Actall Corporation

ISO 9001:2015 Certified

PALS 9K | System Design Overview

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CONTACT

Inquiries should be directed to:

Actall Corporation
2017 Curtis Street
Denver, CO 80205

Phone:
303-226-4799
Toll-free:
1-800-598-1745

For technical support, please call us direct during regular business hours (Monday through Friday, 8:00 a.m. to 5:00 p.m. Mountain Standard Time) or Emai us 24/7.

303-226-4799
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Actall Corporation
2360 Lawrence St.
Denver, CO 80205
Phone: 303-226-4799
Fax: 303-650-4523
Email: support@actallsp.com

For technical assistance, please call (800) 598-1745 during regular business hours (Monday through Friday, 8:00 a.m. to 5:00 p.m. Mountain Standard Time) or Email: support@actallsp.com . For assistance after normal business hours, please use the web based form provided at www.actallsp.com, a response will be made within four hours of your request.

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Equipment

The PALS©® Personal Duress Alarm System consists of a central monitoring computer, which receives data through a serial receiver, sent from transmitters and RF Network devices. Numerous types of transmitters are available, including fixed-position contact sensors, motion and smoke detectors, and Personal Mobile Transmitters. Mobile transmitters (PMTs) read and store location IDs transmitted from Infrared Transmitters (IRTs) located throughout the facility. These transmitters then communicate their location to the Monitoring Station, allowing Control Operators to track and locate the position of the individuals wearing PMTs. Additional Monitoring and/or Administrative stations may be added to the system as necessary.

How RF Transmitters Communicate with Receivers

Wireless transmitters and RF network devices send coded digital messages to the serial receiver(s) via the installed repeater network. These messages contain data identifying the transmitter and its status. Multiple transmissions of this data over the 902 to 928 MHz frequency range help prevent signal interference and ensure that the signal is received.

How IRTs Communicate with PMTs

IRTs send coded digital messages to an infrared receiver mounting inside the Personal Mobile Transmitter. Each message contains data identifying the IRT ID. The PMT stores the last two received location IDs, updating this list as new location Ids are read.

Device Details

Crisis Controller©™ Monitoring Center

The Crisis Controller©™ Alert Monitoring Center receives and supervises alarm information from wireless security devices and transmitters. Data from these devices is processed by the software and displayed to rapid response to alarms and trouble conditions. The monitoring Center should be installed in an environment appropriate for computing equipment.

The Crisis Controller software can communicate with outside systems via two methods: An ASCII stream sent out via RS232 (the outbound data can be pre-configured to accommodate different formats) and a form C contact module (requires additional hardware and software).

There are several feature upgrades available to Crisis Controller including: Alpha Numeric Page Transmitter interface, Hard Contact Input/output board(s), two way radio interface, and bar code hardware (used to activate or deactivate PMTs)

Serial Receiver(s)

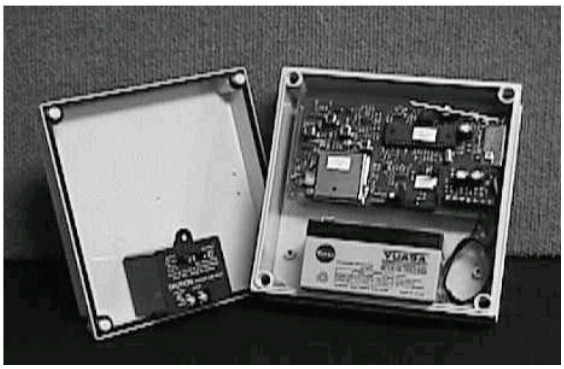
The Receiver identifies valid messages, decodes them, and transmits that data to the Crisis Controller©™ software for alarm annunciation on the Alarm Monitoring PC. This device is separately powered via local source and connects to the Monitoring Station via a serial connection. It should be installed not more than 100 feet (cable length) from the Monitoring Station and should not be mounted on a metal surface, or enclosed in a metal cabinet. Care should also be taken to ensure that the antennae are not blocked by other piping or HVAC equipment when mounted.

Personal Mobile Transmitters

The Personal Mobile Transmitters (PMTs) used with the PALS©® system work in conjunction with IRT Locators to provide detailed information of location and movement. PMTs read the transmitted IDs from IRTs and store the two most recently received IRT Locator IDs. When an alarm is sent, the IDs are sent (along with the unit ID, alarm type and device status), to the Serial Receiver attached to the Monitoring Center PC. This unit is powered via a standard 3V Lithium Ion disposable battery. The life of the battery is generally 12 months, but can be reduced by the firmware programming (increased IR read frequency or elevated transmission frequency will reduce the battery life). Actall Security Products manufactures two PMT versions: the PALS 9000 and the L2L.

Repeaters

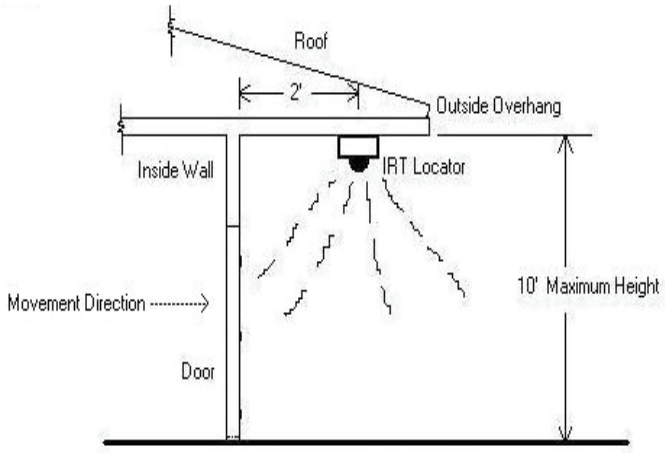
Repeaters are deployed in almost every installation to ensure 100% alarm transmission throughout the defined secured area. In most cases, ASP personnel perform an RF Site Survey prior to device installation to verify the number and location of Repeaters. This can be determined by special signal strength measuring equipment, or by using Crisis Controller in "Test Mode", which displays signal margin and signal level of each transmitter (see the Actall® User Manual). In general terms, Repeaters should be used when signal strength tests indicate marginal or weak signal conditions and/or to provide redundant transmission pathways in critical sites. The Repeater will re-transmit incoming weak signals at a higher strength. Repeater functionality should not be confused with IR or RF locating devices. The system should be designed with as many Repeaters as necessary to ensure that every alarm transmission is received, as Repeaters have special decoding features prevent "runaway" repetition of transmissions.



Repeater

Installation: Apply power via the supplied 14VAC transformer, or directly to the unit from an appropriate transformer at the local source. Once power is applied, the Repeater can be programmed using the Crisis Controller©™ software and the Serial Receiver (see the Actall® User Manual). Once the Repeater is programmed, it should be mounted on a wall or ceiling using the weather/tamper proof mounting box. In some cases, it may be necessary to adjust the position of the Repeater inside the mounting box to enhance performance of the device. The transmitting side of the Repeater should be facing as directly to the desired RF path to the Serial Receiver as possible. The Repeater should never be mounted on or against a metal surface, as this will reduce its range.

Once installed, a 1.2AH backup battery can be added as a backup power supply. The Repeater will trickle charge the battery in approximately 48 hours. A 1.2AH battery should provide 4 to 8 hours of backup power.

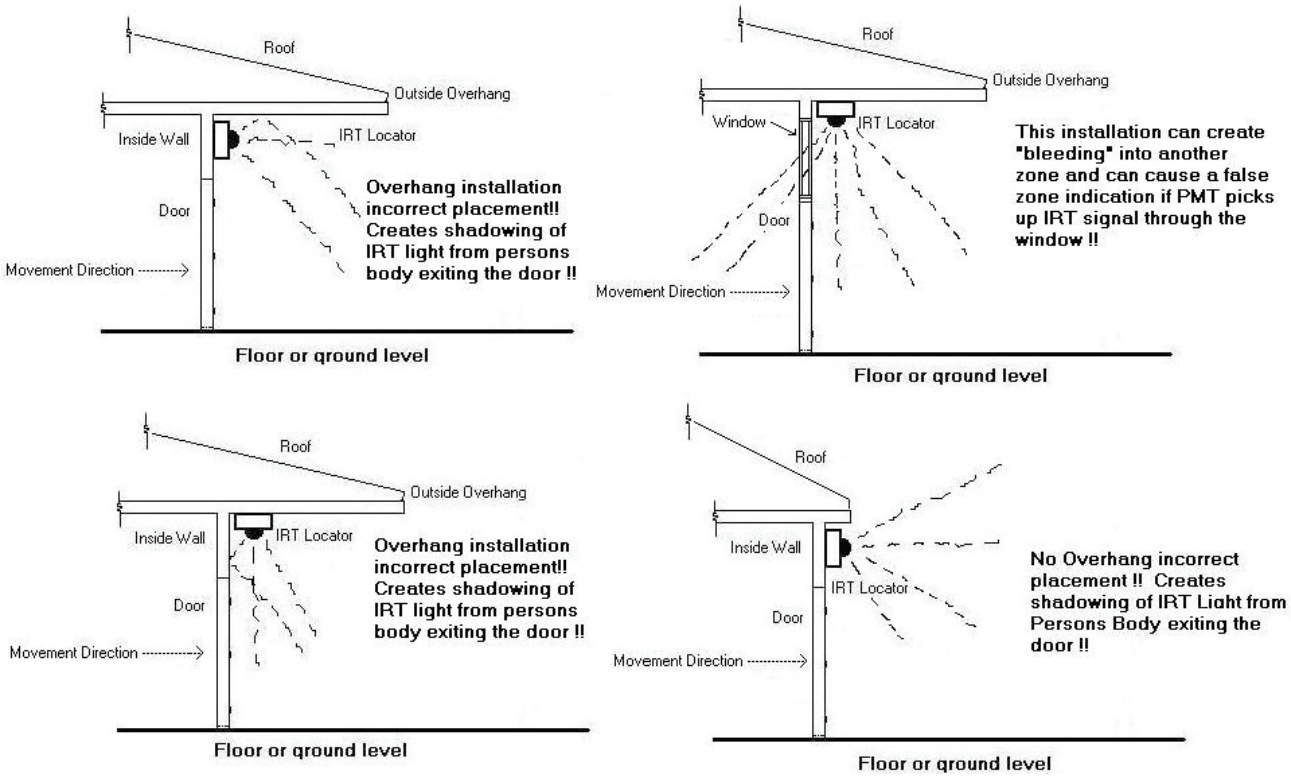


Door Mounted IRT (Side View)

The continuity of location information should also be examined. It is important that all passageways between zones be covered; otherwise personnel will be able to travel between zones without registering at the new location. Any alarms sent from such a device would annunciate in the last area that the device was located, not the current location. Common exceptions to this are: Doorways designated for emergency use only, points of exit that go outside the coverage area and areas that have many entrances. In the last instance, it may be satisfactory to place IRTs so that a new location will be registered if the PMT travels an acceptable distance from the exit point from the previous zone. This is primarily done to accommodate budget needs. Remember, devices can always be added at a later date if the owner desires a greater level of location granularity. Lastly, the need for updated location information must be considered. While it is possible to populate a facility with many devices to provide very detailed location information, we recommend that a sufficient number of devices be installed to provide response team members useful information in the case of an emergency.

Installers should place IRTs to eliminate overlapping zones of dual coverage. When signals from adjacent IRTs collide, "dead zones" are created, from which no viable information is accessible to the PMT. IRTs are not generally affected by exposure to sunlight, but PMT IR receivers can be saturated with environmental IR and their ability to read the Locator IDs can be reduced. In these cases, installers should locate the IRTs in areas that the PMT will not be in direct sunlight when the Locator data needs to be received.

IRT range can be reduced by proximity to fluorescent lighting. Generally speaking, loss is minimal if the IRTs are farther than 2 meters from the light source and the light source is not generating in-band noise. In-band noise is typically generated by an electronic ballast. IRTs must be mounted per the diagrams shown. Incorrectly mounting the IRTs may significantly reduce the range or inhibit the operation of the unit. The following are four examples of incorrectly mounted IRTs.



Incorrectly Mounted IRTs (Side View)

Wireless RF Locators (RFL)

Another method of determining location of PMTs is through Wireless RF Locators. These devices are 900MHz transceivers that attach data to transmitter messages indicating which Locator(s) have picked up an alarm signal directly from the transmitter. The Crisis Controller software then displays the first RFL device received, indicating the position of the alarm. Wireless RF Locators provide relatively coarse indications of location, partly due to their extensive range. They are particularly well suited for outdoor zoning with the PALS©® transmitters.

Wireless RF Locators can be used very effectively in conjunction with IRT Locators. For example, IRT Locators can be used to closely monitor movement inside a building. They can be programmed to indicate when personnel enter or leave an IRT-supervised area. If personnel need to move between buildings, for example, RF Locators can provide larger area coverage while they are in transit. When they enter another building, IRT sensors will note their arrival.

Unless Crisis Controller is aware that a user has exited an IRT Locator zone, it will not look for RF Locator transmissions. These exit points are programmed in the software by checking the “Exit IRT” box on the IRT setup page. When Crisis controller receives an alarm from a PMT with the primary location as an IRT programmed as an exit, the software will listen for a matching report from an RF Locator. Exit units should be placed at doorways or passageways leading into areas covered by RF Locators.

It is important to note that the RF sensitivity of RF Locators is not uniform surrounding the device. The dispersion pattern of the signal is primarily in front of the device (extending outward from the device as mounted in the housing). Because of this, and the manner in which the software and hardware interacts for outdoor location (see above), the position of the RFL (both the mounting box and the device inside the box) when mounted is very critical to its performance. Particular care should be taken to properly position these devices to define the outdoor zones.

Wireless RF Locators must be used in conjunction with IRT exit points on the PALS©® 9000. Due to the characteristics of RF and the tolerances of the Wireless RF Locator, it is very likely that RF Locators will need to have overlapping coverage. This means that it is also very likely that more than one RF Locator will receive a given message. Because of this, there is a brief delay in the Crisis Controller©™ software when reporting any potential RF Locator messages. In addition, because the RF Locator is based on its RF sensitivity, if not properly adjusted, a missed signal is possible.

After the Crisis Controller©™ software has been successfully installed and tested, routine maintenance tasks can be performed by trained supervisors.

Troubleshooting

Problems that appear related to hardware or programming should be referred to the installer. Below are typical maintenance issues that can arise during operation of the Crisis Controller©™ software. For additional support, operation, or installation difficulties contact Actall® Technical Support at (800) 598 - 1745 Monday through Friday, 8:00 a.m. to 5:00 p.m. Mountain time or Email support@actallsp.com.

Transmitter Problems

Wireless transmitters are battery powered. Battery life on most products is estimated in years and should not pose a problem. When batteries do begin to fail, however, transmitters will report this to the software and a trouble warning will be generated in time to replace the battery. Some transmitters can be protected against tampering. Tamper switches or end of line resistors can cause a trouble warning to be generated, indicating that the transmitter has been damaged or disturbed.

PMTs

PMT battery life can be extended by turning the PMT off when not in use (move the slide switch to position 1). When the PMT is off, it continues to report supervision information to the Serial Receiver.

Receiver/Repeater Problems

Receivers and repeaters are highly reliable. Typically, if there is a problem it appears as a receiver or repeater failure, and is noted in the monitoring log. Failure of power sources and backups, wiring disconnection or inadvertent reassignment of COM ports can all cause a trouble warning to be generated. For improved RF range, make sure to mount the receiver in a location that is RF friendly (no metal back plates or back boxes).

IRTs

Communication between IRTs and PMTs is very reliable. If an IRT is not providing the correct address, make sure the power supply is providing the proper amount of current and reprogram the device.

PMT Specifications

Peak Current:	30mA
Frequency:	902 – 928 MHz
Maximum power output:	10mW
RF Open field range:	750 feet

Lapel Specifications

Peak Current:	3mA
Connection:	Shielded stereo cable
Conductors:	2 plus shield

IRT-M Specifications

Supply, Master IRT Locator:	12-18 VDC @ 300mA
Current with jumper in HI:	155mA
Current with jumper in LO:	75mA
Current without jumper:	25mA
Maximum power dissipation:	2 watts
Open field range with jumper in HI:	125 feet
Open field range with jumper in LO:	80 feet
Open field range without jumper:	40 feet

IRT-S Specifications

Supply, Slave IRT Locator:	12-18 VDC @ 300mA
Current with jumper:	130mA
Current without jumper:	65mA
Maximum power dissipation:	2 watts
Open field range:	5-10% less than Master IRT

SIO32 Specifications

Supply:	9 VDC to 35 VDC @ 700mA
Form C Relays:	35 VDC @ 1A
	120 VAC @ .5A
	60 VDC @ .3A
Input sync current:	80mA
Maximum power dissipation:	3 watts
Input Connection:	DB9 Male
Output Connection:	DB9 Female
Maximum # per Serial Port:	8

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2017 Curtis Street | Denver, CO 80205
www.actall.com 303-226-4799