

#### INTRODUCTION

The 2000 Series represents Zetron's top-of-the-line paging terminals.

The 2000 Series offers the system operator an affordable platform upon which sophisticated features and additional capacity can be built as required. Advanced capabilities can be integrated into the initial purchase, or can be added later as easy field upgrades.

Component standardization simplifies system maintenance and upgrades. The

software-intensive design allows a high degree of flexibility and enables system operators to fine-tune their terminals' performance to an unprecedented degree. This software-based approach also means that many older systems can be updated with the very latest features at a relatively small cost.



#### 2000 SERIES MODELS

The 2000 Series paging terminals are ideal for growing systems. A Model 2100 or 2200 can be configured to fit the present application and be expanded incrementally as growth occurs.

##### **Model 2100 Paging Terminal**

The Model 2100 is cost effective for as few as two or three hundred users. Its modest size belies its flexibility: the Model 2100 can support the same wide range of advanced features as the Model 2200. If the Model 2100's capacity is exceeded through growth, it can be upgraded by switching to a Model 2200 chassis. The internal cards can be transferred to the new chassis because they are common throughout the 2000 Series. This way, the major part of the investment in the paging terminal is retained as the system grows.

##### **Model 2200 Paging Terminal**

The Model 2200 is the best choice for applications requiring its larger capacity for pagers, telephone trunk interfaces, and voice storage. Only a small additional cost over the Model 2100, the Model 2200 is the wisest choice for system operators who expect to grow quickly or whose initial requirements would put the Model 2100 near its maximum capacity.

##### **Model 2200EX Expansion Chassis**

The Model 2200EX ensures that the system operator has a growth path beyond the basic capacities of the Model 2200. With the addition of a Model 2200EX, the Model 2200 can grow to support 38 telephone trunks and 50,000 pagers. Furthermore, a second EX chassis can be added, increasing trunk capacity to 58.

### For Commercial Paging Providers:

Commercial paging networks require the level of performance, sophisticated feature set, technology flexibility, and expandability that the 2000 Series paging terminal offers.

- Small initial system size available with easy field upgrades so service providers' infrastructure can grow with their customer base
- TNPP and satellite downlink capability lets paging systems be part of area-wide and nationwide networks
- DID and foreign exchange lines support multiple services
- Advanced database management, diagnostics, and billing support help operators manage their systems for maximum profitability
- System voice prompts present a professional image to customers and eliminate caller confusion
- Integrated voice messaging/retrieval give operators more services to sell

### Application

The 2000 Series Paging Terminal is ideal for mid-sized, commercial paging operators that sell airtime to subscribers that send and receive voice, numeric, and alphanumeric pages.

- Offers the ideal combination of feature-rich products and low cost so commercial operators can provide competitive services at the lowest possible price
- Comprehensive selection of interfaces—that support telephone equipment, radio transmitters, networks, paging encoding formats, and page entry stations—allows commercial operators to provide service to a diversified subscriber base
- Supports a wide variety of TNPP network topologies. For national or inter-regional paging, multiple terminals can be networked for increased subscriber capacity and coverage. A network of paging terminals can be part of a regional, nationwide, or worldwide paging network.
- Ability to simultaneously transmit a single message from multiple transmitters and towers ensures that the message is delivered faster and with less chance of failure
- Because pagers can have a group capcode in addition to an individual capcode, a single message can be sent to all pagers in a group

### For Private Paging Systems:

With the 2000 Series Paging Terminal, the owner of a company has total control over the services and administration of their private paging system.

- Priority and group paging allow the creation and support of emergency response teams
- Outdial TAP capability allows pages from the terminal to be routed to outside carriers for wide area paging
- Local telephone, optional integrated modem, and serial input interfaces allow paging from several different sources
- Availability of unusual paging formats means existing pagers do not have to be replaced or discarded
- Serial TAP interface allows external systems to automatically send display pages. (Nurse-call, alarm monitoring, industrial control, and CAD)
- Multiple telephone interfaces (DID, E&M, T1, end-to-end) means no costly upgrades to existing phone service and PBX systems
- The private owner can customize their coverage area to ensure excellent service by penetrating specific buildings and structures, encompassing an entire campus, or creating a private, wide-area network.

### Applications

- Establish a central point for all messages to be received and dispersed, with access to the system from any touch tone telephone. Workers that are in the field or away from their stations can be contacted at all times.
- Ensure that critical messages are received, emergency response teams are deployed, and problems are resolved
- Use group paging as an easy way to make sure individuals within a group receive information pertinent to their job function
- Send detailed message to mobile staff that describes what, where, and how they need to respond to customers' needs
- Eliminate or reduce the distraction caused by loudspeaker overhead paging. Individuals or workgroups can be contacted with a single, quiet page
- Link production automation into a paging system to immediately notify dispersed personnel of malfunctioning equipment and processes so productivity is not impacted and product quality is not compromised
- Provide wide-area networking privileges only to those individuals who require interconnection to a regional, national, or worldwide paging network.
- Communicate with hearing-impaired employees through alphanumeric messages
- Integrate paging system with communication, security, and building management

### **Numeric and Alphanumeric Display Paging**

The 2000 Series fully supports a variety of digital display formats, including POCSAG, FLEX™, Golay (GSC), and Multitone.

The 2000 Series can support numeric pages via DTMF input from telephones, and it has two unique ways for callers to send alphanumeric pages from a DTMF telephone. The first feature lets callers select from one hundred “canned” alphanumeric messages that the system operator has programmed into the system. The second feature lets callers spell out their own alpha messages using the buttons on a standard telephone keypad.

Alphanumeric and numeric messages can also be entered by operators using remote terminals connected both locally via serial cable and via modem. See the section on “TAP paging and TNPP networking” for additional information about remote page entry.

### **Voice Paging and Storage**

Excellent voice quality is one of the outstanding features of the 2000 Series. Zetron’s implementation of digital voice technology results in audio clarity that is unsurpassed. Users can hear the difference.

Silence compression eliminates pauses in spoken messages to maximize radio channel use. The sensitivity of this compression can be adjusted as a software parameter to compensate for varying telephone line quality.

The Voice Controller can handle up to 4 Telco trunks which are recording voice pages simultaneously. Up to 28 voice channels can be added in blocks of 4 (for a total of 32). Ten minutes of internal voice storage is dynamically allocated to telephone interfaces on an as-needed basis, maximizing trunk efficiency by processing several calls simultaneously.

### **Priority Paging**

Six levels of paging priority are supported, including “next out” and “breakthrough”. These priorities can be assigned both on a per-pager and on a per-interface basis. This allows key pagers to be set so that they are always the next out regardless of current traffic, and local operators can break through with live voice pages in case of emergency. The interrupted page is stored and resent after the emergency page.

### **Group Paging**

Group paging is supported both for specific formats, such as two-tone group call, as well as for formats that do not inherently have group call capability. This feature supports 1,000 groups of up to forty-eight pagers each. Each group can mix dissimilar pager formats, and can

even support both voice and display pagers in a single group. For maximum flexibility, a group can be a member of another group, and an individual pager can be in several different groups.

### **Countdown paging**

Countdown paging allows the operator to sell a set number of pages to a subscriber. Before the pages are exhausted, a warning page is sent to the subscriber. This is useful when a subscriber is behind in payments or to sell pagers prepackaged with pager service.

### **Talk-Back**

Talk-back allows two-way communication between telephone (land line) callers and mobile radio users. The 2000 Series supports half-duplex and full-duplex radio stations with carrier switching.

### **System Voice Prompts**

The System Voice Prompts option uses a factory-recorded human voice to guide callers through the paging process. The prompts tell callers when to override a pager number, whether to speak a voice message or to enter a telephone number, and when an invalid number has been reached. These prompts can be easily modified by the system operator to fit a specific application. The same high-quality Voice Controller that records voice pages is used to record/replay system voice prompts. This option may be purchased individually or as a part of the PageSaver option.

### **Subscriber Recorded Prompts**

The Subscriber Recorded Prompts option enables users to record their own voice prompts. The system operator can specify who has access to this feature, and how long their voice greetings can be. This option may be purchased individually or as a part of the PageSaver option.

### **Alarm Monitoring**

When equipped with the Alarm Dialer Interface option, the 2000 Series paging terminal can accept calls from ADEMCO-compatible alarm dialers using the “ADEMCO 4/9 DTMF” (also known as “FAST”) protocol. Each alarm dialer can monitor up to 8 alarm points, and will initiate a display page if any change is detected by the dialer. In addition, an error page can be sent if the dialer fails to check in at specified intervals.

## TELCO INTERFACE

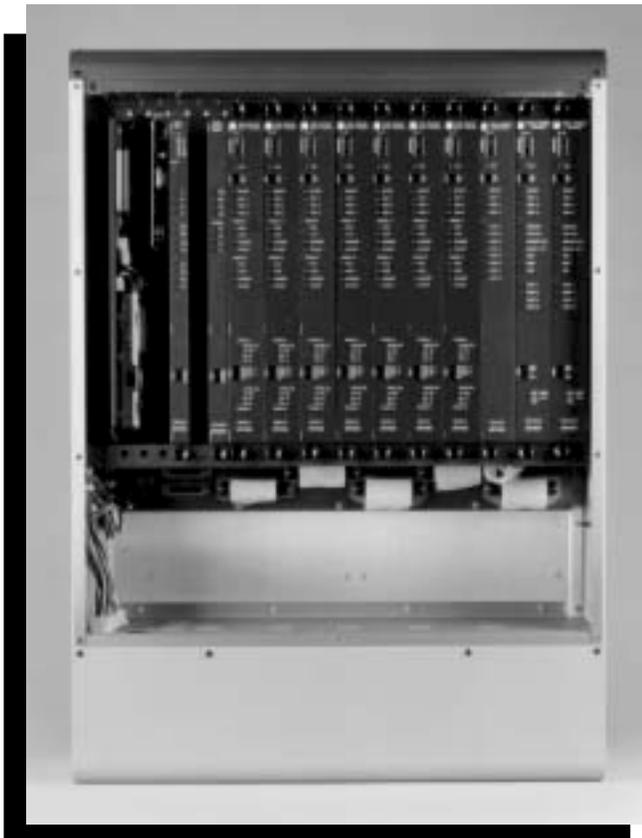
There are two basic types of Telco interfaces supported by the 2000 Series terminals: analog and digital T1. Analog lines are supported via the Dual Telco cards. Digital T1 spans are supported with the Digital T1 Interface chassis.

### Telco line types

Direct Inward Dial (DID) or E&M input from a telco central office is most commonly used by wide-area service providers. The caller dials a normal telephone number; the last 2 to 7 digits of this number are automatically sent to the paging terminal by the telephone company, selecting the particular subscriber to be paged.

The telco also offers digital T1 lines. Twenty-four DID channels are carried over a single T1 span, and partial spans can be supported by the 2000 Series.

Other types of lines (end-to-end, loop start, ground start, or E&M tie line) are answered with a beep tone and/or voice prompt. The caller then keys in the pager number using a touch-tone telephone. In-plant systems often use these line types.



*The 2000 Series paging terminals take advantage of a versatile, modular design. Hardware capacity and options are added via insertable circuit cards.*

## Dual Telco Analog Interface Cards

The Dual Telco interface card supports two analog telephone trunks. Up to 29 Dual cards can be installed in a single 2000 Series system (with two Dual 2200EX chassis). There are two types of trunk cards. One type handles telephone company DID lines (either immediate or wink start), end-to-end, and DTMF over dial line. It also handles PBX lines (either loop start, E&M type I, ground start, or station). The second type of trunk card handles E&M 4-wire audio lines.

### Dial click decoder for Legacy telephone systems

If the caller has a rotary (pulse-dial) telephone, the optional dial click decoder card is required. Note: the viability of dial click decoding depends on the type of telco CO serving each of the callers and the paging terminal. Consult Zetron for specific applications.

### Dual multifrequency decoder

Most Telco trunks to a customer use Dual-Tone Multi-Frequency (DTMF) signaling. However, in some instances, Multi-Frequency (MF) lines may be supplied by the phone company. This option supports MF for both trunks on a Dual card.

## Digital T1 Interface

The Digital T1 Interface is for carriers who want the economic benefits of T1 telephone service. Trunks that are carried over the T1 span are less costly than standard trunks both in telco charges and in paging terminal hardware. The cost of a Digital T1 Interface configured for 24 channels is significantly lower than the cost of twelve Dual Telco Interface Cards required to support twenty-four analog telephone trunks in the 2000 Series paging terminal. One or two Digital T1 interfaces can be connected to a single 2000 Series terminal.

When equipped with 4 Hex Trunk cards, the Digital T1 Interface supports all 24 trunks on a T1 span. If less than 24 trunks are required (a partial T1 span), fewer Hex Trunk cards can be installed to support partial T1 connections at a reduced cost.



*Digital T1 Interface.*

## TAP

TAP (Telocator Alphanumeric Protocol) was designed as a one-way protocol to be used by a piece of equipment sending pages to a single paging terminal, such as an alarm monitoring system, alphanumeric message entry station, personal computer, PC network, or 3rd party email or web-based paging software. It typically operates over a serial link either directly using an RS-232 port, or over a telephone line and modem.

Dedicated serial TAP ports are available with the Multi-port Serial Interface option which comes with 2 to 8 serial ports. The Dual Telco interface cards and Digital T1 interface also support incoming TAP applications when equipped with alphanumeric messaging input modem option. When the call is to a DID phone number designated for alphanumeric access, the modem automatically starts trying to communicate using TAP protocol.

## OUTDIAL TAP

The Outdial TAP Interface module is designed to send small to medium volumes of display pages from one terminal to another. It may be used to extend the coverage region for some users of an in-plant paging system, by calling up an external wide area paging service.

Using Outdial TAP, the 2000 Series Paging Terminal can be configured to automatically forward a page to a public service provider after having been configured as a subscriber of that system.

## TNPP

TNPP (Telocator Network Paging Protocol) was designed to tie paging terminals together in a network. A paging terminal that receives a TNPP packet can tell which pages to transmit, which ones to pass along to other paging terminals in the network, and whether any information has become corrupted.

TNPP networking is made possible in the 2000 Series terminals with the TNPP Network Interface Card. The TNPP card can be configured for unidirectional TNPP to support one-way satellite downlink, or bidirectional TNPP to support full duplex, land based networks, and 2-way VSAT satellite based networks. The TNPP Network Interface Card can support 2 to 8 direct TNPP connections. Dial-out TNPP is supported with the optional TNPP Buffer PC software.

Network destinations for pages are entered in the subscribers' database records as simple names instead of the cryptic hexadecimal node identification numbers that are used by the TNPP protocol. The destination name is cross-referenced to the actual node ID number in a lookup table in the system software. This means that if a change in the network configuration requires a new destination node ID, the system operator can make one change in the lookup table instead of hundreds or thousands of changes in the subscriber database.

## PAGING TRANSMITTER INTERFACE

The paging transmitter interface is accomplished through the Radio Station card plugged into the 2000 Series chassis. The Radio Station card is quite versatile and can be adapted to many different transmitter control applications. Consult Zetron for specific applications.

### Direct transmitter control

For direct control of a paging transmitter, digital outputs from the Radio Station card can modulate the FSK (frequency shift keying) input of the paging transmitter and change its modulation between analog (AC) and digital (DC) modes.

### Remote transmitter control

The 2000 Series paging terminal is capable of controlling remote transmitters by encoding the paging site address, analog/digital mode, and transmitter key-up information as audio tone information (Motorola PURC<sup>®</sup> tone protocol) and sending the data over telephone lines, microwave or a radio link.

Optionally, Zetron's Model 66 Transmitter Control panel can be used at the transmitter site for controlling transmitters that do not support the PURC<sup>®</sup> protocol.

The Model 68 Transmitter System Controller is an ideal option for providing cost effective transmitter control for systems where high throughput is not an issue. The Model 68 allows a 2000 Series terminal with a single Radio Station card to selectively address up to 16 links to transmitters and transmitter systems.

### Shared channel support

Some paging channels are shared with co-channel carriers. In these systems, it is necessary for the transmitter sites to notify the paging terminal when the channel is clear for transmission. The Radio Station card recognizes the COR/CAS signal (from a receiver monitoring the frequency). The paging terminal stores and sends pages destined for that zone when the "busy signal" is cleared.

### Multiple Addresses

In low traffic situations, wide-area paging systems can be designed to avoid the expense of simulcast equipment. By arranging the geographical paging area into zones that do not overlap, the paging terminal can select each zone in sequence and reach all paging subscribers. With the Multiple Address option, up to 30 transmitters in a single zone can be addressed.

### Morse code ID

The Radio Station card sends the Morse code station ID to maintain FCC compliance.

## VOICE MESSAGING WITH PAGESAVER

The PageSaver option puts the most-asked-for features of voice messaging/retrieval systems right inside your Zetron paging terminal, eliminating expensive external voice messaging systems. With PageSaver you can: rent voice message boxes, insure voice and numeric pages by putting them in



messageboxes so subscribers can replay them over the phone, page subscribers when a message is deposited in their messagebox, even offer special announcement telephone numbers. Combining paging and messaging simplifies management, minimizes the number of phone lines, and reduces overall cost.

PageSaver comes standard with 72 hours of voice storage, available for all the different types of messages. The number, length, and retention time of each subscriber's messages, pages, and voice greetings can be tailored by the operator. The Model 2200 can also be equipped with mirrored disk drives which backup personal prompts in the event of a drive malfunction.

A terminal with the PageSaver option allows each subscriber any combination of the following options:

### **Voice Messagebox with Notify**

This service beeps a subscriber's pager every time a message is deposited in their messagebox.

### **Voice Messagebox**

Like a personal answering machine, a voice messagebox records messages from phone callers for later phone retrieval by the subscriber.

### **Announcement**

Subscribers with or without pagers can record voice messages that replay over their assigned telephone number.

### **Paging**

This is traditional tone-only, tone-and-voice, and display paging.

### **Paging with Insurance**

If a subscriber misses or doesn't understand a voice or numeric page, they can phone in and hear it again.

### **Call Forward**

A subscriber can have two pre-programmed numbers which forward to another subscriber.

## SIMULCAST THROUGH MODEL 600/620



The 2000 Series paging terminal can be interfaced to Zetron's High Speed Simulcast Paging System for efficient wide-area paging coverage.

The High Speed Simulcast Paging System uses timing information from the Global Positioning System (GPS) to synchronize the transmission of digital paging signals to very tight tolerances. This provides the microsecond timing accuracy necessary for high-speed simulcast paging with protocols such as POCSAG and FLEX®.

The system consists of the Model 600 Wireless Data Manager (Source Unit) and multiple (up to 1000) Model 620 Wireless Data Encoders (Destination Units). The link between the Source and Destination units may be any type (or combination) of link that can reliably transport data. Designed for non-proprietary transmitters, the system is ideal for cost effective build-out of new transmitter sites for public or private paging system operators.

Standard features include encoding for POCSAG (512, 1200 and 2400 baud) and basic FLEX (1600), support for up to 1000 destinations with TNPP routing and zoning capabilities, multi-frequency transmitter control, Trimble Acutime 2000 compatible GPS interface, traditional two-level digital transmitter interface, and multiple user-definable input/output ports. Optional features include enhanced four-level FLEX (3200 and 6400 baud) for the I20 transmitter interface, and support for other GPS devices.

### **Model 600 Wireless Data Manager**

The Model 600 accepts TNPP input from up to three TNPP links, efficiently batches the pages with timing information from an attached GPS, and delivers the pages across a link to multiple Model 620 Wireless Data Encoders.

### **Model 620 Wireless Data Encoder**

The Model 620 receives batches of paging data from the Model 600, and encodes the data for POCSAG or FLEX. At the precise time indicated by an attached GPS, the encoded message batch is sent to the transmitter, resulting in synchronous broadcast with other Model 620 controlled transmitters.

## SYSTEM MANAGEMENT THROUGH ZBASE

ZBASE is the database management program for the 2000 Series Paging Terminals, included with each paging terminal purchased. It allows the system operator access to the subscriber, group, and message databases.

In addition, ZBASE aids the system operator in monitoring system usage. Detailed reports on account status and call counts show the levels of service for all subscribers. Statistics are presented as graphs that show trunk, channel, TNPP, and voice storage use. System call logs keep a record of every page that the terminal handles.

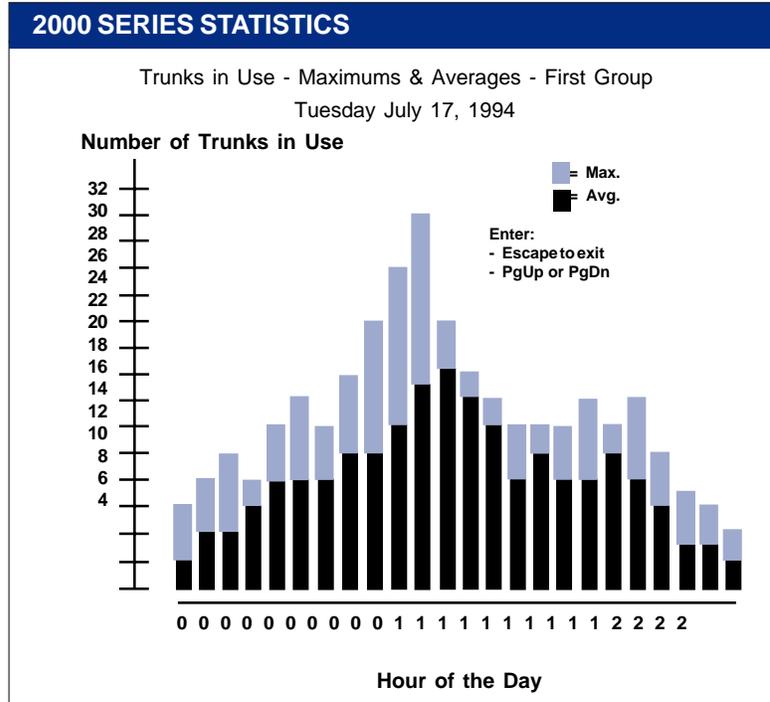
The basic version of ZBASE which is shipped with every 2000 Series terminal runs on a stand-alone PC. An option called Network ZBASE can be purchased which allows multiple operators on a network to use ZBASE at the same time.

The operator menus for either of these configurations may be modified by the user to display in any language.

The EZBASE software option makes it possible for someone outside the office to dial-up and remotely work with the 2000 Series subscriber and group databases.

The Secured Agent Access (SAA) option allows the system operator to limit the database editing privileges of individual remote agents.

The ZBIF option allows third party subscriber database and billing software to access the 2000 Series subscriber database. Eliminating double-entry of data into the billing system and then into ZBASE reduces data entry errors and speeds pager setup, insuring all active pagers are billed properly.



## SYSTEM CAPABILITIES COMPARISON

|  | 2100             | 2200  | 2200 with 2200EX | 2200 with Dual 2200EX Chassis |
|--|------------------|---|------------------|-------------------------------|
| Pagers (standard/max.)                                   | 2,000/3,000      | 2,000/10,000  | 2,000/50,000     | 2,000/50,000                  |
| System Card Slots  | 5                | 6   | 6                | 6                             |
| Interface Card Slots                                     | 5                | 10  | 20               | 30                            |
| Telco Trunk Interface (max)                              | 8                | 18  | 38               | 58                            |
| Radio Channel Interface (max)                            | 2                | 4   | 8                | 8                             |
| Dimensions (H x W x D)                                   | 21" x 17" x 5.5" | 30" x 22" x 7"  | 21" x 22" x 7" * | 21" x 22" x 7" *              |
| Weight   | 40 lb.           | 75 lb.  | 60 lb. *         | 60 lb. *                      |
| Power Supply<br>(AC input: 115 or 220/240 VAC, 47-63 Hz) | 80 watts, max.   | 200 watts, max.<br>(48 VDC input power supply optionally available) | 400 watts, max.  | 600 watts, max.               |

\* Applies to 2200EX chassis only.

## ZETRON SUPPORT

Remote factory support is accomplished through the dial-access modem that comes standard with every 2000 Series paging terminal. The paging terminal's system log files can be downloaded by Zetron support technicians, allowing them to analyze the terminal's internal events and accurately diagnose the system's condition. Emergency support is available around the clock, so that factory response to critical problems is never more than a few minutes away.

System operators are provided with additional tools to make self-support easier as well. Automatic test pages can be generated from the ZBASE software

when modifying subscriber records to insure correct setup. Every software configuration option that can be performed by factory technicians is explained in detail in the system installation and maintenance manual, so that system operators can make these changes themselves if they choose. The manual also explains the meaning of every code recorded in the system logs, so system operators can do their own diagnostics.

Factory training is available for those who want to acquire an in-depth knowledge of the 2000 Series architecture, programming, installation, and maintenance. This class consists of three days of lecture, discussion, and hands-on training with a 2000 Series paging terminal.

## SPECIFICATIONS

### GENERAL

Standard Model 2100 and Model 2200 are equipped with a hard disk for system software, subscriber database, and voice storage, as well as an autobaud modem for remote programming, diagnostics, and factory support

Environmental +40 to +120 degrees F. (+5 to +50 degrees C.), 10,000 ft. (3,000 m.) altitude, 8% to 80% relative humidity, non-condensing

Power (Model 2100)  
AC input 115/230 volts AC +/- 10%, 47-63 Hz  
150 Watts maximum

Power (Model 2200)  
AC input 115/230 volts AC +/- 10%, 47-63 Hz  
DC input option 40-70 volts DC  
300 Watts maximum

### TAP CAPABILITIES

Inbound TAP Via telephone line modems or direct RS-232 connection (up to 16 ports)

Outdial TAP Up to 32 different destinations via single external modem

### TNPP CAPABILITIES

Maximum nodes supported 64

### TELCO INTERFACE

Available Interface Types (field configurable) Central office DID selector-level (up to 7-digit feed), End-to-End loop and ground start (ring and overdial), PABX 2-wire trunk, E&M Type 1 2-wire audio, Local Access telephone set for priority override. E&M Type 2 with 4-wire audio available as a separate interface, T1 up to 48 channels

Line Coupling 600-ohm Transformer, adjustable balance duplex hybrid

Input DTMF (0-9, \*, #, A-D), Dial Pulse (0-9), optional MF R1 (0-9, KP, ST), MF R2 (for international use), 300/1200 baud modem (optional Alpha Messaging Input Modem), optional Dual Dial Click Decoder

### RADIO TRANSMITTER INTERFACE

Configurations Transmit only Paging, optional Transmit/Receive Talk-back Paging

Signaling Formats  
Analog 2-tone sequential, 5/6-tone analog  
Digital Multitone Mark IV/V/VI POCSAG (512, 1200, and 2400 baud), Golan Sequential code (GSC), NEC D3, D4, and FLEX (1600 baud)

Transmit Audio Balanced 600 ohm transformer, selectable flat tone or -6 dB per octave de-emphasis @ 300-3000Hz, selectable flat voice or +6 dB per octave pre-emphasis

Format Encoding Analog frequency accuracy +/-0.02%, analog tone distortion less than 0.2%, digital data stability +/- 2 ppm

Remote Control Motorola PURC (sequential signaling of up to 16 transmitter zones per channel), Quintron SCM/SCU, tone formats. Four binary TTL leads provide information for outboard controller units to select up to 16 transmitter zones per channel

### VOICE CAPABILITIES (Optional)

Independent Voice Channels 4 to 32, each dynamically allocated to trunks on an as-needed basis

PageSaver Voice Message Retrieval 72 hours voice storage, 999-second maximum voice message length, 100 messages per subscriber maximum (50 messages per mode), maximum message retention time is 255 hours

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See Zetron price list for option pricing.

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