
PREMISES PAGER SYSTEM[®]

SmartAlert 200 Series

RS-232 Transmitter (8214)

RS-232 and Telephone Interconnect Transmitter (8205)



Programming and Installation Guide
Part Number 320124 Rev E
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Introduction

JTECH Communications Inc. is a privately owned United States Corporation which designs and manufactures cost effective in-house communications systems for customers throughout the world.

Thank you for choosing JTECH Communications Inc. as the provider for your on-premises paging requirements. We truly appreciate your confidence in our products. At JTECH there is no greater commitment than providing you with total customer satisfaction.

Please take a few minutes to review this manual prior to installing and operating your system. The manual will provide you with installation instructions, provide answers to the most frequently asked questions, and offer suggestions to ensure you receive all of the many benefits your system can provide.

Additionally, this manual will assist you with problem determination and offer helpful advice when seeking customer service. We are confident that JTECH Communications Inc. has the most responsive customer service available within the industry. Please do not hesitate to call JTECH Communications Inc. Customer Care at 800.321.6221 if you have any questions. We look forward to a long and mutually rewarding partnership.

TABLE OF CONTENTS

INTRODUCTION	ii
SYSTEM OVERVIEW AND COMPONENTS.....	1
PAGER TYPES	2
PROGRAMMING TERMINOLOGY FOR THE SMARTALERT RS232	3
RS232 INTERFACE HARDWARE HANDSHAKING-REQUEST TO SEND / CLEAR TO SEND	7
BAUD RATE.....	7
MESSAGE FORMAT	8
DETAILS OF THE MESSAGE PARTS	9
HARDWARE INSTALLATION.....	11
OPERATION.....	12
TROUBLESHOOTING	13
SERVICE	14
APPENDIX A - TELEPHONE INTERCONNECT SPECIFICATIONS.....	15
APPENDIX B - DETAILED TECHNICAL SPECIFICATIONS.....	16
GENERAL TERMS AND CONDITIONS.....	17

System Overview and Components

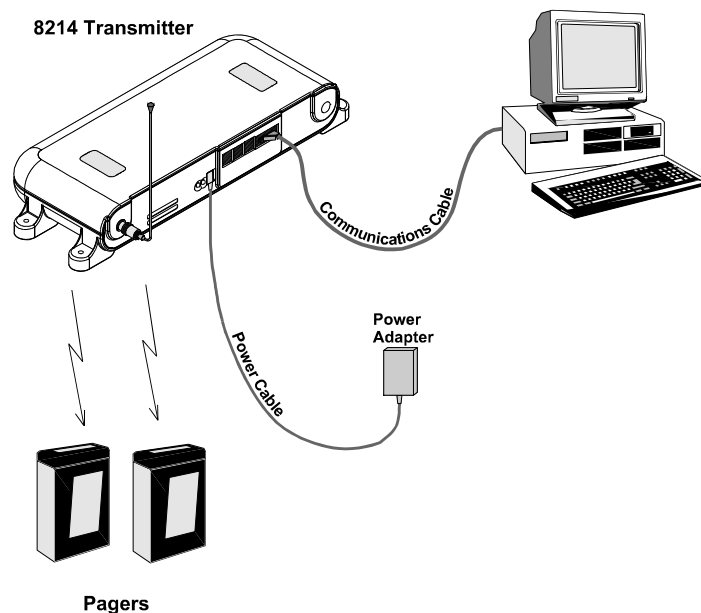
System Overview

Congratulations on your purchase of the SmartAlert 200 Series RS232 Paging Transmitter or the SmartAlert 200 Series RS232 with Telephone Interconnect. These transmitters were designed to interface with a host device to page Industry Standard POCSAG UHF Pagers. The host device may be a personal computer or other electronic device utilizing RS232 communications. This audience for this guide is twofold. It first serves as a programming guide for software developers to design an application to interface to the SmartAlert. Secondly it shows the end user how to install and operate the SmartAlert 200 Series RS232.

Components

The basic system components are:

- SmartAlert RS232 (model 8214/8205) Paging Transmitter with antenna and Power Adapter
- RS232 communications cable
- Telephone Interconnect Cable (with model 8205 telephone interface option only)
- SmartAlert 200 Series RS232 Paging Transmitter Programming and Installation Guide
- Warranty registration card



Please inspect the system upon receipt. If the contents appear to be damaged contact the shipper to file a claim and notify JTECH Communications Customer Care department. If any components are missing, contact Customer Care.

Pager Types

The SmartAlert 200 Series RS232 can be programmed to work with several types of JTECH Communications pagers. Most commonly, these include Numeric and Alphanumeric (Alpha) pagers, although pager types may also include Vibe Only, Vibe/Tone, Glowster[®] and CommPass[™] Vibe/Flash and Vibe/Flash/Voice pagers. Please refer to the instructions that accompanied your pagers for installation and operation or request the UHF Desktop Transmitter product documentation (P/N 325005) for complete details on these JTECH paging products.

JTECH pagers conform to a number of industry standards. Seven (7) variables are typical of most pagers. These variables are:

1. Language Recognized: POCSAG
2. Message Protocol: Alphanumeric or Numeric Only
3. RF Baud Rate: 512, 1200, or 2400
4. Data Inversion: Yes or No
5. Priority Message: Yes or No
6. Cap Code: Up to 2 Million individually accessible codes
7. Receive Frequency

These variables along with other pager terminology are described in the next section.

Programming Terminology for the SmartAlert RS232

Language

Over the years a number radio frequency data patterns (Languages) have evolved to “speak” to pagers. POCSAG is the most widely used language today and a language that JTECH products support. POCSAG is simply an algorithm that is used to encode alphanumeric and numeric data for transmission via modulated radio waves.

Message Protocol

Two types of data may be sent to today’s pagers, either numeric only or alphanumeric. Numeric only data is easier to decode and may be received on less costly pagers. Alphanumeric data is more flexible than numeric only, but is more difficult (expensive) to decode and display and therefore must be received on more expensive pagers. The received radio data for Alphanumeric POCSAG messages are different in format than numeric only messages and therefore will result in “garbage” being displayed when alpha messages are sent to numeric only pagers. The opposite is also true. JTECH Communications, Inc. uses a specific descriptor in the format used to “Talk” to its transmitters to allow the user to select either alphanumeric or numeric only protocol. (This option is only available when using 7 digit extended protocol). The actual modulated radio waves sent in alphanumeric messages versus numeric only messages are different even though the content may appear the same. For example, the radio waves received by a numeric only pager that is to display the message ‘123’ will be quite different than the radio waves received by an alphanumeric pager that is to display the message ‘123’.

RF Baud Rate

Radio Frequency baud rates are the rates at which radio transmitters modulate radio waves into the “1’s” and “0’s” received by pagers. The most common RF baud rate is 512 baud, but 1200 baud and 2400 baud are increasing in popularity. JTECH Communications, Inc. uses 512 baud, but our transmitters will support 1200 and 2400. Testing to date has shown 2400 baud to be slightly less reliable than either 512 or 1200. Faster data rates are used primarily by wide area paging services where throughput is a critical concern. For example, at peak paging times, a citywide paging service would be able to send four times the number of pages by using a 2400-baud rate vs. 512 baud. On-site systems simply do not have the traffic to necessitate the use of higher baud rates. The observable difference may only be one to one and a half seconds faster with 2400-baud versus 512 baud. With the higher reliability of 512 baud the difference in speed is not enough to offset this reliability difference. JTECH uses a specific descriptor in the format used to “Talk” to its transmitters to allow the user to select either 512, 1200 or 2400 baud.

Receive Frequency

The receive frequency is the center frequency measured in millions of cycles per second that a pager is tuned to. A single frequency may typically support hundreds of thousands of pagers and it is the Cap Code that allows specific identification of an individual pager. For a pager to operate, the frequency of the transmitter (SmartAlert RS232) must match the receive frequency of the pager.

Radio Frequency (RF) Baud Rate vs. RS-232 Baud Rate

JTECH equipment, which connects via an RS-232 connection, communicates between the host and the hardware at 1200 baud.

The term “baud rate” has also been associated with the frequency at which radio waves designating “1’s” and “0’s” arrive at a pager (see page 3.) This RF baud rate is often confused with the baud rate of “1’s” and “0’s” arriving at the transmitting equipment from the host. Typical RF baud rates are 512, 1200 and 2400. JTECH supports 512, 1200 and 2400 baud pagers.

Data Inversion

Radio data sent to pagers may be sent either right side up (non-inverted) or upside down (inverted). It is not clear where this option originated, but it nevertheless persists. Most commercially available pagers have the option of accepting either orientation, however, the pager supplier usually sets this option and therefore either non-inverted or inverted data must be received, but not both. This pager option is not usually field selectable and must be “downloaded” to the pager via special equipment available from most paging dealers. Data non-inverted is the most common data orientation. JTECH uses a specific descriptor in the paging format used to “Talk” to its transmitters to allow the user to select either a non-inverted or inverted data format. (This option is only available when using 7-digit extended protocol.)

Priority Message

Some pagers support an option that allows the sender to indicate a “High Priority” page. These types of pages usually cause a vibration pager to “Beep” indicating a high priority message has been received. Ordinary priority messages sent to vibration pagers cause the pager to simply vibrate. This pager option is not usually field selectable and must be “downloaded” to the pager via special equipment available from most paging dealers. JTECH uses a specific descriptor in the paging format used to “Talk” to its transmitters to allow the user to select either a normal priority or high priority message.

Cap Codes

POCSAG pagers must receive a special seven-digit “address” to let it know that the message that follows is for this particular pager. Since thousands of pagers will share a common frequency, a method must exist that allows a single pager among these thousands to respond and all others to remain silent. A system of addresses has been developed that allows all pagers on a common frequency to hear all pages, but only the individual pager whose address was sent to actually signal and display the message. This “Address” is referred to as Cap Code. A Cap Code is the actual seven-digit number that must be received by a POCSAG pager to have the pager receive a message.

Pager Number

Pager Number often refers to the one to four digit number placed on a pager label. In systems that support cross reference tables, the Pager Number may only be the number on the label of the pager and only serve as a cross-reference to its actual Cap Code. For example, to simplify use by an end user, you might label a pager with a phone extension of #002, and your computer software may associate pager #002 with cap code 0000016.

Numeric Pager

Numeric pagers sold by JTECH are capable of displaying 1 to 16-digits. A numeric pager will not display an alpha message. When this class of pager is targeted to receive a page it must receive a numeric only radio transmission. If a numeric only pager receives an alphanumeric transmission sent to its cap code it will attempt to decode the message and will then display ‘garbage’ on the screen. Numeric only pagers are not ‘smart’ enough to know not to attempt to display alpha data. Therefore the software sending the transmission must be smart enough not to send alphanumeric data to numeric only pagers.

Alpha Numeric Pager

Alphanumeric pagers are capable of up to 120 alpha or numeric characters. Most will display an alpha message as well as a numeric message. When this class of pager is targeted to receive a page, it may receive either numeric only or alphanumeric data and if the pager is properly set up, it will display either type of data properly. Alphanumeric pagers require special set up and adherence to special transmission rules to properly display both alpha and numeric only radio transmissions.

Multiple Cap Code Pagers

Many pagers are able to have multiple cap codes which are useful for group paging. The number of cap codes for pagers varies depending on the manufacturer and model.

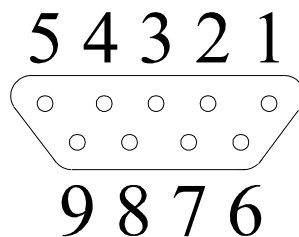
Programming your Application to Communicate with the SmartAlert RS232

In order to communicate with the SmartAlert via an RS-232 interface, an RS-232 baud rate, message protocol, and message format must be defined and adhered to by any software application wishing to successfully send pages.

Physical Interfaces

Data Connection

Five lines are connected on the Female DB9 on the transmitter. These lines are illustrated below:



- 1) No Connection
- 2) Transmit Data from SmartAlert Transmitter out to Host (Attached to Line Driver Transmit Side)
- 3) Receive Data from Host into SmartAlert Transmitter (Attached to Line Driver Receive Side)
- 4) No Connection
- 5) Signal Ground
- 6) No Connection
- 7) Request to Send Line from Host into SmartAlert Transmitter (Attached to Line Driver Receive Side)
- 8) Clear to Send Line from SmartAlert Transmitter out to Host (Attached to Line Driver Transmit Side)
- 9) No Connection

Power Connection

Power is supplied via a 120 volt AC input and 13.8 volt DC output wall adapter. The physical configuration of the power plug is via a 2.1mm internal diameter negative voltage and 5.5mm external diameter positive voltage.

- Center Negative at 13.8 volts DC.

Communication Protocol

The SmartAlert Transmitter requires, in addition to the correct physical interconnection, that the proper RS232 protocol be followed. That protocol is:

- 1200 baud
- 8 data bits
- No parity
- 1 stop bit

In addition, the proper message format must be followed. The message format descriptions follow.

RS232 Interface Hardware Handshaking-Request To Send / Clear To Send

While the SmartAlert transmitter does not monitor RTS, it does toggle Clear to Send (CTS) to allow it to meter data out of the Host output buffer. Therefore, the Host must observe CTS from the transmitter and never send any data while CTS is low. **Any data sent while CTS is low will be lost!**

The SmartAlert transmitter uses only CTS to indicate when it is OK to send data to the unit. The SmartAlert transmitter expects the host will cease sending data immediately upon dropping CTS from High to Low.

Some specialized high-speed serial port drivers will buffer up to 16 characters and will continue to send data long after CTS has dropped. This causes important data to be lost since the SmartAlert transmitter is not paying attention to the incoming data while CTS is low. Generally these specialized high-speed serial port drivers allow you to set the amount of data that will be buffered and therefore sent upon the dropping of CTS. If this is your situation, set this parameter to 1 or 0.

Windows 95 & Windows 3.1X serial port drivers perform as expected and cease sending characters immediately upon the transition of CTS from High to Low.

Baud Rate

The RS-232 baud rate required by the SmartAlert transmitter is summarized below:

- 1200,N,8,1 (1200 Baud, No Parity, 8 Data Bits, 1 Stop Bit)

Message Format

The recommended format is the 7-digit extended format. The 7-digit extended format consists of six parts:

1. Preamble
2. Function Bit (not used in the 3-digit message format)
3. Cap Code
4. Separator
5. Pager Message
6. Terminator

A code sample is shown below. Please refer to this example as you read through the sections that describe each part of the message. The 7-digit extended message format is the recommended format to use for application developers wishing to exploit the maximum amount of flexibility out of their page-enabled application. This format allows the SmartAlert transmitter to access three types of pager baud rates (512, 1200, 2400), two types of pager data (alphanumeric and numeric only), all four function bits (01 through 04) enabling priority messaging, and two types of messages (Non inverted and Inverted).

Below is an excerpt from a simple visual basic software program utilizing 7-digit extended format, which will result in a non inverted, priority page, to a 512 RF baud alphanumeric pager:

```
MSComm1.PortOpen = True           'Opens Serial Port for Communication
Preamble = Chr$(255) & Chr$(255) & Chr$(255)
FBit = Chr$(03)                    'Set Function bit #3
Cap Code = "2049999"
Separator = Chr$(10)               'This is an Non Inverted,512 RF baud, Alpha Page
PagerMessage = "This is a test Page"
Terminator = Chr$(13)
OutPutString = Preamble & Fbit & TargetPager & Separator & PagerMessage & Terminator
MSComm1.Output = OutPutString
```

Example Data Stream Into 8214: (Expressed in hex)

```
FF FF FF 03 32 30 34 39 39 39 39 0A 54 48 49 53 20 49 53 20 41 20 54 45 53 54 20 50 41 47 45 OD
| P | F | Cap Code:2049999 | S | Message: THIS IS A TEST PAGE | T |
```

P = Preamble
F = Function Bit (Byte)
Cap Code = Seven Digits
S = Separator
Message = Up to 120 Characters
T = Terminator

Details of the Message Parts

1. Preamble

Preamble is a string of three hex characters used to provide “padding” between messages in an output buffer as well as information to the SmartAlert transmitter that a paging message is on its way. The Preamble is Chr\$(255) & Chr\$(255) & Chr\$(255)

2. Function Bit

The function bit is actually a byte and is a single hex character, which follows immediately after the preamble. This character signifies to the SmartAlert transmitter which function bit to “Turn On” in the POCSAG message that is sent. The selection of function bits in the transmitted message allows the application developer to exploit various functions, which reside inside the pager. Function bits in the transmitted message by themselves do not evoke functions from the pager, rather they must match functions which are pre-programmed into the pager before they cause a pager to operate in a particular fashion. For our purposes here, one of four hex characters are available to select function bits in the transmitted message. Hex 01 to hex 04 are the acceptable characters. The following table shows, which function bits, evoke what pager reactions.

Function Bit (Only One May Be Set)	Function accessed from Pager
Function Bit #1 Enabled	Non Priority Alert for Numeric Only Pagers
Function Bit #2 Enabled	Priority Alert for Numeric Only Pagers
Function Bit #3 Enabled	Non Priority Alert for Alphanumeric Pagers
Function Bit #4 Enabled	Priority Alert for Alphanumeric Pagers

3. Cap Code

Cap Code for 7-digit extended Message Format

In the seven-digit extended format no assumptions or cross-references are made and the seven-digit pager cap code sent is the actual seven-digit pager cap code received by the pager. Application developers will find the seven digit extended format provides maximum flexibility.

Important note: If the cap code prefix of 000 is used, the SmartAlert transmitter recognizes this as the JTECH “times 8” (X8) cap code scheme. The transmitter multiplies the ‘cap code’ number provided by 8 prior to transmission to the pager. For example, the JTECH pager may have two labels. One will be the ‘pager ID’ number the other will be the cap code number. The pager ID number will be the cap code divided by 8. With the times 8 scheme, be sure to use the pager ID number in your program. All other cap codes using valid prefixes will be sent as entered into the program.

4. Separator

A separator is used to separate the Cap Code from the actual message to be displayed. The separator in the 7-digit extended format provides three additional pieces of information to the SmartAlert transmitter. That information is what type of pager that is to be spoken to (alpha or numeric only), what baud rate is to be used (512, 1200, or 2400), and inverted or non-inverted data.

The default Radio Frequency Baud Rate is 512 RF baud. However, many pagers available today require 512 RF Baud, 1200 RF Baud or 2400 RF Baud. The 7 digit extended format allows access to these 1200 RF baud and 2400 RF baud pagers. The capability of sending priority messages to both alpha and numeric only pagers is also available in the 7-digit extended format. The table below depicts the acceptable combinations for various RF baud rates, alphanumeric paging and numeric only paging, inverted and non-inverted data, as well as the implementation for priority and non-priority messaging using the 7-digit extended message format.

RF Baud Rate	Inverted Or Non Inverted	Alpha Or Numeric Only	Separator In VB	Separator In Hex
512	Inverted	Alpha	Chr\$(02)	02
512	Inverted	Numeric Only	Chr\$(11)	0B
512	Non Inverted	Alpha	Chr\$(10)	0A
512	Non Inverted	Numeric Only	Chr\$(03)	03
1200	Inverted	Alpha	Chr\$(04)	04
1200	Inverted	Numeric Only	Chr\$(13)	0D
1200	Non Inverted	Alpha	Chr\$(12)	0C
1200	Non Inverted	Numeric Only	Chr\$(05)	05
2400	Inverted	Alpha	Chr\$(06)	06
2400	Inverted	Numeric Only	Chr\$(15)	0F
2400	Non Inverted	Alpha	Chr\$(14)	0E
2400	Non Inverted	Numeric Only	Chr\$(07)	07

5. Message

This section of the format represents the information to be displayed on the pager. Up to 120 characters may be sent for alphanumeric pagers. The maximum number of message digits for numeric pagers is 20.

6. Terminator

The terminator is used to indicate the end of the message. The terminator character is the carriage return character Chr\$(13) or hex 0D.

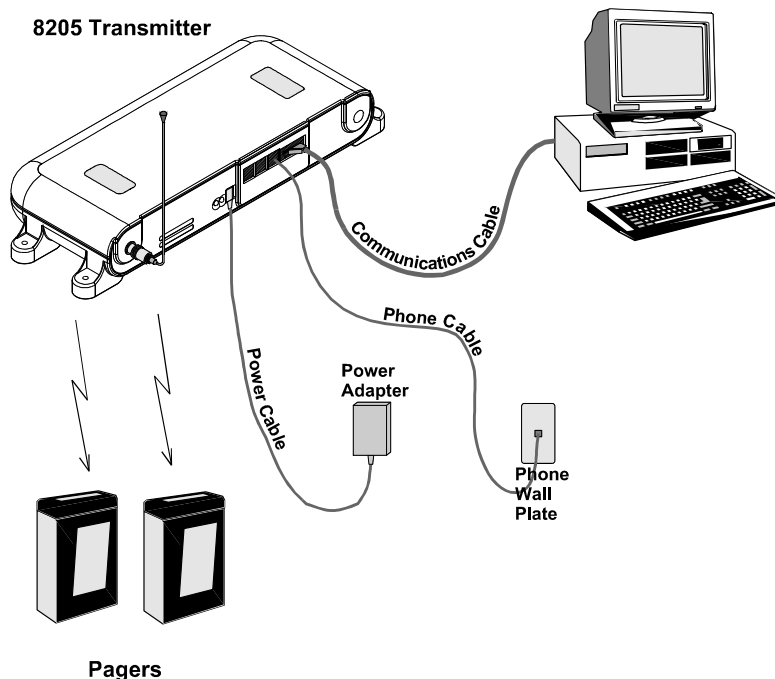
Hardware Installation

The SmartAlert Transmitter is wired directly to a communications port on your host device. This may be a Personal Computer or other electronic device and to any analog phone jack on your telephone system. The first consideration in installation is regarding the placement of the SmartAlert Transmitter. It should be as high as possible and must be located within the length of the communications cable. RS232 cable length maximum is 50 feet. The next consideration involves safety. Be sure the unit is securely mounted and safe from liquids, extreme heat, and possible physical damage.

The antenna must be vertical. As with any transmitting unit, pay close attention to obstructions when locating antenna. Wall, pipes, ducts, mirrored glass, or other similar barriers may weaken or misdirect transmitted signals. Certain materials and construction, especially metal, have the potential to partially or completely block the signal. Also remember that the SmartAlert Transmitter requires an 110V outlet for power.

Follow the directions below for the SmartAlert model 8205 RS232 with Telephone Interface

1. Attach the antenna to the BNC antenna port marked A1.
2. Connect one end of the RJ-11 phone cord to the phone jack marked J2 on the front of the unit and the other to an available phone jack line in your telephone system. The Phone Interface requires an **analog** phone jack; the Phone Interface must be able to hear the tones from a push button telephone. Please refer to the section titled 'Telephone Interconnect Specifications' for additional help in determining the type of phone line. Continue with step two below.



Follow the directions below for the SmartAlert

1. Attach the antenna to the BNC antenna port marked A1.
2. Attach the male end of DB-9 straight through cable to the female DB-9 connector located on the front of the SmartAlert transmitter. The PC requires only a straight through DB-9 male to DB-9 Female cable. The SmartAlert is configured as a DCE device and does not require a Null Modem cable.
3. Attach the female end of the DB-9 straight through cable to the male DB-9 serial port connector on the Host PC. If only a male DB-25 serial port connector is available, you must purchase an adapter. This standard adapter has a male DB-9 on one end and a female DB-25 on the other.
4. **Note:** *All cables and the antenna must be connected before applying power to the SmartAlert transmitter unit.* Insert wall adapter into power connector located on front of SmartAlert transmitter. Insert wall adapter into standard 110V AC-wall outlet. After a brief (15-second) power up sequence, the right and left indicator lights on the SmartAlert transmitter will begin to slowly blink in an alternating fashion indicating a ready condition. The unit is now ready to accept data at 1200 baud, 8 data bits, no parity and 1 stop bit on the RS232 port or input from a telephone (with telephone interface only).

Operation

Paging a Single Pager using the Telephone Interconnect

1. Pick up the receiver, listen for the dial tone and dial any of the system extensions that have been assigned to the Paging System. A beep indicates the system is ready for you to enter the pager number.
2. Within 4 seconds press the number of the pager (up to four digits) you wish to page using the telephone keypad.
3. Press the * key to indicate you wish to enter a message for a **numeric** page **or** press the # key to send a **vibrating** page. If you select a vibrating page a beep will be heard verifying the message was sent.
4. For a digital page, enter a message up to 12 digits. If the message is 12 digits, a beep is heard once the 12th digit is entered. This tone indicates the message has been sent. Press the pound (#) key on the phone keypad to send the page if the message is less than 12 digits. A beep is heard verifying the message was sent.
5. Hang up the receiver.

Group Paging Using the Telephone Interconnect

Group paging works with numeric pagers only.

1. Pick up the receiver, listen for the dial tone and dial any of the system extensions that have been assigned to the Paging System. You will hear a single beep indicating the system is ready for you to enter the group number.
2. Within 4 seconds press the * key and the number of the group (1-9) you wish to page using the telephone keypad.
3. Press the * key.
4. Enter a message up to 12 digits. If the message is 12 digits, a beep is heard once the 12th digit is entered. This tone indicates the message has been sent. Press the pound (#) key on the phone keypad to send the page if the message is less than 12 digits. A beep is heard verifying the message was sent.
5. Hang up the receiver.

Troubleshooting

If you cannot page from a telephone, ensure that the Telephone Interconnect has power. The indicator lights (L1 and L2) should be blinking slowly, in an alternating fashion.

L2 will turn on while the phone is ringing and will flash when digits are received. L1 will flash as the digits are entered. L1 and L2 will continue blinking slowly after the phone interface hangs up the phone line.

If the extension rings continually without answering, check the following:

1. The phone Interface is powered on (watch L1 and L2).
2. The phone lines assigned to the Paging System from the phone system switch are connected to the Phone Interface.
3. The hunt group in your phone system is set up for only one extension connected to the Phone Interface.

If the extension rings, the SmartAlert transmitter with telephone interface answers and if you hear the initial beep, but the SmartAlert transmitter with telephone fails to respond, please refer to the section titled 'Telephone Interconnect Specifications'.

Service

If you need service, dial toll-free 800.321.6221 or 561.997.0772 and select option 6 for JTECH Customer Care. If your problem cannot be solved over the phone by one of our service technicians, we will issue you a return materials authorization (RMA) number for you to send the product in for service. Once your product has been received by JTECH, it will be repaired and returned to you with in the current posted lead-time. This is the standard Repair/Return program and covers all pager products. (In lieu of a phone call, you may also send a fax to 561.995.2260 or e-mail us at “wecare@jtech.com”.)

As the most critical system component and integral to your business, the system Master Transmitter is covered by our Advance Replacement program. When you receive the replacement, simply place the defective transmitter unit in the same box that it arrived in, attach the return address label to the outside of the box (this label also includes your RMA number) and return it to us. All returned shipment costs are the responsibility of the client. Advance Replacement services are also offered on most pager products for your convenience. Ask your Customer Care Representative about purchasing this value-added service.

When return-shipping products to JTECH, we recommend equipment be shipped in a traceable manner for your protection. US Mail is not a recommended method of shipment. Any equipment not received by JTECH Communications within 20 days will be billed to the client at full retail value.

There are no charges for repaired equipment within the warranty period other than your shipping costs. There may be an additional charge if, after the item is returned and analyzed, it is determined to be “non-salvageable” - for example, liquid damage, abused or misused. The standard warranty does not cover the replacement of adapters, antennas, pager belt clips, pager promobacks, pager battery doors, user-replaceable rechargeable batteries, pager neck chains, liquid damage to master transmitter and pagers, lightning strikes or other acts of God that could affect the performance of the master transmitter, pagers and peripherals.

Check with Customer Care for extended warranty options, as well as the latest charges for repair or replacement of equipment that is out of warranty. All non-warranty repairs, pager replacements and the shipment of parts are sent on a C.O.D. basis. Any order returned to JTECH is subject to a restocking fee. Refunds are on product and tax only.

JTECH Communications is committed to providing reliable and responsive service to our clients. We believe that our service is the most responsive, comprehensive and cost-effective program in the industry.

Appendix A - Telephone Interconnect Specifications

Telephone Interfacing

Phone Line Interface – The SmartAlert transmitter with telephone will accept input from end-to-end (line level) telephone circuits. Selector or trunk level input is not possible. The phones and phone system must be capable of DTMF and provide a Bell standard ringing voltage.

PABX Interface – The PABX (Private Automated Branch Exchange) must pass DTMF tones, and Ringing Voltage, for the SmartAlert transmitter with telephone to work. A simple test can be used to see if DTMF tones are passed through the telephone system. Dial a phone extension and depress any of the keys on the phone pad. If the party you called can hear tones, then the system does pass DTMF. Because many of the newer PABX's are digital systems, they may not pass DTMF. In this situation, the customer must install a separate DTMF capable end-to-end phone line for the SmartAlert transmitter with telephone. Special feature phone consoles may not use DTMF signaling and you can also use the test described above to test the phone consoles.

Key System – Some customers may not have a PBX, but may have multiple telephone lines, which are connected to numerous phone sets with push buttons to activate “pick up”. In this situation, a separate telephone line should be dedicated to the SmartAlert transmitter with telephone and users would dial a 7-digit phone number to access the SmartAlert transmitter with telephone.

Telephone Interconnect Description

The SmartAlert transmitter with telephone's interface is that of a very basic 'Line Level' hook-up which operates in the following manner:

- The telephone system supplies 'battery' voltage across Tip and Ring. When measured from ground '-48' volts will be seen on Ring while '0' volts (ground), will be seen on Tip.
- When someone picks up a phone and enters the phone number to the SmartAlert transmitter with telephone, the telephone system applies an interrupted 'Ringing' voltage (two seconds ring, four seconds rest) across Tip and Ring. Ringing voltage is an AC signal, which is usually around 105 volts rms.
- The SmartAlert transmitter with telephone's module detects the ringing and recognizes it as a request for seizure. The encoder's telephone module goes off hook, energizes a relay, and puts a low impedance closure across Tip and Ring, back to the telephone system.

- The telephone system then detects current flowing from its source of battery, through the SmartAlert transmitter with telephone's loop closure, and back to the telephone system. The current flow energizes relays in the telephone system, which connect bi-directional audio lines through Tip and Ring to the SmartAlert transmitter with telephone.
- Once connected, the SmartAlert transmitter with telephone prompts the caller to enter a pager number. The caller must enter this number via a true DTMF tone type telephone. The DTMF tones must be at least 50 msec in duration with a 50 msec pause between digits. Numbers entered via Rotary dial, or Digital phone systems are not recognized by the SmartAlert transmitter with telephone.
- Termination of the call can be accomplished in three different ways:
 - 1) The calling party hangs up their telephone before the SmartAlert transmitter with telephone times out. This terminates the call at the telephone end, but not at the encoder's end. The disconnect created by the caller hanging up its phone never makes it through the connection between the telephone system and the SmartAlert transmitter with telephone. To overcome this loss of a disconnect signal the encoder uses an 'inactivity timer' which will time out and terminate the call, in the encoder, after a loss of audio on Tip and Ring for approximately four seconds.
 - 2) The SmartAlert transmitter with telephone times out before the calling party hangs up the telephone; this terminates the call at the encoders end.
 - 3) The calling party enters the correct string of digits described in the section 'Paging a Single Pager Using the Telephone Interconnect'. When the last (#) pound key is pressed the page is sent and the call is terminated.

Appendix B - Detailed Technical Specifications

SmartAlert Model 8214/8205 Transmitter

Item	Specification
Operating voltage	13.8 volts 1.7 amp external wall mount power supply
Power Output	0.5 - 2 watts (Factory set; default is 2W)
Modulation	FSK 512 BPS
Protocol	POCSAG
Antenna port	50 ohm BNC with Whip Antenna and rotating base
Mounting	Horizontal for Base Mounting/ Vertical for wall mount
Data Format	7 digit extended [recommended]
Operating frequency	UHF synthesized 450 MHz-470 MHz
Temperature Stability	-30° C to +50° C better than 5 ppm
Size	13.3" L (338 mm) x 6.5" H (165 mm) x 2.37 "T (60 mm)
Weight	4.3 lbs. (625 g)

General Terms and Conditions

This offer is subject to the terms and conditions listed below which are binding upon the seller and the buyer under this offer and are hereby incorporated by reference in any subsequent agreement for purchase duly executed between JTECH Communications Inc. Inc. (Seller) and its buyer of goods proposed for sale herein:

- 1. Price.** All prices are F.O.B. point of origin, unless otherwise agreed to in writing by the buyer and seller. Prices quoted are those in effect at the time of quotation and are valid for 30 days from the date of quotation regardless of existence of any written confirmation. Until the proposal price and subsequent purchase price are paid in full, the buyer grants seller a security interest in all of the goods described in this proposal all of the goods described in any resulting contract and buyer agrees to sign on seller's request any required documentation to complete seller's said security interest.
- 2. Payment Terms.** Normal payment terms are C.O.D. unless otherwise set forth in this proposal. Any outstanding balances not paid by the date on which they are due to JTECH Communications Inc. Inc. shall be subject to interest of 1 1/2% per month on the unpaid balance (or the maximum allowable by law whichever is the lesser) as well as rebilling charges together with reasonable attorney's fees and paralegal fees including all such fees in any appeal together with all costs associated with efforts by JTECH Communications Inc. to enforce the terms of this proposal as well as all agreements between the parties. Any discounts offered will be calculated from the date of invoice to the date that payment is received by JTECH Communications Inc. or JTECH Communications Inc.'s agents. Any discount is void if not taken at time of payment of the invoice containing said discount within thirty (30) days of the date on which the goods for which the discount is allowed, have been received by Buyer, its agents or employees.
- 3. Products.** Products are defined as those items listed on this proposal and a subsequent resultant purchase order to JTECH Communications Inc. containing items listed on this proposal.
- 4. Acceptance.** Upon receipt the buyer shall immediately inspect and/or test the products. Unless stated otherwise in writing on the final agreement between the parties, products shall be deemed accepted unless the buyer notifies JTECH Communications Inc. within 5 working days after receipt of shipment of any defect or discrepancy.
- 5. Transportation.** Unless the buyer specifies the method of transportation, JTECH Communications Inc. will use its best judgment in determining the method of transportation. All costs of standard transportation, premium transportation if required through no fault of JTECH, and other costs such as excise taxes, duty, freight forwarding or the like shall be billed to the buyer.
- 6. Title and Risk of Loss.** Title of goods sold, shall pass to buyer at the F.O.B. point.
- 7. Limited Warranty for material and workmanship.** JTECH (Seller) warrants to the buyer that products purchased from JTECH shall be free from defects in material and workmanship under normal use and service. JTECH's obligation under this warranty shall be limited to the repair or exchange of any part or parts which may thus prove defective under normal use and service within one (1) year from date of purchase by the original purchaser, and which our examination shall disclose to our satisfaction to be thus defective. **THIS PROPOSAL AND SUBSEQUENT SALE ARE MADE ON THE EXPRESS UNDERSTANDING THAT THERE IS NO IMPLIED WARRANTY THAT THE GOODS SHALL BE MERCHANTABILITY OR AN IMPLIED WARRANTY THAT THE GOODS SHALL BE FIT FOR ANY PARTICULAR PURPOSE. THE BUYER ACKNOWLEDGES THAT BUYER IS NOT RELYING ON THE SELLER'S SKILL OR JUDGMENT TO SELECT OR FURNISH GOODS SUITABLE FOR ANY PARTICULAR PURPOSE AND THAT THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THOSE PREVIOUSLY SET FORTH HEREIN. PURCHASER IS DIRECTED NOT TO RELY ON JTECH'S PRODUCTS TO FUNCTION AS AN INTEGRAL PART OF ITS LIFE CARE/LIFE SUPPORT PROCEDURES OR SYSTEMS. JTECH'S PRODUCTS ARE NOT DESIGNED FOR SUCH USE; PARTICULARLY WHEN AN ALLEGATION MAY BE MADE THAT PRODUCT MALFUNCTION CONTRIBUTED TO THE FAILURE TO ADMINISTER A PROPER TREATMENT, PROCEDURE, ACTION, OR MEDICATION. BUYER AGREES TO FULLY PROTECT, DEFEND AND HOLD SELLER HARMLESS FROM CLAIMS OR DAMAGES RESULTING FROM THE USE OF JTECH'S PRODUCTS IN LIFE CARE/LIFE SUPPORT PROCEDURES.** Any claim by the buyer for the repair or exchange of goods proposed and of goods actually sold to buyer shall be deemed waived by the buyer unless submitted in writing to JTECH within the earlier of (a) 30 (thirty) days from the date the buyer discovered or by reasonable inspection should have discovered any claimed breach of the foregoing warranty.
- 8. Damages Based Upon Negligence or Strict Liability.** JTECH's obligation based upon any claim of negligence or of strict liability as a result of its delivery of products ordered by Buyer, shall be limited to, at JTECH's option, repairing or replacing the products that are found by JTECH to be defective, or refunding the purchase price of such products. **In no event shall JTECH's liability exceed the purchase price of the products** which are subject matter of any such claim. JTECH shall not be obligated to make any such refund or replacement until at least thirty (30) days after JTECH has received from Buyer the subject alleged defective product, which will be shipped to JTECH at the buyer's expense.

9. Disclaimer of Consequential Damages. In no event shall JTECH be liable for incidental or consequential damages arising out of or in connection with the purchase by Buyer of goods from JTECH including, without limitation, such damages which may be caused by a breach of any obligation or warranty imposed on JTECH under such purchase. Consequential damages shall include without limitation, loss of use, income or profit, or loss sustained as the result of injury to any person, or loss or damage to any property, or loss or damages sustained as the result of work stoppage. Buyer shall indemnify JTECH against all liability, cost, or expense which may be sustained by JTECH due to loss, damage, or injury. IN NO EVENT, SHALL JTECH'S LIABILITY EXCEED THE PURCHASE PRICE OF GOODS.

10. Taxes. Unless specifically provided herein, the price for goods purchased as a result of this proposal does not include sales, use, excise or similar taxes, whether Federal, State or local. Buyer is responsible for all applicable taxes for any goods after title passes to the Buyer at the F.O.B.point. If Buyer is exempt from paying sales taxes, a certificate evidencing such shall be provided to JTECH upon request.

11. Export. Buyer agrees not to directly or indirectly export any Goods purchased from JTECH (whether or not modified by subsequent services) including, but not limited to parts, equipment, software or technical data/documentation without first obtaining the required U.S. Government export license(s). If Buyer intends to export Goods outside the U.S., Buyer shall determine whether an export license is required; and, if so, obtain that license from the U.S. Government. Buyer shall protect, defend and indemnify JTECH from any loss or liability due to Buyer's failure to comply with export regulations. Buyer further warrants that the Goods sold to Buyer from JTECH will not be resold, transferred, exported or reused in any way by Buyer in violation of any laws, regulations or export control imposed by the U. S. Government.

12. Delays. Unless specified in writing by JTECH to the contrary, goods in stock shall be shipped immediately upon the signing of a binding purchase agreement. Goods not in stock will be shipped as soon as possible. JTECH will not be liable for any nonperformance of the Agreement resulting from this proposal caused by strikes, fires, disasters, riots, acts of God or other causes or conditions beyond JTECH's reasonable control. In the event of such delay or nonperformance, JTECH may, at its sole option, and without liability, cancel any portion of the Agreement resulting from this proposal and/or extend any date upon which any performance is due.

13. Termination. If Buyer (a) fails to pay any amount owed when due, or (b) assigns or transfers the Agreement subsequently resulting from this proposal without JTECH's prior written consent, or (c) makes an assignment for benefit of creditors, or (d) files or has filed against it, petition for relief under federal or state bankruptcy laws, or (e) breaches any other term or condition of this proposal or resultant contract, JTECH may terminate any portion of the agreement resulting from this proposal in addition to JTECH's other available remedies. If JTECH fails to perform any obligation when due, and if such failure is not remedied within thirty (30) days after receipt of written notice from Buyer, Buyer may terminate any portion of such Agreement. In all other cases, the Agreement resulting from this proposal may be terminated by either party by giving sixty (60) days written notice. Termination of the Agreement, for any reason, shall in no way interfere with the obligation of Buyer to pay all monies payable as of the effective date of termination or which become payable for Goods ordered and delivered after such termination. If such Agreement is terminated by Buyer for any reason other than default by JTECH, Buyer shall be liable immediately thereupon, to pay to JTECH the full contract price for all goods completed by JTECH pursuant to the Agreement and for all work in process at the time of termination.

14. Returns and Cancellations. Buyer may not cancel any order or return any Goods that have been special or custom ordered, custom manufactured or configured, unless specifically agreed to in writing to seller in this proposal and in the subsequent agreement. Returns are subject to a restocking fee which will be due to seller when the goods are received by seller.

15. Patents and Copyrights. In no event shall JTECH be liable for damages arising from infringement of patents or copyrights. In the event that Buyer should be enjoined in any such suit alleging infringement of patent(s) or copyright(s) or proceeding from using any of the Goods purchased pursuant to this proposal and subsequent Agreement, JTECH, at its option, shall either (a) secure termination of the injunction and procure for Buyer the right to use such goods without obligation or liability or (b) replace or modify said Goods with non infringing materials at JTECH's expense and refund the purchase price of the infringing goods to Buyer; provided, however, that in no event shall JTECH be liable for or have any obligations under this paragraph if the alleged infringement is by reason of the specifications provided by Buyer to JTECH under this agreement. The foregoing shall be Buyer's exclusive remedy against JTECH with respect to any alleged patent or Copyright infringement. The sale of goods does not convey any license of copyright under any proprietary or patent rights of any manufacturer. JTECH shall not have any liability if the alleged infringement is based upon the use or application of the Goods in combination with other Goods and Buyer shall protect, defend, and indemnify JTECH therefrom. JTECH disclaims all other liability for infringement of intellectual property rights and further disclaims any liability for incidental or consequential damages arising in connection with such infringement.

16. Manufacturer Liability. In addition to JTECH's limited warranty for materials and workmanship as per section 7 herein, and unless specifically agreed to in writing by the manufacturer, JTECH and Buyer, Buyer represents to JTECH and the manufacturer that the Goods sold pursuant to this proposal and the subsequent resultant Agreement incorporating such of the terms of this proposal agreed to by JTECH and buyer do not constitute standard components intended for use by Buyer or JTECH in life support systems, surgical implantation, nuclear facilities, or for any other application in which the failure of the Goods or the product in which the Goods are to be used could create a situation where personal injury or death may occur.

17. Credit Terms. All orders and shipments shall at all times be subject to the approval of JTECH's credit department. JTECH reserves the right of declining to make any shipment called for by the contract between seller and buyer whenever, for any reason, there is doubt in JTECH's sole judgment, as to buyer's willingness or ability to pay for the goods ordered on Buyer's solvency and JTECH shall not, in such event, be liable for breach or nonperformance of this Agreement in whole or in part.

18. Packaging. Packaging will be standard commercial package and acceptable to commercial carriers. Special customer packaging will be furnished only when specified and so stated herein and the cost thereof shall have been agreed to by both the Buyer and JTECH in writing.

19. Substituted or Repaired Goods. If substitute additional or repaired goods are purchased by Buyer from JTECH, the terms and conditions of this proposal and resultant Agreement shall be applicable thereto, the same as if such substituted, additional or repaired Goods had been originally purchased hereunder unless specifically stated to the contrary in this proposal or subsequent resultant Agreement.

20. General Conditions. No agent, salesman or other party is authorized to bind JTECH to any agreement, warranty, statement, promise or understanding not expressed herein. The sale of Goods pursuant to this proposal and any subsequent resultant Agreement shall be governed by the laws of the State of Florida. Any notice which is required under the terms of a resultant Agreement shall be in writing and delivered to the address of the party set forth in the Agreement and shall be effective when actually received. The remedies reserved by the parties shall be cumulative and in addition to other remedies provided by law. JTECH shall not be required to proceed with the performance of any obligation under a resultant Agreement so long as Buyer is in default or in breach of any of Buyer's obligations or agreements herein. Any clerical errors are subject to correction. No delay or omission by JTECH in exercising any right or remedy under that agreement shall constitute a waiver of such right or remedy. The waiver, invalidity, or unenforceability of any provision in a resultant Agreement shall not affect the validity of the agreement as a whole or any other provisions herein. An Agreement resulting from this proposal shall be binding upon and shall inure to the benefit of the successors and assigns of Buyer and JTECH. Buyer may not assign or transfer such Agreement in whole or in part without the prior written consent of JTECH. For the purposes of such agreement, the Buyer and JTECH agree, notwithstanding any of the items sold not constituting "goods" as defined in Article 2 of the Uniform Commercial Code as enacted and amended from time to time in the state of Florida, for the purpose of interpreting this proposal or a resultant Agreement all items shall be deemed to be such "goods." **Buyer agrees that acceptance of this proposal and receipt of shipment from JTECH pursuant to any resultant Agreement shall constitute acceptance in total of the preceding General Terms and Conditions except as otherwise agree to in writing by the parties thereto.**



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