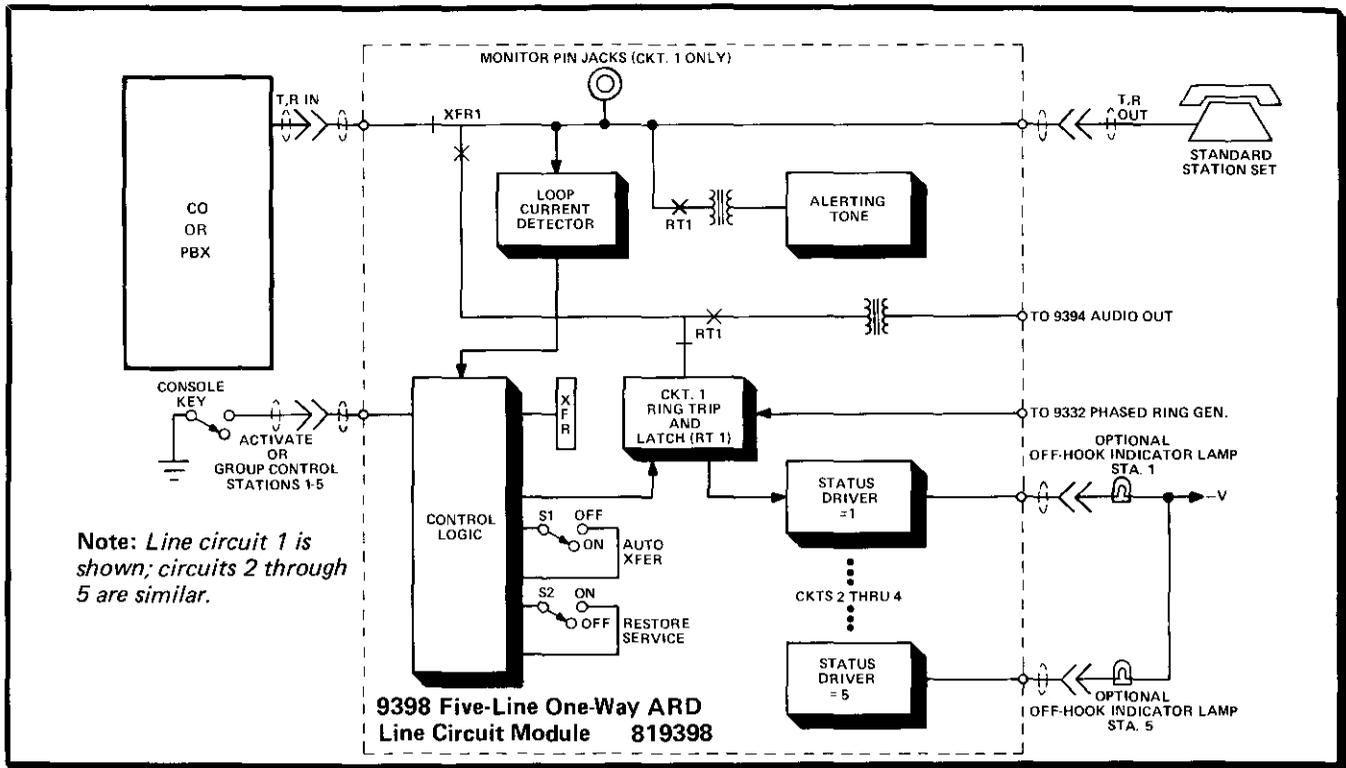


figure 6. 9398 Five-Line One-Way ARD Line Circuit Module (819398) block diagram

tone that is bridged onto all calls that are in progress when the module is activated. This tone notifies the busy subscriber that an emergency message is pending and allows the subscriber to complete the call in progress before receiving the alerting message. When the subscriber goes on-hook, the telephone rings at the distinctive rate, and, when the call is answered, the subscriber receives the alerting message.

2.16 Switch *S2* selects either of two methods of handling a disconnect after the alerting message is received by the subscriber. With *S2* set to position *A*, normal telephone service is restored to each subscriber served by the 9398 module after the alerting message is received and the subscriber hangs up. Position *B* of this switch prevents restoration of normal telephone service to the 9398's subscribers until the 294 System returns to the idle condition. This lockout option is normally used in applications where traffic to the serving CO or PBX must be limited during an emergency situation.

2.17 An isolation transformer on the 9398 prevents a short circuit on a station telephone or cable pair from affecting transmission to the stations served by other 9398's in the System.

2.18 Five front-panel test points, one per line circuit, are provided to facilitate testing. In any 294 System, one 9398 module is required for each five stations to be served. One 294 Assembly houses up to ten 9398's.

#### 8108 Ringing Generator

2.19 The 8108 Ringing Generator provides tapped 80, 90, 100, and 110Vac outputs, all at

20Hz, from  $-48\text{Vdc}$  input. The 8108 is rated at 20 watts of ringing power with a maximum full-load input current of 900mA.

2.20 Designed for 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.

2.21 Normally, one 8108 Ringing Generator is required for each 50-station shelf of the 294 System. For Systems of fewer than 50 stations, however, a smaller ringing generator can be supplied. In installations where battery-biased ( $-48\text{Vdc}$ ) ringing is externally available, the 8108 Ringing Generator is not required.

**Note:** One 8108 Ringing Generator provides ringing for 50 ringers. This must be taken into account when two or more telephones share the same extension number.

2.22 The 294 System continuously monitors its ringing supply, and the 9332 module provides a fault indication 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

2.23 The 8007 Power Supply provides a  $-48\text{Vdc}$ , 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.

2.24 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 at the bottom of the System's cabinet.

2.25 Normally, one 8007 Power Supply is required for 294 Systems of 50 to 150 stations. However, a power supply of lesser or greater capacity can be supplied, for smaller or larger Systems, respectively.

#### **battery backup**

2.26 A power supply with integral battery charger and two Tellabs 80-0040 Standby Power Assemblies (equipped with four 79-0057 batteries) can provide the 294 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 294 System remains functional during a power outage depends upon the number of shelves and the types of peripheral equipment used. Typically, a 250-line 294 System equipped with two 80-0040 Standby Power Assemblies (each providing -24Vdc) can remain operational for approximately 24 hours.

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

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

2.28 In applications where the switching equipment and the 294 System are collocated, it may be advantageous to use the switching equipment's power supply and battery backup system to power the 294 System. Transfer panels are available that make efficient use of the switching equipment's power supply in certain alerting applications. The 294 System operates from nominal -48Vdc filtered, ground-referenced input power.

#### **recording devices**

2.29 Two Recorders are available for the 294 System:

- A. Code-A-Phone unit, Model 111-1 (Tellabs part number 79-0123). This is a tape-drive-type unit that can provide a message 0 to 6 minutes in length (continuously adjustable). The message must be recorded and verified at the location where the unit is installed (this cannot be done remotely). 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.
- B. Audichron unit, Model 220 (Tellabs part number 79-0163 for mounting in 19-inch relay racks; rack adapters are available for mounting in 23-inch relay racks). This is a digital-storage-type

unit that can provide a message 2 to 20 seconds in length, adjustable 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.

2.30 The Model 111-1 and Model 220 Recorders allow the 294 Community 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.

2.31 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.

2.32 Normally, one Model 111-1 or Model 220 Recorder is used with the 294 System. However, in applications that require several different messages to be transmitted simultaneously during an emergency alert, additional Recorders can be supplied.

#### **930 System Control Enclosure (activation panel)**

2.33 The 930 System Control Enclosure (see figure 7) provides activation control for the 294 System in the event of an emergency or for routine testing. 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 System Control Enclosure is made up of the following sections:

- A. 9301 Telephone Handset Panel. This section contains a standard telephone handset that can broadcast a live message to selected zones. This telephone also provides recorded-message monitoring capability with record control, and can be used to override a recorded message with a live broadcast.
- B. 9302 Zone Select Panel. These locking *zone* pushbuttons (with status indicators) control the activation of the 294 System's associated zones. The size and configuration of a particular zone are determined by installation wiring (see section 2 of the 294 System Installation Practice, section 8X294-2, for specific installation procedures). In addition, an *all-call* pushbutton is provided for activating all zones simultaneously.
- C. 9303 Annunciator Panel. This panel provides visible indications at the 930 Enclosure when stations are answered during an alert. One 9303 can serve 100 stations.

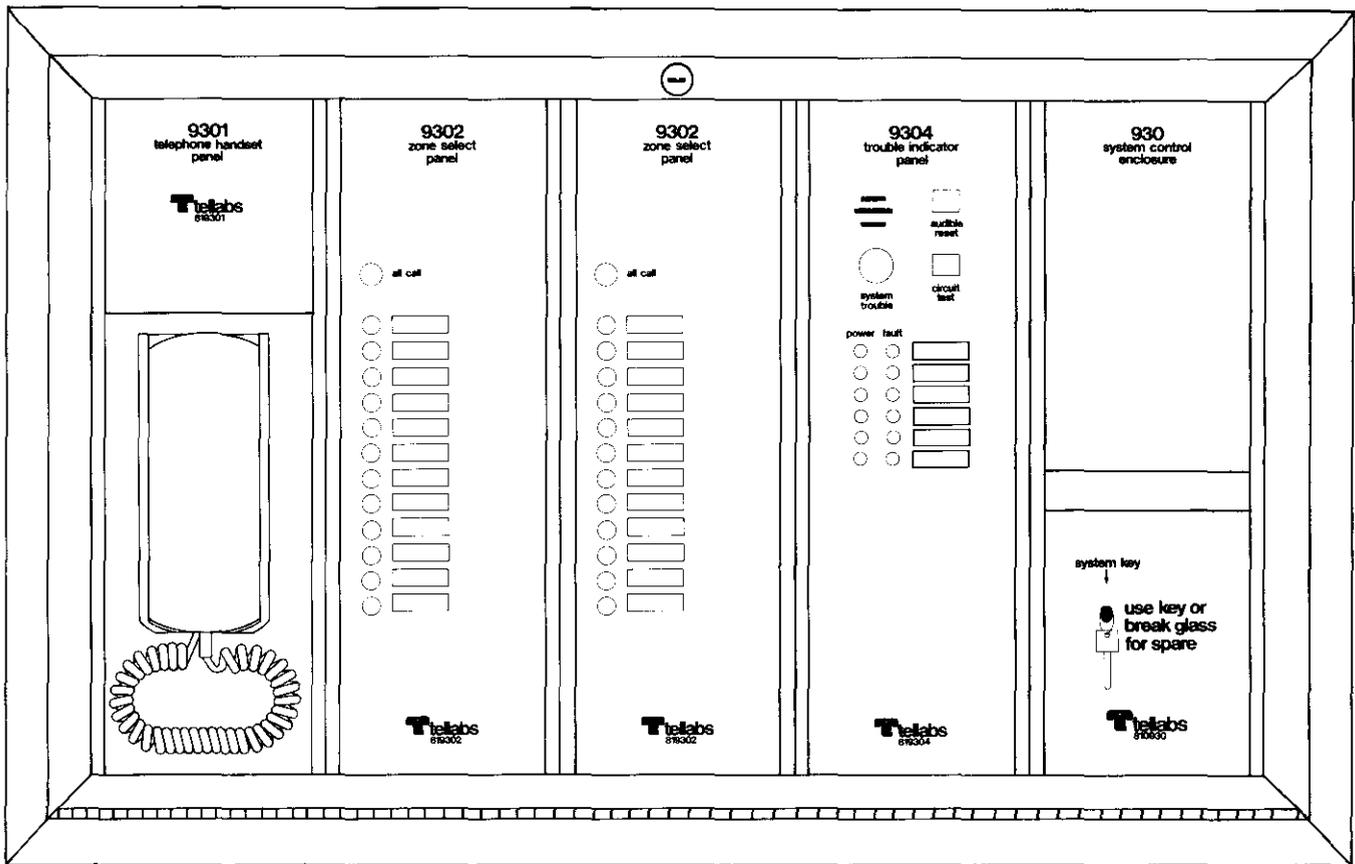


Figure 7. 930 System Control Enclosure (shown with a second 9302 panel, which is optional)

D. 9304 Trouble Indicator Panel. This section provides visible and audible indications of a fault in the System. An *audible reset* pushbutton silences the audible fault alarm while maintaining the visible *system trouble* lamp indication until the fault condition is cleared. Subsystem *power* lamps light continuously when the System is powered up, and subsystem *fault* lamps can be used to isolate a problem to a particular subsystem.

E. 9300 Blank Panel. This panel is used to fill unused slots in the 930 Enclosure.

2.34 The modular construction of the 930 System Control Enclosure allows it to be custom-built to meet the exact requirements of a particular installation. For example, when recorded messages are always used (instead of live broadcasts), an additional 9302 Zone Select Panel can be installed in place of the 9301 Telephone Handset Panel. Wider panels that can accommodate additional sections are also available.

2.35 The wall-mounted System Control Enclosure (activation panel) measures approximately 29.5 x 20.25 x 8.0 inches. It is recommended that the Enclosure 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 Enclosure in an emergency while providing security to discourage vandalism.

### larger systems

2.36 Larger 294 Systems are made up of additional 50-station increments (each of which makes up a basic 294 System) plus appropriate ringing generators and power supply. Figure 8 shows the equipment layout of a typical 1000-line 294 System with an 8206-23 Filter and Fuse Panel (minus the power supply, backup battery pack, recording device, and System Control Enclosure).

### 3. peripheral equipment

3.01 Because requirements for alerting systems are extremely varied, the 294 Community Alerting System is designed with maximum adaptability for interfacing peripheral equipment. The 294 System provides a basic framework that can interface a variety of other equipment. Tellabs' Applications 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 7.02 for a specific System design proposal. Figure 9 shows one possible 294 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

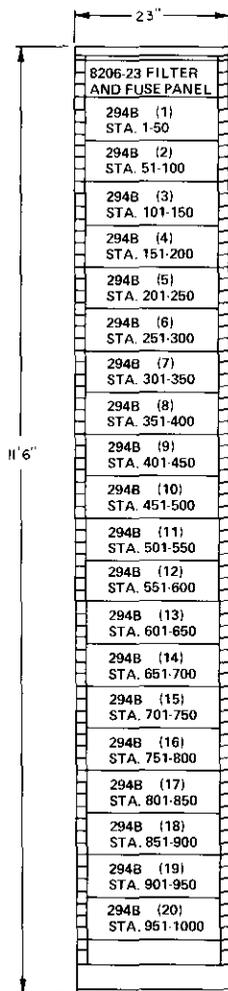


figure 8. Typical 1000-line relay-rack-mounted 294 System

support modules. These modules and other peripheral equipment are described below.

### multiline key telephone console

3.03 Multiline key telephone consoles are available for special-purpose applications. This equipment is used instead of the wall-mounted 930 System Control Enclosure.

3.04 A number of multiline key consoles are available to interface the 294 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.

3.05 Each key on the multiline console represents one zone. In addition to the zone keys, one key is designated all-call. If recording devices are used, specific keys can be arranged 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 294 Assembly provides 50 connectorized lamp leads (two 25-pin Amphenol type connectors). Each lamp lead is grounded whenever its associated station goes off-hook during an emergency message. Lamp status is latched into the 294 System until the System returns to the idle condi-

tion. The connectors on the 294 System shelf allow direct connection to the answer-lamp panels. For large installations, preassigned keys on a console 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 294 System. In small applications, this may be used instead of, or in addition to, the wall-mounted System Control Enclosure normally 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 294 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 that is 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 to implement these special wiring schemes. 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 zone 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 Access Trunk Circuit Module

3.12 The 9196 2Wire ARD Loop Start Access Trunk Circuit Module is an automatic answering

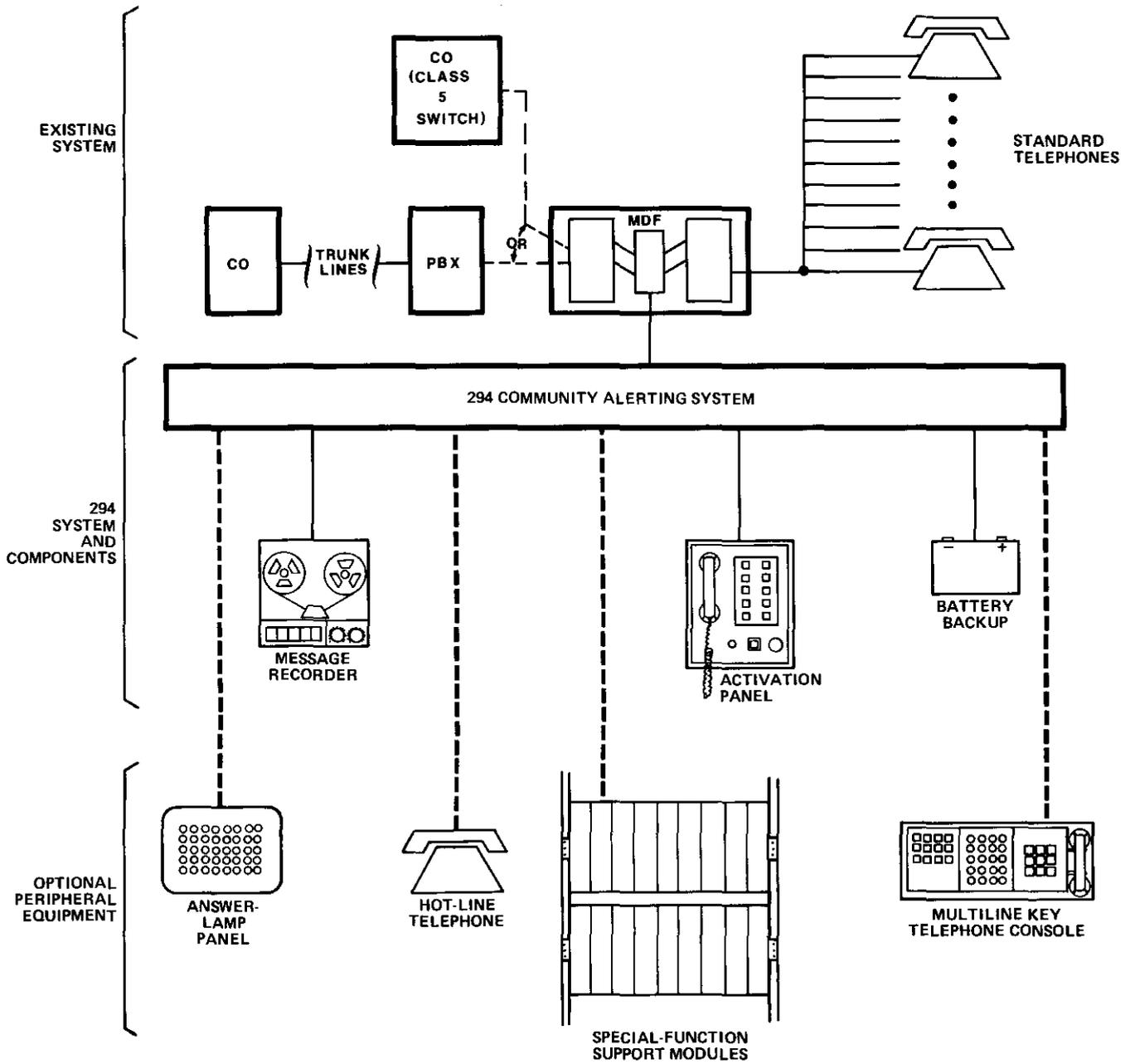


figure 9. 294 System with peripheral equipment

device that is connected to an unpublished PBX number to provide for automatic and/or remote access to the 294 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 294 System. Quick inter-connection is therefore possible because both the Quick-Connect Blocks and the 294 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.

**345 Status/Control Concentrator System**  
 3.14 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 the 345 Status/Control Concentrator (SCC) System. Figure 10 shows a typical application of this System. The SCC System can also be used to activate the 294 System if the 294 is equipped with a two-way communication port. One SCC System can provide a direct data-processing interface for up to 2000 status lamp outputs from a 294 System. These outputs are then scanned by the SCC System, converted to a serial format, and outputted on an RS-232-C data port that allows direct connection to computers, modems, terminals, or other peripheral equipment. For applications larger than 2000 lines, multiple Status/Control Concentrator Systems can be used.

**292R Conference/Alerting System**  
 3.15 The 294 System is capable of interfacing modules of the Tellabs 292R Conference/Alerting System (or an entire 292R System). The Tellabs 292R System provides up to 60 stations with two-way communication. The 292R System can be activated simultaneously with the 294 System or independently. Either manual access, automatic access, or combined manual and automatic access can be used to activate the 292R. Three remote-access ports allow parties away from their own telephones to enter the conference by dialing an unlisted number from any convenient nearby telephone. In the 292R Common Equipment Shelf, module position 11 is prewired to accommodate the 6072 DTMF/ Dial Decoder module for selective alerting. The 292R System consists of one Common Equipment Shelf and one to six Station Shelves, depending upon the number of lines required. The station line-circuit modules housed in the Station Shelves are 9291 modules.

**miscellaneous applications**  
 3.16 The aforementioned modules are designed with specific features for specific applications. Other applications can be accommodated by combining the decoders, timers, relay modules, and other Type 10 modules into various application packages. For additional details on any of these applications 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 7.02.

**4. application**  
 4.01 The 294 Community Alerting System can be used in a variety of emergency-alerting applications. The System has two main configurations. The

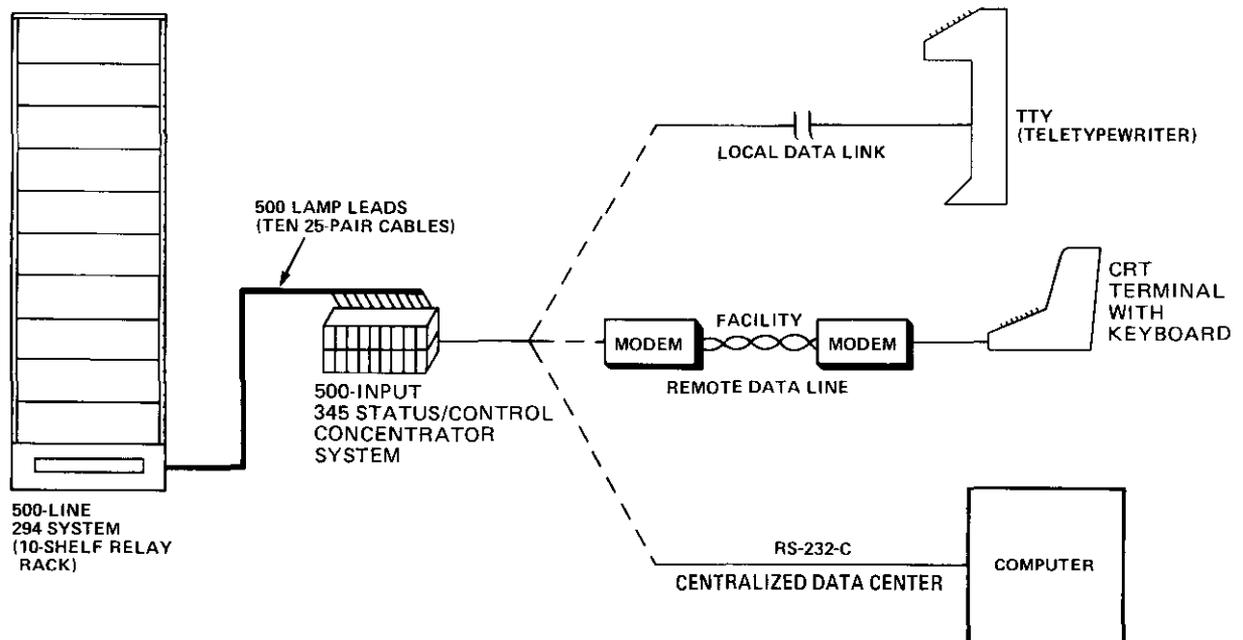


figure 10. Three typical 345 Status/Control Concentrator System applications

294 can be installed between a PBX and existing on-premises telephones. This arrangement is common in hotel and office-building environments. The 294 can also be installed in a central office to serve existing telephones within a community. The 294 System can be used in other applications as well; the System can be installed in series with CO lines and existing on-premises telephones. This arrangement is common in high-rise apartment environments.

#### **master/slave configurations**

4.02 In some applications of the 294 System, it is necessary to locate portions of the 294 System at remote locations. For example, the community surrounding a train yard might be served by portions of several central offices. In this case, a 294 System must be located in each CO and each System must be connected to a central location by private lines. For such applications, Tellabs can supply a wide array of equipment to provide supervised control and message interfaces between these remote locations. A 345 Status/Control Concentrator System can be used to efficiently provide this control and message interface function for the remote locations.

#### **recording devices**

4.03 A variety of recorders are available, ranging from simple magnetic-tape types to computerized announcers with messages stored in memory. To determine the type of recording device and support equipment to be used, the following operational requirements must be considered:

- A. Will one message be sufficient, or will several messages be required?
- B. If several messages are required, will they need to be transmitted simultaneously during an emergency call?
- C. Will the recorded message need to be changed, and, if so, will this be done remotely at a console or at the recorder location in the equipment room? (Some recorders are designed so that they can be desk-mounted next to an alerting console.)
- D. Will the System be using backup batteries? If so, the recorder must be compatible with the backup system.

#### **optional activation methods**

4.04 The 294 System can be activated by means other than the 930 System Control Enclosure. Listed below are a few of the methods by which the 294 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 person who initiates the call 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 pre-recorded 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 switched network. With this method, an unpublished number is connected to a decoder package provided with the 294 System. Personnel aware of the remote-activating number can go off-hook with any DTMF telephone connected to the switched network 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 294 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.

4.05 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 Applications Engineering Group at one of the telephone numbers listed in paragraph 7.02 of this Practice for additional information.

#### **5. operation**

5.01 This *operation* section describes the use of a 294 Community Alerting System in a small-community evacuation application. This provides a basic understanding of the System's operation and can be easily extended to other applications.

#### **station instructions**

5.02 Tellabs recommends that telephones connected to the 294 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. Also, please note the following:

- (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; 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

5.03 In the idle state, subscriber telephones are connected to the local CO, and normal telephone service is provided. The CO supplies station loop current and ringing, functioning exactly as if the 294 System were not connected.

#### system activation

5.04 When an emergency occurs, the 930 System Control Enclosure is normally used to initiate the alerting procedure. The Enclosure 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 or area. For example, if the 294 System is being used to evacuate factory workers in the event of a fire, zones closest to the fire are evacuated first, and zones farther away are evacuated in an order corresponding to their distance from the hazard.

5.05 Zoned alerting is accomplished via the pushbuttons on the Control Enclosure that activate the group leads on the line-circuit modules. Each line-circuit module controls five stations, which are alerted when their group leads are grounded. One zone lead per line-circuit module allows flexibility in zone selection (zones can be floors, buildings, key personnel, etc.). These zone leads can also be multiplied together or wired to a diode matrix module to design an overlapping-zone arrangement for special applications. An all-call feature integral to the 294 System permits single-lead (ground) activation of an entire 50-station mounting assembly or of a group of multiplied assemblies.

5.06 When the System is activated, on-hook stations ring at a distinctive rate of 0.5 second on, 2 seconds off, which permits the called party to distinguish between a normal call and an emergency call. An option switch allows selection of either automatic transfer or warning tone for stations that are off-hook when the System is activated. A second option switch allows the station to remain connected to the alerting message until the System is deactivated or to be restored to normal telephone service via a hookswitch flash. Stations that have not answered the emergency call 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 who is a heavy sleeper to receive the emergency call.

5.07 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 Control Enclosure contains pushbuttons for either a recorded or a live announcement. A maximum of two separate messages per 294 Mounting Assembly can be transmitted simultaneously if required (1 message for every 25 stations). A single message source can be connected to all shelves with practically no limitations.

#### system reset

5.08 The 294 System is reset by deactivating the group-call or all-call leads on the 294 Assembly. This is normally accomplished by resetting the *zone* or *all-call* activation buttons on the System Control Enclosure. The System can be optionally configured for automatic reset after a predetermined time interval or arranged for coded reset.

#### step-by-step operating instructions

5.09 Use the following procedures as a guide to activating and/or checking the 294 System:

#### zone selection

- A. Depress either the appropriate *zone* button or the *all call* button on the 9302 Zone Select Panel, as required. Red lights within buttons light to designate activated zones.
- B. Remove the telephone from the 9301 Telephone Handset Panel and give a verbal alerting message to the selected zone or zones. Repeat the live message for 30 seconds to 1 minute.
- C. Depress more *zone* buttons to communicate with additional zones, if required.
- D. Depress previously selected *zone* buttons again to cancel the alert to those zones.
- E. Repeat steps A, B, and C to ensure that the alerting message is received by all stations.

#### trouble indication (on the 9304 Trouble Indicator Panel)

- A. A subsystem fault is indicated by the following conditions:
  1. Audible alarm sounds.
  2. *System trouble* lamp (yellow) lights.
  3. Subsystem *fault* lamp (red) lights.
- B. A subsystem power failure is indicated by the *power* lamp (green) being off (not lighted).
- C. Depress the *audible reset* button to silence the audible alarm.
- D. The System can be tested by depressing the *circuit test* button.

5.10 For additional information about using the 294 System, please contact Tellabs Customer Service at your Tellabs Regional Office or at our Lisle, Illinois, or Mississauga, Ontario, Headquarters. Telephone numbers are listed in paragraph 7.02 of this Practice.

## 6. system specifications

### *system capacity*

5 stations per 9398 module; 50 stations per 294 Mounting Assembly; a system of any size 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: 2000-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  $-48\text{Vdc}$

frequency: 20Hz  $\pm 0.2\text{Hz}$

harmonic distortion: less than 5%

ringing capacity: each 9398 module can ring a total 10.0A REN as defined in FCC Part 68

### *audio*

compression range:  $-25$  to  $-5\text{dBm}$

output level:  $-6\text{dBm}$  or  $-12\text{dBm}$ , switch selectable

frequency response:  $\pm 1.0\text{dB}$ , 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  $-56\text{Vdc}$ , filtered, positive-ground-referenced

dc input current: (per 50-station Mounting Assembly and ringing generator) system idle, 0.25 ampere maximum; system active, 3 amperes maximum

### *operating environment*

$32^\circ$  to  $122^\circ\text{F}$  ( $0^\circ$  to  $50^\circ\text{C}$ ), humidity to 95% (no condensation)

### *dimensions*

#### 294 Mounting Assembly:

5.92 inches (15.04cm) high

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

9.5 inches (24.1cm) deep

#### 8108 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 50-line System with no ringing or power

### *mounting*

prewired 294 Mounting Assembly: 19-inch or 23-inch relay rack (6 inches of vertical rack space is used)

8108 Ringing Generator: apparatus case, or relay rack via mounting bars

## 7. warranty information

7.01 Tellabs warrants the 294 Community 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 294 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.*

7.02 For additional information on the 294 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

## 8. FCC registration information

### introduction

8.01 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 294 Community Alerting System is connected to the terminal side of a PBX or to central office (CO) lines.

8.02 Paragraph 8.10 of this section contains a sample table which gives examples of the type of data that the customer must supply to the serving telephone company regarding installation of the 294 System. Paragraph 8.10 also contains a typical System equipment configuration incorporating the data in table 1.

### connection arrangements

8.03 Registered terminal equipment may not be connected to coin lines or party lines.

8.04 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.

8.05 Customers directly connecting systems consisting of combinations of individually registered terminal equipment (e.g., a PBX, the 294 System, and telephone sets) shall, before such connection is made, provide to the telephone company the following information:

A. 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).

- B. A list of FCC Registration Numbers for equipment to be used in the system. (See the sample table in paragraph 8.10.)
- C. The quantities and Universal Service Order Code (USOC) numbers of the required standard jacks.
- D. For each jack, the sequence in which lines are to be connected, technical description codes by position, and service code by position. (See the sample table in paragraph 8.10.)

**installation requirements**

8.06 The standard registered 294 System (including cables) is considered a fully protected system. Therefore, all connections between the 294 System and the telephone network are to be made via fully protected on-premises wiring. Standard 294 Systems are typically 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 RJ21X 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.

8.07 All other connections to the 294 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.

**incidence of harm**

8.08 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.

8.09 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 Tellabs 294 System Installation Practice, section 81294-2) 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.

8.10 The telephone company may make changes to its communication 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.

**information supplied to the telephone company for 294 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	294-0.0A plus tel set	RJ21X	26, 1	294, PBX and tel set
EXT. BBB	2wire loop	294-0.0A plus tel set	RJ21X	27, 2	294, PBX and tel set
EXT. CCC	2wire loop	294-0.0A plus tel set	RJ21X	28, 3	294, PBX and tel set
<b>Information for all stations must be supplied.</b>					
EXT. ZZZ	2wire loop	294-0.0A plus tel set	RJ21X	(last circuit assigned)	294, PBX and tel set

table 1. Sample information table for 294 System configured as shown in figure 11

**typical configuration and sample information table**  
 8.11 Figure 11 in this section shows a typical 294 System equipment configuration, while table 1 provides a sample information table. The sample table is representative of the information that the customer must supply to the serving telephone company in regard to installation of registered 294 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 the "294 USOC Assignment Worksheets" supplied in the 294 System Installation Practice, section 81294-2. For 294 Systems larger than 50 stations, multiple sheets are required.

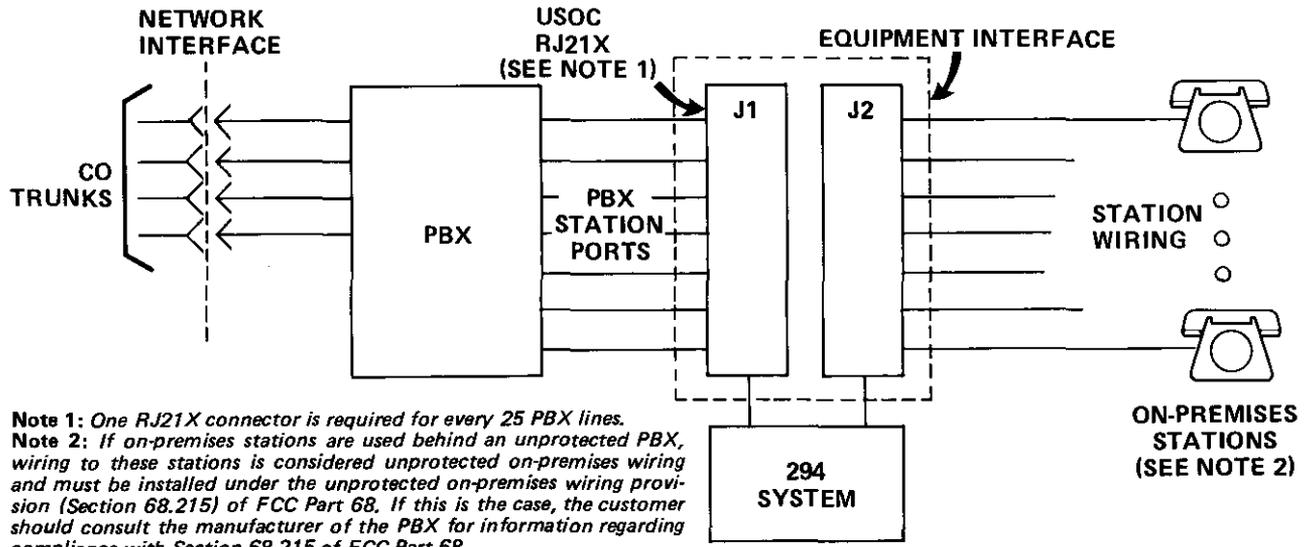


figure 11. Typical 294 System arrangement with PBX interface