



INFINITY  
PERIMETER  
SYSTEMS

# **Perimeter Security System**

## **Infinity 2020 PRODUCT MANUAL**

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# ***Perimeter Security System***

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***Section I: Software***



## ***Section I: Software***

### **1.1 Software Overview**

#### **Introduction**

ISC perimeter intrusion detection systems are unique in the security market. Their reliability, efficiency and the features they offer are unmatched. This is in part due to the innovative nature and high quality of their hardware products, but also owes a lot to the advanced nature of their specialized software.

ISC's software development team has designed all of ISC's system management software. It is matched perfectly to the hardware aspects of the system and allows total control of the security of a site from the comfort of a control room.

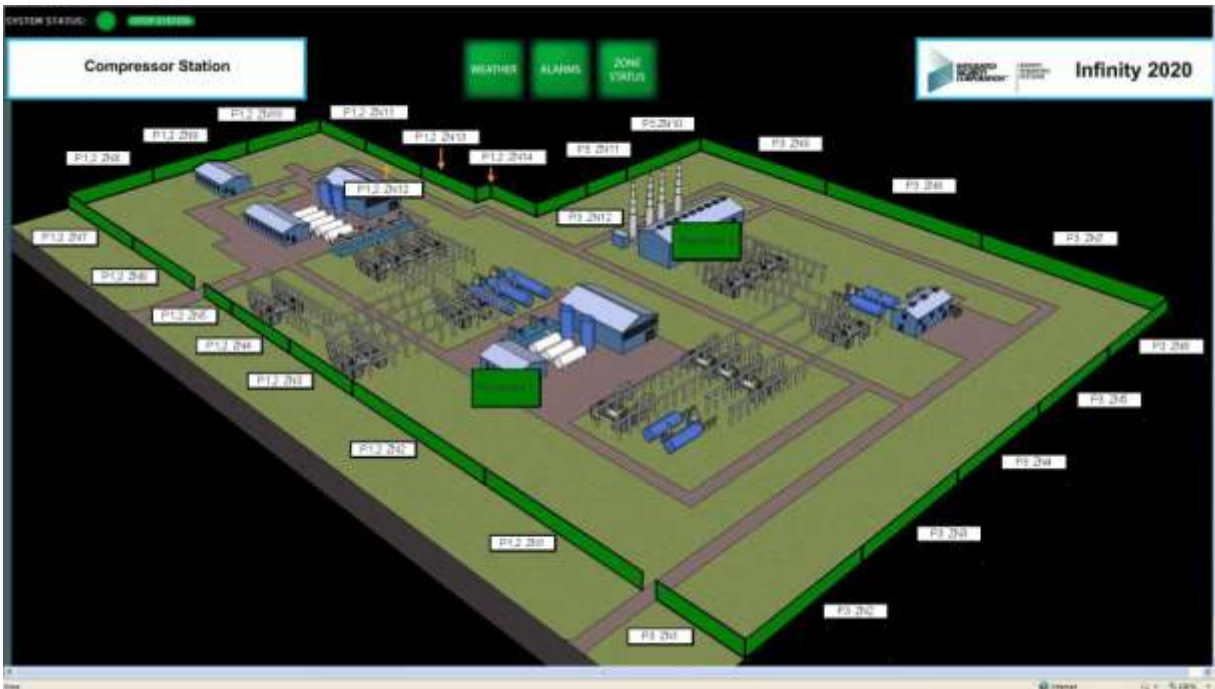
One of the pioneering advances of ISC's technology is the ability to control fence zone sensitivities and other parameters from the central computer. Other fence mounted systems require a technician to be sent out to the fence itself to make minor adjustments to the operation of the system. All ISC system functions are user adjustable from the central computer keyboard. In the event of a need to alter any of the system settings, such as arming or disarming a zone or adjusting sensitivity, the end-user can easily do this from the central computer keyboard. No field adjustments required.

Software control of security systems is the future of security technology. The unparalleled control it offers the user is invaluable. ISC is at the forefront of this field. Below you will see how this expertise can allow you to gain better control of your security situation.

#### **Locating an intrusion: Map screens**

Each site which has an ISC Infinity 2020 installed has a custom-made color computer map which is normally displayed on the central computer screen. It will show, or exclude, any details that the customer requires, including details that will assist response teams to reach the scene. Fence zones, or other alarm zones are displayed along with their status. In the event of an alarm, the relevant zone on the map screen begins flashing red, and a custom digitally synthesized audio voice announcement will

sound to alert security personnel. In addition, CCTV cameras can be automatically targeted to the alarmed zone



ISC perimeter zones are extremely flexible in terms of size and number. There is no minimum zone size should a certain section of the perimeter require extra accuracy in locating an attempted intrusion. The maximum zone size can be up to 15,000 feet, so a perimeter as large as a national border can easily be protected. Each host PC has the ability to support an unlimited number of zones, thereby making the system easily expandable.

The Infinity 2020 has the ability to identify the point of an attempted intrusion or escape on an accurate map in front of the officer on duty, which allows a much more rapid and accurate response.

Auto-targeting CCTV cameras is easily accomplished and can be made to display the site of the intrusion automatically. The Infinity 2020 communicates to camera controllers with contact relays.

If a site is large, complex or involves a number of remote sites, the computer can "zoom in" on designated areas of the site, giving a more accurate picture of the attempted intrusion. The ISC system can monitor more than the perimeter fence. It can also monitor the security devices in the buildings themselves (magnetic switches, passive infra red). In the event of the main screen showing an alarm in a building, the guard can zoom in onto a floor plan of that building and display the room in which the alarm has

occurred. Other alarm sensors, such as smoke detectors can be incorporated and would allow the exact location of a fire to be identified.

## **Software Adjustable Sensitivity**

One of ISC's special features is the ability for an end-user to easily change the sensitivity characteristics of the system's configuration. Every area of a site is different and, in order to eliminate false alarms, must be uniquely adjusted to the local conditions. ISC's shock-vibration technology allows advanced computer analysis of the incoming signals, and allows varying of the sensitivity from the central computer keyboard.

Every zone is totally independent and can be adjusted separately. Thus, zones that are subject to more environmental disturbance are given a slightly higher alarm threshold. Any attempt to climb or cut the fence is still easily detected, and disturbances that might otherwise create a false alarm are screened out.

ISC's integral weather station is one of its most important components. By allowing for meteorological disturbances, weather induced false alarms are virtually eliminated. The weather station continuously updates the system software with details of wind speed and precipitation intensity so that the system is always perfectly adjusted for the current conditions. Wind and precipitation compensation factors can be fine tuned for each zone simply by pressing a few buttons on the central computer keyboard. For instance, if a section of the site is subject to a wind tunneling effect, its wind compensation can be raised, almost completely eliminating false alarms caused by that tunneling effect.

## **Zone Set Up Options**

Any zone can be configured in one of seven states; Alarm, Event, Conditional, Dual, Trigger, Remote Event and Remote Conditional.

In the "ALARM" state, any alarm condition in that zone will cause the system to report that an alarm has occurred. This is the default setting and would be used for, among other things, the majority of the perimeter fence.

In the "EVENT" state, a condition that would ordinarily create an alarm is recorded, but does not produce an alarm response. For instance, a gate that is used with an access control system for authorized access can be set as an EVENT zone. The system data log maintains a record of every authorized access, along with the date and time that it occurred, but no alarm will be reported if a valid card read has been obtained. Unauthorized gate openings will cause an alarm condition.

The "CONDITIONAL" status is used for zones that are normally in an alarm state, but may be accessed without alarm if an adjacent zone has experienced an authorized entry. Most often, conditional zones would be used on either side of a gate to prevent the vibrations set up by the opening and closing of the gate from creating an alarm.

Disturbance of the fence at any other time would produce an alarm. The time period between the EVENT zone access and the CONDITIONAL zone returning to alarm state is user definable via software from the central computer keyboard.

The "DUAL" alarm state is an alarm condition that would require two zones to be alarmed during a software programmable time period to cause an alarm to be generated at the central monitoring computer. This alarm state would be used in the event an interior microwave zone and a perimeter fence zone would have to be alarmed during a preset time period in order to register an alarm condition at the central computer. Both alarms will be recorded as "Events" on the computer data log, however, an alarm condition will not be displayed on the central computer unless both zones are alarmed during a preset time period.

The "Trigger" alarm type is used in conjunction with the "Dual" alarm state to act as the trigger zone that must be alarmed in conjunction with the "Dual" zone, to generate an alarm condition at the central monitoring computer.

The "REVENT" alarm type defines a "Remote Event" alarm that is similar to the above mentioned "Event" type alarm condition except that the event processing takes place at the remote site processor and is not recorded on the central computer data log. An "Event" can be a valid card read from an access control card reader to open a gate without generating an alarm condition.

The "RCOND" alarm type defines a "Remote Conditional" alarm that is similar to the "Conditional" alarm type mentioned above except that the conditional alarm processing is done at the remote site processor and is not reported to the central monitoring computer.

## **Scheduler**

The Infinity 2020 software provides a scheduler for automatic arming or disarming of zones during specified time periods and dates. For instance, if a gate or door requires it to be disarmed from 8:30am to 5:00pm Monday through Friday, the system software does this automatically.

## **The Alarm Screen**

In the event of an alarm, the "Alarm Screen" gives details of the location and type of alarm. In addition to zone alarms, the system also recognizes four other alarm states.

**Power Failure:**

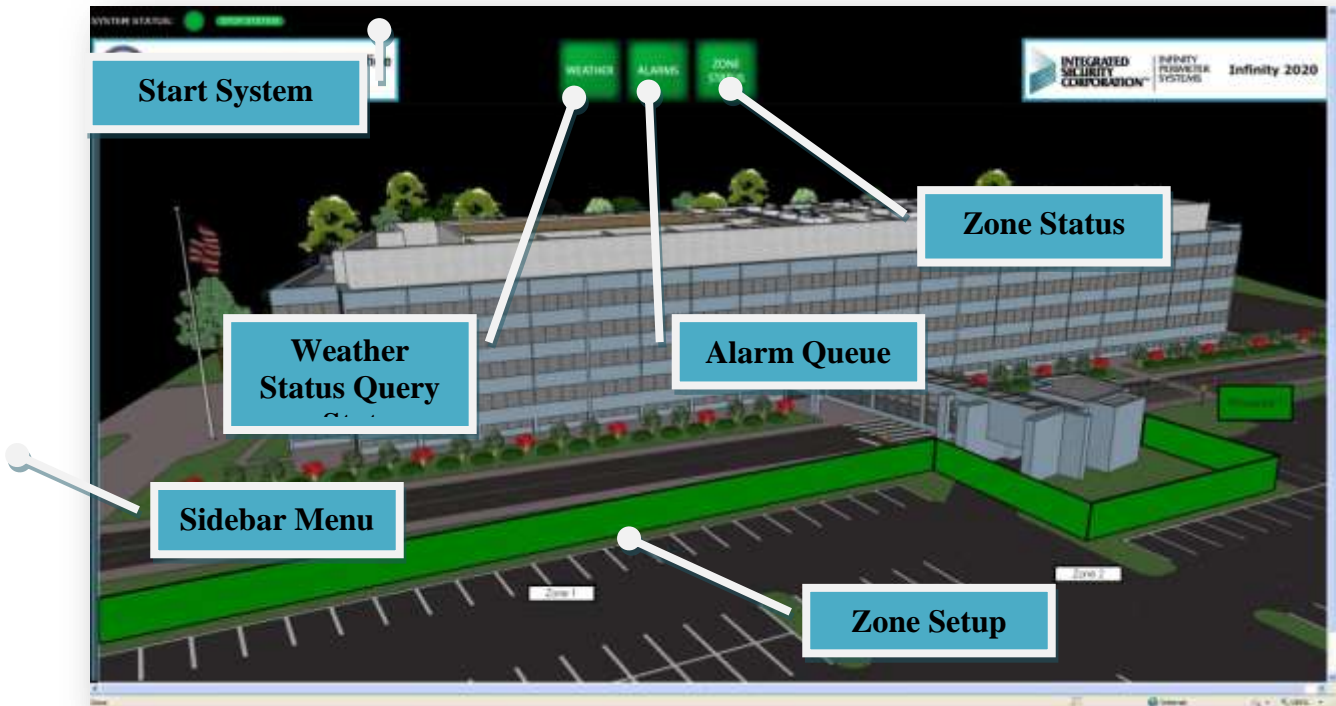
In the event of main AC power fail.

**Tamper Alarm:**

In the event of the processor box or field transponder enclosure being opened to expose the ISC system electronics.

- Transponder Comm. Alarm:** In the event of a field transponder power failure or the processor controller card being unable to communicate with the field transponder.
- Controller Comm. Alarm:** In the event the central computer being unable to communicate with the processor controller card.
- Low Battery:** In the event the backup battery has drained to low voltage level

On the site map screen, these alarms would appear wherever the relevant hardware is situated.



Once the control room is alerted to an alarm, the user can bring up the alarm screen by using a computer mouse to click on the flashing red alarm zone, or if a touch screen monitor is used the operator simply touches the flashing alarm zone on the touch screen monitor. The Alarm Screen displays details on the alarm location and nature (e.g. zone alarm, power failure etc.). The user can acknowledge the alarm and silence the digital voice announcement, but the zone remains in alarm until the cause is investigated and the user ascribes a "cause" for the alarm. The clearing of the alarm with a user-defined cause is automatically entered in the data log, along with the times and dates each action was taken. This prevents staff from simply acknowledging alarms and not investigating them, without supervisors becoming aware.

## **Voice Alarm Announcement**

The Infinity 2020 comes with a built in, high quality digitally recorded audio announcement for each alarm. The customer can specify exactly what announcements should be made for zone alarms as well as the response information.

Far better than a simple bell or buzzer, the voice announcement will immediately inform everyone in the control room exactly where an alarm has occurred so that the correct action is taken sooner.

## **Custom Response Information For Each Alarm**

In addition to the voice announcement of the alarm the Infinity 2020 software displays on the central computer monitor custom response information for each alarm. This information is vital in assuring alarms are responded to properly.

## **Data Log: Print out and Disk Record**

The ISC Infinity 2020 records all system events on a hard disk data log as well as an on-line printout. Details recorded with time and date include:

<b>Log on times:</b>	User's ID number, correct/incorrect password entry.
<b>System settings at log on:</b>	Zone status, sensitivities, and wind/rain compensation.
<b>System setting alterations:</b>	Sensitivity, zone status, arm/disarm/access
<b>Zone Types:</b>	"Events" and "Conditional" events
<b>Zone Alarms:</b>	Zone number
<b>Alarm Time:</b>	Time of alarm acknowledgement
<b>Alarm Clear Time:</b>	Time alarm investigated
<b>User Log Times:</b>	Time users Log In/Out

The data log can be sorted on any field, date, time, etc., to generate custom reports on all alarm activity.

## **Multi-Level Password Protection**

ISC systems offer multiple password entry levels. The customer can define exactly what access levels are granted for each user. Super Users and Supervisors can at any time change the access of any user in a class below theirs, but cannot give anyone a higher access than they themselves hold.

For each of the software functions, a user may have full read/write access, read only access or no access.

## **Remote Site Operation**

ISC engineers are specialists in the field of remote site operation. With the Infinity 2020, one control station can monitor and control unmanned or lightly manned sites anywhere in the world.

In the event of an alarm at a remote site, the base station is informed immediately and reacts exactly as if it were monitoring a local site. The main map shows which location is the origin of the alarm, and the user can zoom in to display a map of that particular site and show which zone is in alarm. The computer map and the voice announcement give the location of the site and the zone within the site.

The Infinity 2020 system does not just monitor the remote sites, it can also control them and alter any of the system settings, just as if they were local hard wired sites. Thus, sensitivities, arming/disarming etc can be adjusted in the usual way. It is a true total remote control system.

The remote link can be via any communication medium. This system allows truly world wide remote capability; a system in London could control a site in Hong Kong. The Infinity 2020 can also utilize microwave transmitters, satellite or any other form of communication.

## **1.2 ISC Products Range**

ISC perimeter protection systems, ranging from the full PC based site security monitoring systems of the Infinity 2020, to the Remote version with network and or fiber capabilities and the Stand Alone version that provides output contacts to other site monitoring systems.

### **ISC Infinity 2020**

The ISC Infinity 2020 is the basic, full feature site monitoring scheme. It provides total software control via a supplied PC. The Infinity 2020 offers:

### Color graphic site display

Maps based on customer supplied site maps. Optional zoom screens available.

### Full multi level password control

Initial settings to customer's requirements, subsequently user alterable.

### Disk data log

Backup capability, plus on-line print out of events.

### Digital voice alarm announcements

Wording to customer's requirements. One message for each zone or other alarm state.

### Software variable sensitivity and zone status

All zones can be armed and disarmed from the computer (providing appropriate password access has been achieved). ISC sensor zones are independently adjustable for varying sensitivity levels. Automatic weather compensation factors are also independently variable for each zone.

The screenshot shows a window titled "Zone Setup" with a close button in the top right corner. The window contains the following fields and controls:

- Controller : 1 NRO Controller
- Transponder : 1 Transponder 1
- Input : 1 Zone 1
- Zone Label: Zone 1 (text input)
- Active?:  Yes  No
- Region: Main (dropdown)
- Status: Secure (dropdown)
- Alarm Type: Alarm (dropdown)
- Conditional on Zone: --Select-- (dropdown)
- Triggering on Zone: --Select-- (dropdown)
- Period: :10 (dropdown)
- Vibration: 190 (spin box)
- Wind: 30 (spin box)
- Precipitation: 20 (spin box)
- Audio: Zone Alarm (text input) with a Browse... button

At the bottom of the window, there are four buttons: Save, Cancel, Restore Defaults, and Copy Sensivity Data.

The system hardware consists of:

**Host computer:** Dual core processor or better with 2GB DDR2 Non ECC SDRAM, Integrated Video, Intel GMA 4500, 80 GB SATA Hard Drive/8MB Databurst Cache, 8X DVD-ROM and color VGA Flat screen Monitor.

**Processor:** All components housed in NEMA rated metal cabinets. 110/220/240VAC with 12 VDC battery backup, tamper alarm.

Connection from the PC to the processor is via Ethernet, fiber optic link or RS-232 communication. Field processors can be installed at different locations on the site if required. Connection between processors is via Ethernet or fiber optic link.

Each Vision Board's 16 alarm zones can consist of a combination of ISC fence sensors or any other alarm device such as passive infrared or microwave barriers.

There are a total of 36 relays per processor. In addition to the processor's fence alarm relay outputs, there are relay outputs for other events. Each zone has two relay outputs (32 total), plus there is one power loss alarm, one tamper alarm, one communication failure alarm and one general alarm output.

Zones connected to ISC S-10 sensor line are all independently adjustable for sensitivity at the PC monitoring station on a scale of 1-254.

Each S-10 fence zone can have a maximum length of approximately 15,000 feet, with no minimum zone length.

When connected to the WX-75M weather station, wind and precipitation is automatically taken into account in the determination of an alarm condition. Fine-tuning is achieved by variation of the wind and precipitation compensation factors. Multiple weather stations can be used at large sites with more than one processor.

## **Remote Operation**

The Infinity 2020 is designed for operation in a computer network. The system is supplied with a choice of built-in Ethernet or fiber optic interfaces. All the functions of the Infinity 2020 are available remotely including site maps, zones status control and sensitivity adjustment. The Infinity 2020 can control multiple remote sites, and monitors all links for disruption.

## **Stand Alone Version**

The Infinity 2020 is available in a stand-alone version supplying relay outputs to other site monitoring systems without being monitored directly by security personnel. In this

“unattended mode”, alarms are automatically cleared without requiring operator action, after a user specified period.

The stand-alone version allows full software control of the system, including zone sensitivity function for fine tuning calibration, which contributes to ISC’s outstanding low false alarm rate. The stand-alone version is supplied on a laptop computer which can be folded and stored out of the way when access to the software is not required.

## **1.3 ISC Peripherals**

### **S-10 Sensor Line**

This is one of the breakthroughs that put ISC at the front of the perimeter security field. The ISC S-10 sensor line comes supplied with permanently attached S-4 sensors. Shock-vibration detection technology puts ISC way in front of micro phonic systems in terms of reliability and false alarm rate. The multi-axis sensor detects any amount of movement in any direction and passes data back to the processor for analysis.

The S-4 sensor is housed in a UV resistant, injection molded assembly, weather sealed with MIL SPEC #A-46146 RTV. EMI and RFI protected, the sensor internal gold plated self-cleaning contacts are Mil Spec and the unit is entirely maintenance free.

### **WX-75M Weather Station**

Weather induced false alarms are all but eliminated as the system automatically compensates for environmental disturbances by analyzing signals from ISC's own weather station.

An anemometer indicates wind speed, while an ingenious system for quantifying the effect of precipitation on fence sensor line sends complex weather data to the processor.

The WX-75M can be fitted to any of ISC's systems with dramatic results.



# ***Perimeter Security System***

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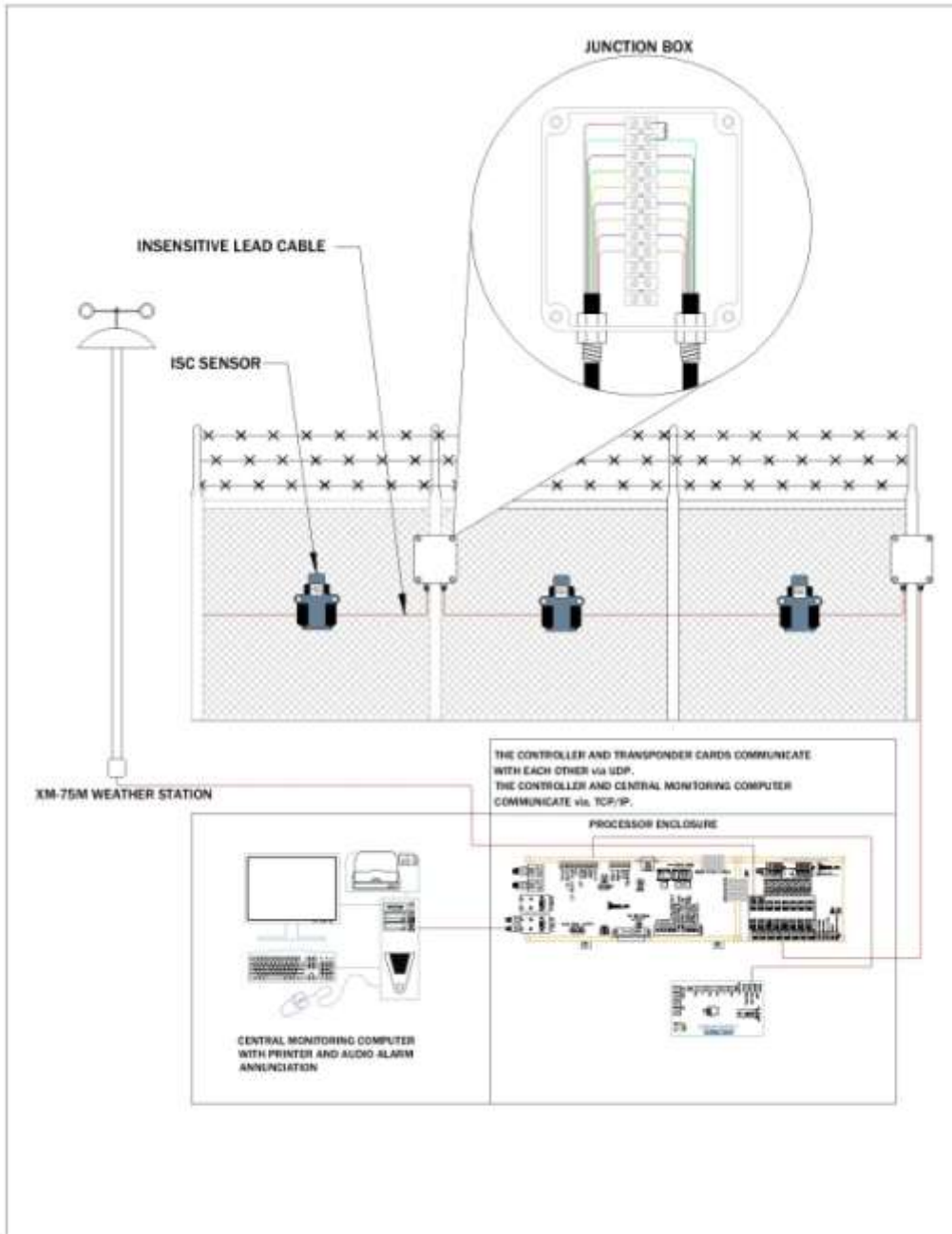
***Section II: Hardware Theory of Operation***

## ***Section II: Hardware Theory of Operation***

### **2.1 Basic Principles of Operation**

The ISC Infinity 2020 is a security monitoring and control system capable of total facility security management. The Infinity 2020 will reliably protect fences of chain link or welded mesh construction, concertina wire and all types of gates. The Infinity 2020 can be used to monitor indoor building alarms or outdoor perimeter applications.

**Figure 1** illustrates a typical multi-zone chain link fence application. The ISC Infinity 2020 is composed of a few main elements that are described in the following paragraphs.



**Figure 1: Typical Multi-Zone Wiring Chain Link Fence Application**

## **Sensor Cables**

The protection of a secured perimeter by the ISC Infinity 2020 is obtained by the sensor cables that are installed along the entire length of the protected perimeter. These sensor cables are highly sensitive to mechanical disturbances.

If a potential intruder attempts to cut, climb over or penetrate a fence or breakthrough a wall on which the ISC sensor cables are mounted, then mechanical stresses in the fence or wall result in slight voltage changes in the sensor cable.

These changes in the electrical characteristics of the sensor cable produce the alarm condition. This is detectable as a difference in potential at the sensor cable input to the transponder module of the processor unit.

The Processor unit continually processes and evaluates the electrical activity of the sensor cable. This processing circuitry will detect attempts to cut, climb or tamper with the security perimeter.

## **Infinity 2020 Processor Electronic Monitoring**

The Infinity 2020 processor continually evaluates the electrical activity of the sensor cable. The processing circuitry of the processor unit will detect an attempt to "climb over", "cut" or "tamper" with the secured perimeter if -

- An electrical signal greater than or less than a preset amplitude is detected in the sensor cable.
- The signal is present for a minimum time (software adjustable).
- A predetermined (software adjustable) number of increments, depending on the sensitivity settings, are detected within a preset minimum time period, by the transponder card microprocessor circuitry.

If the circuitry detects either a cut-through or climb over attempt on the secured perimeter, then it will immediately initiate an intrusion alarm.

## **Terminations**

The Infinity 2020 perimeter sensors have a DC "supervision" circuit to detect shorting or cutting of the sensor cable.

At the end of the sensor cable opposite to the control unit there is a termination device. The standard terminator is a 5.6K-ohm resistor. These devices allow for a small DC current to flow through the cable and to be monitored by the supervision circuit of the processor unit. If the sensor cable is cut or shorted, then the cable voltage drop will change. This is detected by the processor unit, which will immediately initiate an alarm.

## **WX-75M Weather Unit**

The Infinity 2020 includes a weather station to detect adverse weather conditions. This fully integrated monitoring subsystem detects any environmental changes resulting from wind and precipitation and supplies the necessary data to the system processor.

Based on this continuously updated flow of information, the field processor constantly adjusts the sensor operating parameters to minimize generation of environmentally induced false alarms.

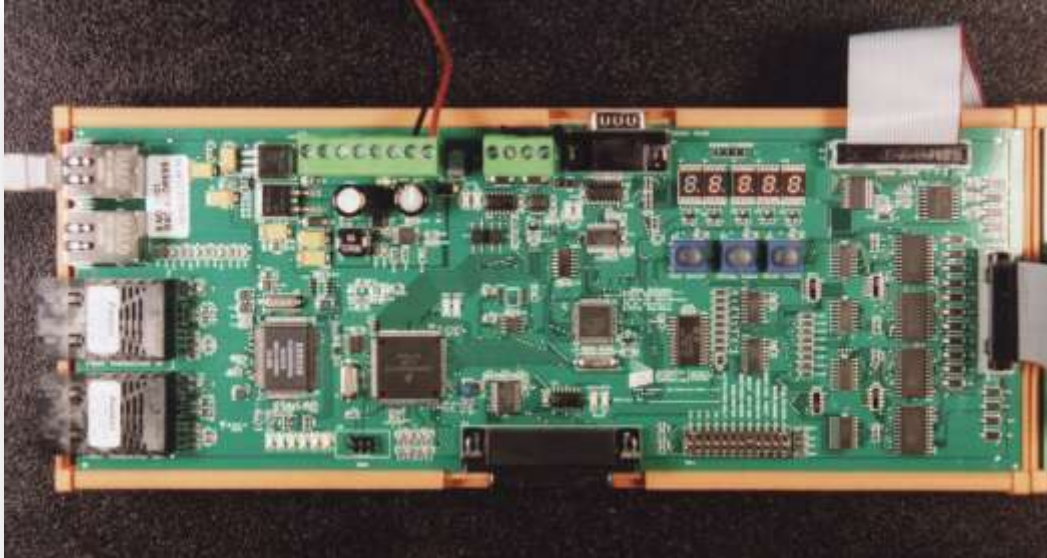
## **2.2 Infinity 2020 Processor Theory of Operation**

**Integrated Security Corporation (ISC)** perimeter intrusion detection systems have been providing industry leading performance for over twenty years. The **Infinity 2020** set of next generation hardware and software leverages today's networked technology while maintaining the same performance, reliability, and trouble-free maintenance our customers have come to know and expect.

### **Overview**

The **Vision Board** monitors up to 16 field mounted sensor cable inputs and reports alarm activity over **TCP/IP encrypted Ethernet** communication links (copper or fiber) to a network PC running the **Infinity 2020 Network Application**. The Vision Board can function as a **Controller** or a **Transponder**. As a Controller the card periodically interrogates one or more transponders which then pass any alarm events to the application. All cards are IP addressable allowing a single Controller to monitor up to 16 Transponders with a total capacity of 256 zones. Transponders monitor **Sensor Line** activity to detect intrusions and pass them to the Controller. Other features include on-board display for zone voltage monitoring, modular alarm relay configurations (Form C), Weather Station compensation at each card, cell phone alarm messaging, DB-25 connection for IP parameters and SMS labeling using external program, on-board 4 port Ethernet switch, tamper switch monitoring, and AC Power Fail and Low Battery alarm reporting.

## Vision Board



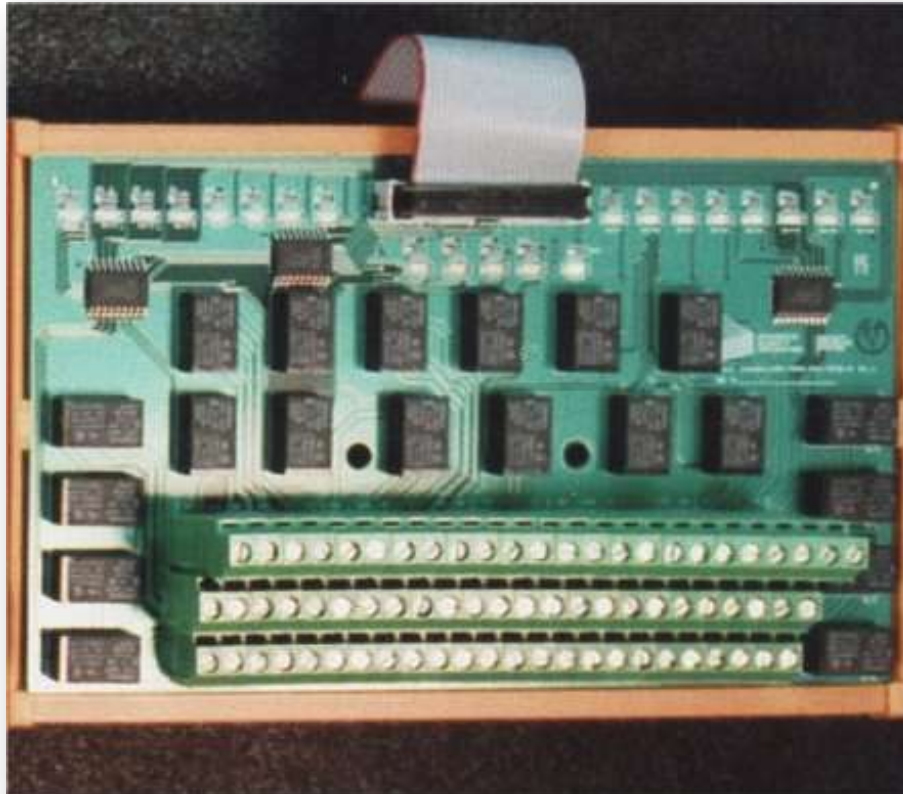
The Vision Board sensor line inputs and weather station inputs are protected against transients via the **Sensor Interface Card**:



Alarms relays are available for Zones Alarms, Power Fail, Transponder Communication issues, and Tamper Alarms. The relays feature high current capacity and Normally

Open and Normally Closed contacts for each Zone. LED indicators also illuminate when relays are energized for easy maintenance and troubleshooting.

### Relay Output Card



## Section 2: Operation and Maintenance

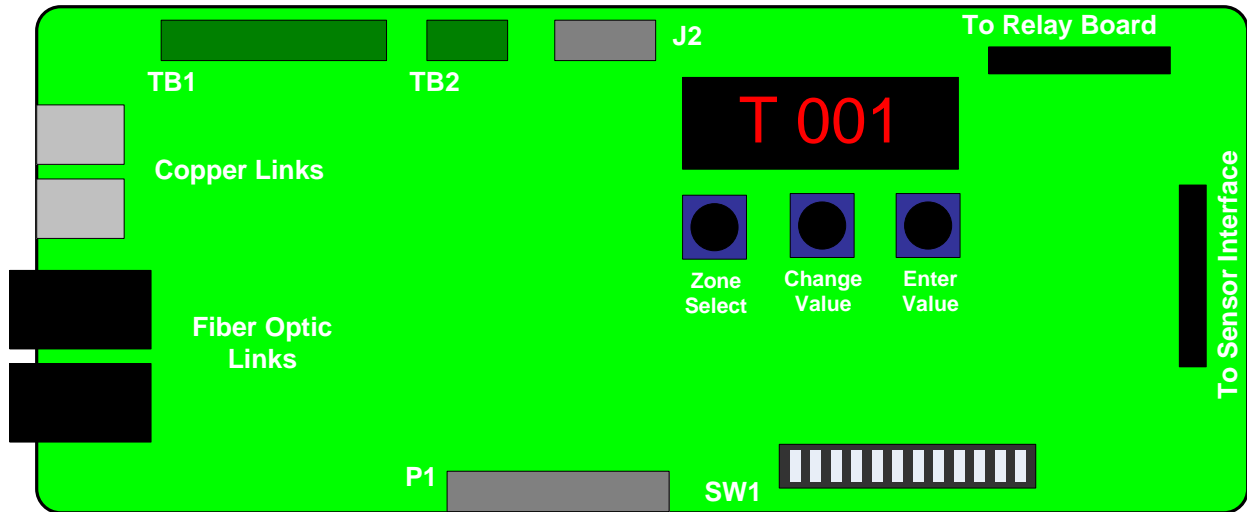
### Major points covered in this section:

- ✓ Key I/O
- ✓ Monitoring and Calibration

### GUI Alarm Events

### Vision Card Key I/O

Below is a graphical overview of the Vision Board's key connections and features:



**Figure 2: Vision Board Key Features**

**Description:**

**Copper Links (J4, J5)**

(2) Single Port 10/100BASE-TX RJ-45 connectors

**Fiber Optic Transceivers**

(2) Fast Ethernet 100BASE-FX SC connectors, 1x9 Package Style, Single Mode or Multi-mode Duplex

**TB1**

- 12 VDC Power Interface
- Altronix Power Supply Alarm Relay Contacts Interface: AC Power Fail, Low Battery

**TB2**

- Enclosure Tamper Switch
- RS-485 interface for Optional Remote Relay Card(s)

**J2**

- Optional interface for External GPRS Cell Modem for SMS Alarm messaging (application required)

**SW1**

- DIP Switch functionality:
  - **SW1-SW4:** FX (Reserved for Future Functionality)
  - **SW5:** Latch or Default mode – in latch mode alarm relays stay energized until cleared by the application, in default mode they are energized for 5 seconds or as long as the alarm condition exists
  - **SW6:** Run/Setup - Reserved for legacy RS-232 operation (port active or menu)
  - **SW7:** Weather/None – indicates if a local Weather station is tied to the card for compensation

- **SW8:** DHCP OFF/ON – manual IP address, or assigned by a network device
- **SW9:** Trans/Contr – assigns the card Controller or Transponder functionality
- **SW10:** Host/No Host – only for RS-232 communication, sets Controller wait time
- **SW11:** GPRS/NONE – with GPRS position set passes alarm messages to cell modem
- **SW12:** CAL/RUN – dictates whether Change Value and Enter Value Switches are active
- 

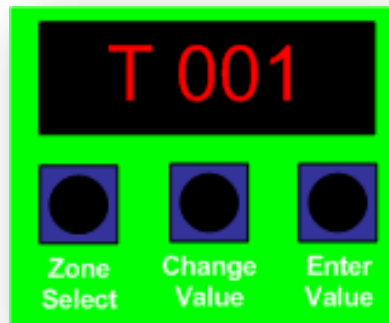
**Note:** all switch position changes require a power cycle for the functionality change to take effect except for the CAL/RUN position.

### Display

- High Brightness / dark face display – readout provides Transponder Address and Zone Voltages

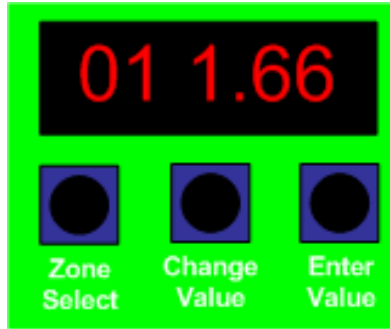
### Monitoring and Maintenance

The display provides current address of the Vision Card identifying the Transponder address. If it is not visible continue depressing the **Zone Select** switch until it becomes visible. To change the Transponder address ensure **SW12** is in the **Calib** position then depress the **Change Value** switch until the desired address is reflected. Finally, depress the **Enter Value** switch to store the new Transponder address.



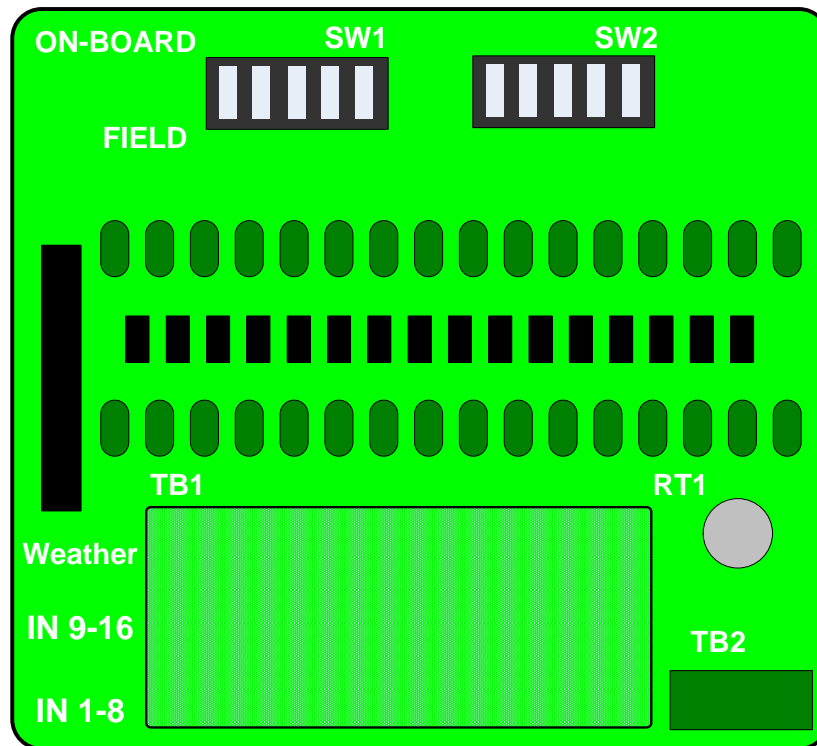
The current zone voltage for all 16 inputs is also available for monitoring. Simply use the **Zone Select** switch to cycle through all the zone voltages

For maintaining the system it is imperative to know that the nominal normal zone voltage should be approximately **1.7 VDC**. Before the Processor Enclosure is secured make certain that SW1-12 is put back into the **RUN** position.



### Sensor Interface Board

Below is a graphical overview of the Sensor Interface Boards key connections and features:



**Figure 3: Sensor Interface Card Key Features**

#### TB1

- Three level termination point where the first pole is the sensor line and the next is ground for first two levels or 16 sensor line inputs
- Top level is for Wind and Rain inputs from field mounted Weather Station

#### TB2

- Speed Amp interface for +5VDC power and digitized anemometer signal

#### RT1

- Return path for clamped transients

## SW1/SW2

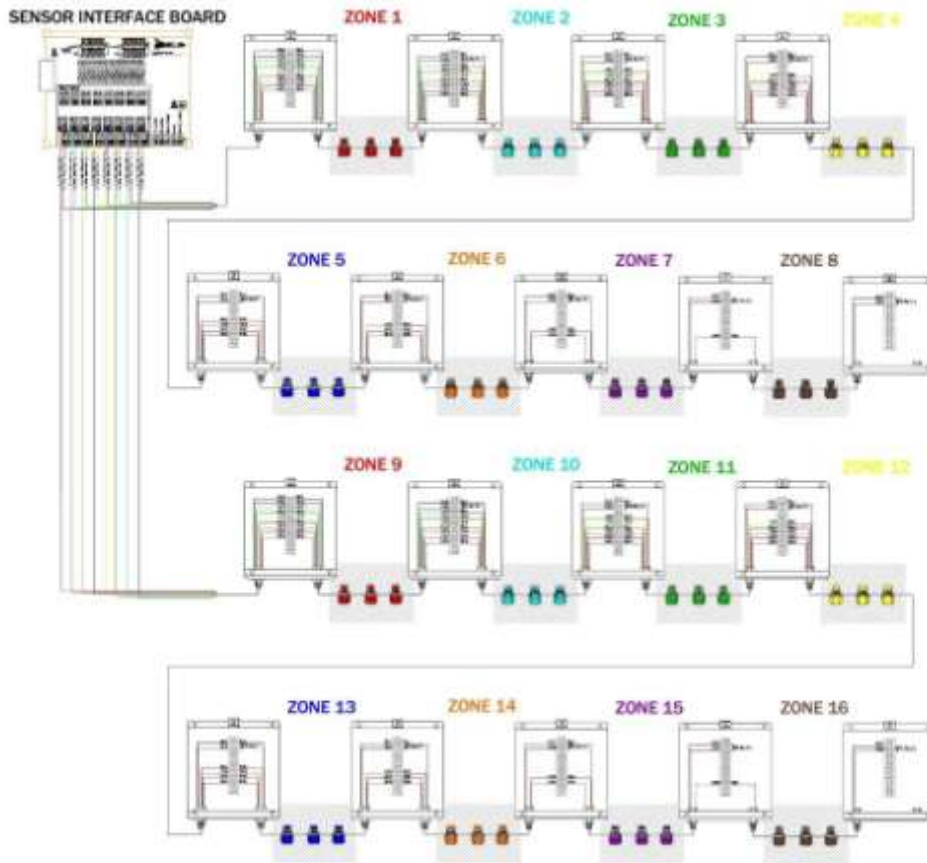
- Convenient DIP switch simulates field termination resistor when sensor line is not present

## Field Replaceable Fusing

- Normal Zone Voltage is 1.6 VDC – if 4.3 VDC is present it could mean an open circuit or blown fuse. Remove the field sensor line and switch DIP to on-board termination resistor. If the voltage is still 4.3 VDC a fuse could be blown. See the fuses listing versus inputs:

Input	Fuses
1	F1,2
2	F3,4
3	F5,6
4	F7,8
5	F9,10
6	F11,12
7	F13,14
8	F15,16
9	F17,F18
10	F19,20
11	F21,22
12	F23,24
13	F25,26
14	F27,28
15	F29,30
16	F31,32

- Replace any open fuses



**Figure 4: Example 16-Zone Wiring Diagram**

## **Intrusion Circuitry**

The sensor line input is sent through an amplifier to obtain a definite high/low signal. This signal is in the form of an electronic pulse with a duration that depends upon the disturbance.

If the intrusion signal is of short duration, such as would occur when the wire mesh on the fence is cut, then a software adjustable timer is incremented, depending on the zone sensitivity setting and the amplitude of the signal.

The selected time frame is the limiting interval for the cumulative monitoring activity of the alarm circuitry. If sufficient disturbance occurs during the time window selected, the software reaches a threshold level and creates an alarm condition.

All sensitivity settings are software adjustable from the central monitoring computer keyboard. No field adjustments are required. All zone sensitivity settings are individually adjustable by zone.

The Infinity 2020 also has software adjustable wind and precipitation compensation settings individually by zone from the central computer keyboard. No field adjustments required.

## **Supervision**

The capabilities described here ensure that if either the sensor cable is cut or shorted, an alarm will be activated.

Each zone is separately supervised.

## **Sensor Cable Supervision**

The sensor cable is terminated by a 5.6K-ohm resistor that forms a voltage divider with a resistor on the Transponder module in the processor unit. This causes the output of the preamplifier to be approximately +2.3 volts DC, which is the reference voltage.

The DC supervision circuit contains a window comparator that compares the preamplifier output to the reference voltage. As long as the preamplifier output is +2.3 volts DC, no alarm will occur. If the sensor cable is cut or shorted, then the 2.3 volt level will change, and an alarm will be initiated.

## **Tamper Circuitry**

A "tamper switch" is mounted on every processor enclosure. If the processor enclosure is opened (to expose the electronics), then the tamper switch becomes an open and a tamper alarm is immediately initiated. A relay output is provided for the tamper alarm. The central monitoring computer will display a tamper alarm.

The tamper switch is a three-position switch that can be placed in a non-alarm mode when the control unit is being serviced.

Local tamper circuitry is available for each Transponder module in the event the Transponder module is placed in the field remote from the processor. The Transponder module also supplies a relay output closure in the event a tamper alarm is initiated at the remote transponder enclosure.

## **Power Supply**

The Infinity 2020 processor power supply obtains 110 volts AC from an external power source. This voltage is bridge-rectified and regulated to provide an operating voltage of

+12 volts DC. The processor Vision cards further regulate the +12 volts DC to provide an output voltage +5 VDC. The +5 VDC output voltage is provided at the Vision modules for powering external security related peripherals, such as the speed amp which is part of the ISC Weather Station.

The power supply also provides a float charge for the optional backup battery. This is set at +12 volts with a current limited to approximately 500 ma.

A red LED will illuminate on the Controller and Transponder modules to indicate the power is normal.

An alarm will be initiated upon loss of +12 VDC to the Vision Card modules.

## **Audio Option**

The Infinity 2020 central computer provides a custom digitized audio annunciation of an alarm condition. The wording and language of the alarm annunciation message can be customized to the customer's requirements.

## **Alarm/Tamper Status Monitoring**

Vision Boards have 16 DC supervised status monitoring inputs. Each input monitors the status of an external End Of Line (EOL) resistor. If the value of the external circuit resistance increases above or decreases below specified values, an alarm condition is reported when the Transponder is next polled.

Dual supervision is featured on points 1-8. Dual supervision allows the reporting of both alarm and tamper status information over a single pair of wires. The alarm and tamper contacts (switches) may be configured for normally open or normally closed operation.

Single supervision is also featured on points 1-8. Single supervision allows the monitoring of alarm status information only. The alarm contacts may be configured for normally open or normally closed operation.

## **Self Test**

The Controller function of the Vision Board is continuously polling the Vision Boards acting as Transponder modules. A complete self-test command is software programmable to occur at predetermined time intervals. The self-test ensures communication between the Transponder, Controller and central monitoring computer. Any interruption of communication immediately causes an alarm.

Transmitting a self-test code in the command byte of the poll message and comparing the information received from the Transponder accomplish the self-test function.

## **Output Control**

External circuit control is also available via the transponder output relay drivers.

The Vision Board module provides relay output contact closures for 16 individual alarm zones.



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# ***Perimeter Security System***

## **Infinity 2020 PRODUCT MANUAL**

### ***Section III: Processor Installation Procedure***



## ***Section III: Processor Installation Procedure***

### **3.1 General**

The primary steps in installing an Integrated Security Corporation intrusion detection system are as follows:

- Mounting the **control unit**.
- Attaching the **sensor cable** to the fence or concertina along the detection line.
- Mounting the **Junction boxes** at the beginning and end of each zone.
- Making all **electrical connections** to the Integrated Security Corporation processor.

The following sections will present procedures for all of these.

### **3.2 Processor Unit Installation**

#### **Overview**

The Integrated Security Corporation processor is an input controller designed to monitor the state of up to 256 input devices or perimeter zones. It is a microprocessor-based processor combining data processing, memory, communications and field inputs. The processor unit consists of controller cards, transponder cards, power supply and weather unit interface hardware.

The processor unit processes field input data and routes status information to the central monitoring computer. The processor unit can also act in a stand-alone capacity to give relay output notification to other site monitoring systems. Relay output status is available for each zone alarm, tamper alarm, communication fail, power fail and a general output relay.

The Integrated Security Corporation processor mounts on an indoor wall surface, in an area that meets the unit's environmental specifications (See Specifications). Transponder cards can be field deployable via fiber optic cable and transceivers if needed. Transponder cards, enclosed in weatherproof enclosures can be mounted directly on the fence material along the perimeter.

The following procedures will lead you through the required steps of installing the ISC System processor unit. Each procedure is concerned with only one part of the installation. Read each procedure and examine the accompanying illustration before attempting to do the procedure.

### **3.3 Processor Electrical Connections**

**WARNING!!! Failure to disconnect power from all interconnected equipment when performing electrical installation may result in electrical shock or equipment damage.**

#### **Processor Unit**

The Integrated Security Corporation processor unit comes assembled in a moisture-proof enclosure that permits it to be mounted either outdoors or indoors. The processor enclosure can be wall or post mounted.

The approximate location of the processor unit should have been determined by this point, so that it needs only to be physically installed. The processor unit communicates with the central monitoring computer via Ethernet or RS232 interface or fiber optic link. The maximum allowable distance between the processor and the central monitoring computer is 100 feet, if using RS-232. The processor unit has four (4) basic components; the Controller card (Vision Board), the Sensor Interface Board, the processor power supply and the weather station interface hardware. An optional Relay Output Board may also be included. The controller card is the communication interface between the field processors and the central monitoring computer, the Sensor Interface Board receives the field input signals from the alarm devices, and the weather station interface hardware digitizes the input signals from the ISC WX-75M weather station for processing by the controller card microprocessor circuitry.

Before power is applied to the ISC System processor unit, all electrical connections should be checked for proper installation. The following procedure will lead you through the required steps of electrically installing the Integrated Security Corporation processor unit.

#### **Grounding**

Due to its low impedance transmission systems the ISC processor unit is not susceptible to noise interference. However, grounding is required at the

processor for lightning suppression and in the event 50 or 60 cycle noise may be present at the site.

When considering earth ground sources, it is critical to insure that the earth ground source is stable and noise free. An improper or unstable earth ground source can induce noise into the processor unit. This noise may cause the processor to initiate false alarms.

A proper earth ground source may usually be obtained by driving a 6 ft. (2.4 m) copper grounding rod into the ground near the processor unit. Use at least a 10 gauge wire to connect the grounding rod to the processor unit chassis ground stud.

### **\* IMPORTANT \***

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***A large difference in potential may exist between the fence ground and the processor unit ground. This difference in ground is generally induced by a local power source (50 or 60 cycle).***

***Multiple grounds will sometimes produce ground currents into the sensor cable shield, thus introducing noise into the system. For this reason, it is necessary that only one ground path be established for the processor and the shield of the sensor cable and the communication lead cable.***

---

To test for noise resulting from inadequate grounding, simply read the zone input to the transponder card with an oscilloscope for 50 or 60 cycle noise. The signal input to the transponder card should be a steady +2.3 volts DC.

The sensor cable ground is obtained at the processor unit chassis ground connection. If excessive noise is present or becomes evident at some time after installation, check the integrity of the sensor cable installation first. In particular, insure that there is no inadvertent ground connection to the sensor cable shield at junction boxes or terminators.

The processor unit is generally grounded at its mounting location through a grounding rod. In extremely noisy environments, there may be sufficient energy to produce a capacitive coupling with the sensor cable shield. This may happen regardless of the precautions taken to ensure a single DC ground return. If such problems arise, it may become necessary to relocate the processor unit ground closer to the protected fence (periodic grounding of the protected fence may also be useful in such situations).

## **Connecting the AC Power**

Primary power to an AC powered processor unit is 115 VAC. Operating power is 24 VDC, supplied through a step-down transformer in the processor power supply. AC power connection to the processor unit is made on terminals 1 and 4 of the processor power supply.

All power supply connections are made internal to the processor at the factory, in most cases AC power can be supplied by simply plugging in the processor AC power supply cord.

## **Connecting the Backup Battery**

The Integrated Security Corporation processor unit has an optional battery backup to allow operation of the unit during primary power failure. The battery backup normally is connected internal to the processor at the factory, however, the following information is provided.

**WARNING!!! Failure to disconnect power from all interconnected equipment when performing electrical installation may result in electrical shock or equipment damage.**

Perform the following 5 steps to connect the processor unit backup battery:

- Step 1.** Remove AC power to the processor from the circuit breaker panel.
- Step 2.** Place the battery in the processor cabinet and secure in place.
- Step 3.** Battery leads from the switching power supply will be provided and pre-installed from the factory. Connect the two 12 volt batteries in series using the + – leads from power supply and the supplied jumper.
- Step 5.** Restore power to the processor at the circuit breaker panel

## **Installing Zone Input Cables**

Before connecting the field input cables to the transponder zone input connections, verify the installation of the sensor cable by performing the Sensor Cable [Continuity Test](#) listed in Section 6 – System Test and Checkout, Part 6.3 test number 3. All zone inputs to the transponder card must be supervised with an end-of-the-line resistor. Check the resistance between each pair of wires for a

particular zone or alarm device for the presence of the 5.6K $\Omega$  terminating resistance.

Check the sensor cable resistance between the drain wire and the individual zone inputs. This resistance should be a minimum of 2M $\Omega$ .

Perform the following 3 steps to install the zone input cables to the Sensor Interface card:

- Step 1.** In sequence, connect the pair of wires from each of the field zones or switches to terminal block zone inputs. Input pair terminal connections are labeled "IN 1-8" and "IN 9-16" on the Sensor Interface card.
- Step 2.** All input circuits must be supervised with an end-of-the-line resistor. Ensure that the termination resistors are located close to the security device being monitored or at the last sensor for a zone of perimeter sensor cable. Ensure the termination resistors are secure from unauthorized access.
- Step 3.** Connect all sensor cable shield drain wires together, and terminate these conductors to the processor chassis/earth ground stud.

**NOTE:** All unused inputs for activated zones on the transponder card must be terminated with a 5.6 K $\Omega$  resistor across the zone input terminals on the transponder card.

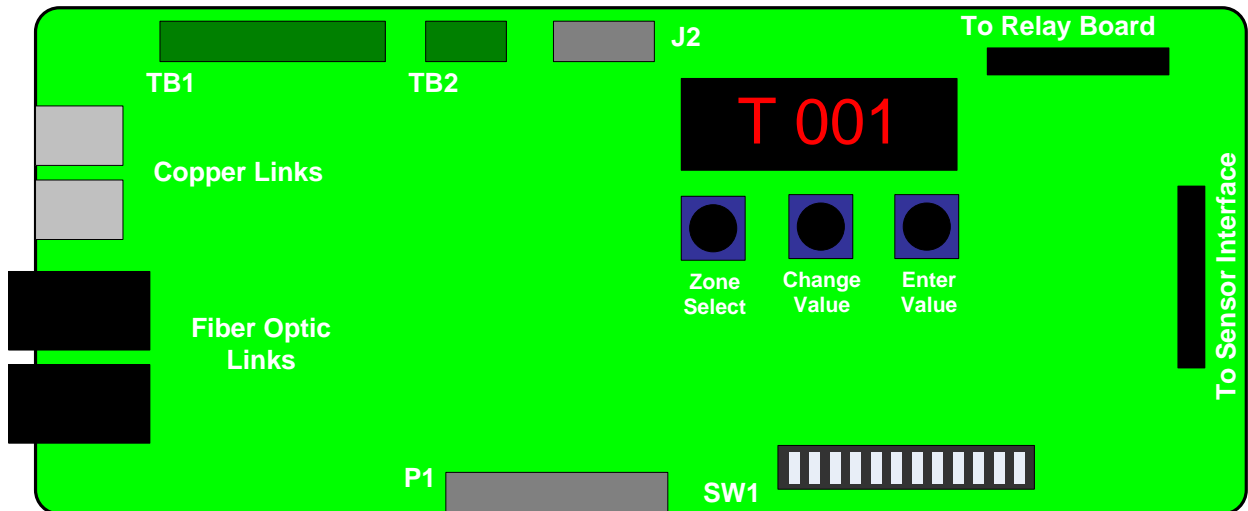
## **Addressing the Vision Board**

The Vision Board has 2 modes of functionality: Controller and Transponder. Configuration is set via on-board DIP Switch **SW1-9** with the switch placed in the appropriate position based on the chosen functionality (cycling of the board power is required for the change to take proper effect).

The Transponder functionality monitors up to 16 sensor line inputs for perimeter intrusions which are reported to the Controller and in turn passed on to the Infinity 2020 Application. When a Vision Card functions as a Transponder its address is also configurable from addresses 1 to 15 via the 3 on-board switches: **Zone Select** (SW2), **Change Value** (SW3), and **Enter Value** (SW4). As to avoid inadvertent changes DIP Switch **SW1-12** features Calibration and Run mode positions. When changes are not required the switch stays in the Run mode position. To change the Transponder address slide **SW1-12** in the "Calib" position. The display features the current Transponder address. Depress the Change Value switch consecutively until the desired address is displayed.

Depress the Enter Value switch once to capture this new address. Note that the real time zone voltage for all 16 inputs can be viewed by consecutively depressing the Zone Select switch.

The Controller monitors one or more Transponders for alarm activity and passes them onto the software application. The Controller also has the ability to monitor up to 16 sensor line inputs and contains an “on-board” Transponder which has a fixed address of T000.



## **Connecting the Central Computer Communication Cable**

The PC running the Infinity 2020 Application requires network connectivity to the Vision Controller Card. In its most simple form, this entails connecting an Ethernet cable (straight through or cross-over) from the PC's Network Interface Card (NIC) to either of the two Vision Card's RJ-45 connectors. Standard 100 BaseTX range restrictions apply, such as the 100 meter range for copper based LAN connections. Long haul communication is also possible via optional on-board fiber transceivers available in single or multimode hardware configurations.

## **WX-75M Weather Station Installation**

All ISC perimeter detection systems include a weather unit that is used to detect adverse weather conditions. This fully integrated monitoring subsystem detects any environmental changes resulting from wind or precipitation and supplies the necessary data to the processor unit. Based on this continuously updated flow of information, the processor constantly adjusts the sensor operating parameters to minimize the generation of environmentally induced false alarms.

To install the weather station electrical inputs to the ISC processor perform the following steps:

- Step 1.** Identify the location where the weather station is to be mounted from the site diagram provided by ISC.
- Step 2.** Using the mounting coupler supplied by ISC, secure the weather station to the 1-1/2 inch rigid mast provided at the site. Insure the anemometer is at least 6 feet above the highest point of the building it is affixed to. Ensure no wind blocks or other obstacles are present that would prohibit exposure of this unit to the environment.
- Step 3.** Route the wire from the weather station into the building then to the ISC processor enclosure. Use lead cable provided where necessary.
- Step 4.** Connect the input wires from the WX-75M weather station anemometer to the terminals labeled "Wind Input" on the processor weather station terminal strip.
- Step 5.** Connect the weather station precipitation dish input wires to the "RAIN" and "GND" terminals on the processor weather station terminal strip.

**Note:** The weather station is usually mounted on the roof of the building housing the processor unit, however, depending on the size and topographical makeup of the perimeter being monitored, the weather station can be mounted remotely in the field along the perimeter fence line.

## **Alarm Relay Output Connections**

The processor transponder card has 9 output relays and the controller card has 2 output relays that are used to indicate alarm conditions detected by the processor unit. These relays are normally open relays that close upon an alarm condition being detected. The relays will remain closed until the alarm condition clears, upon which time the relay will reset after approximately 5 seconds.

The power fail relay output is designed to operate in a "fail-safe" mode. This means that the relay depends on power being present in the processor unit to be energized. This relay is energized in the normally closed configuration. The relay will open upon power fail to the processor.



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***Section IV: Sensor Cable Installation Procedure***



## ***Section IV: Cable Installation Procedure***

### **4.1 Sensor Cable Installation**

#### **Introduction**

This section pertains only to the Integrated Security Corporation sensor cable installation. Prior to installing the sensor cable hardware, site preparations, design and layout must be performed. The security perimeter must be defined and a zone breakdown established. ISC will assist with site layout by customer request.

#### **Requirements for Installers**

Installers must be trained and certified by Integrated Security Corporation.

#### **Installation Layout**

A site diagram should be created for the site to be installed, which will depict zone locations and zone numbers. Follow the instructions on the diagram for where to start and stop each zone. Do not walk off more than 100 feet of sensor cable without mounting the sensors to the fence. This will insure minimal stress on the cable.

#### **Chain Link Fence Sensor Cable Installation**

The following procedure pertains to chain link fence sensor cable installation only. The installation should proceed in the following manner:

- Step 1.** Determine the best position for the sensor. This position may vary based on the application, fence conditions and construction. Please contact ISC for assistance if required.
- Step 2.** Select the spool for the zone being installed. Anchor the start of the sensor cable at the beginning of the zone. Make sure the sensor is positioned directly in the center of the fence panel or in an area of the fence panel where the most activity occurs during an attempt to breach the perimeter. Most chain link fences are installed with posts 10ft. apart. The distance between the sensors on the sensor cable is 10ft. 11 in.
- Step 3.** Reel off 100 feet of sensor cable or approximately ten sensors in a parallel path along the fence to be secured. Maintain a distance as close to the fence as possible to prevent any unnecessary stress on the cable.

**\* CAUTION \***

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**Handle the cable carefully! For best operation and long life, cable should not be knotted, kinked, nicked, or scraped.**

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**Step 4.** Leaving the spool on the ground, return to the start of the run and begin mounting the sensors to the fence panel. Insert the back plate into the sensor body securing holes as shown in the illustration below. Ensure the back plate is positioned so the chain link fence material is between the risers of the back plate. The sensor is in the correct position when the cable is at the bottom of the sensor and you can read the **“ISC”** logo! (See illustration below).



**Step 5.** After the sensor body and back plate have been installed on the fence panel, lightly insert the two (2) securing pins into the sensor body securing holes, as shown in the illustration below.

**DO NOT** push the pins into the sensor body securing holes at this time.

**\* NOTE \***

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**Care must be taken in the positioning of the sensor on the fence panel. The sensor should be installed in the area of the fence panel that receives the most activity during an attempt to breach the security perimeter.**

---



**Step 6.** Once the sensor has been installed on the fence panel and the securing pins lightly inserted into the sensor body securing holes, tighten the sensor body to the fence fabric in the following manner:

Use "Channel Lock" pliers, as shown in the illustration below, to crimp the back plate securely to the sensor body, (if necessary, tape the jaws of the channel lock pliers with electrical tape to prevent scratching the sensor body).

Ensure that the sensor body and back plate are tight enough against the fence fabric to prohibit any movement of the sensor on the fence.



**Step 7.** While crimping the back plate securely to the sensor body, use a small blade screwdriver to push the securing pins tightly into the sensor body securing holes as shown in the illustration below. The blade of the screwdriver should be small enough to push only the securing pins without touching the sides of the securing holes. The screwdriver blade must push the securing pin only into the body.



**Step 8.** After pushing the securing pins tightly into the sensor body securing holes, check to ensure sensor is tight against the fence material. The sensor should not move on the fence fabric.

**Step 9.** After mounting approximately ten sensors, repeat the above procedures until the spool is empty or you reach the end of the predetermined run on the diagram provided with the spool(s). You should now have all sensors mounted on the fence for the zone.

**Step 10.** After crimping all the sensors onto the fence fabric, return to the anchor point to begin ty-wrapping the sensor wire to the fence. Install one ty-wrap on each side of the sensor as close to the sensor body as possible (within 3 inches of sensor). At approximately 15-inch intervals, install ty-wraps working away from the sensor until you reach the post supporting the fence fabric.

**\* NOTE \***

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**Use UV resistant outdoor rated cable ty-wraps when securing the sensor wire to the fence material.**

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**Step 11.** At the post area neatly secure any excess sensor wire by creating a loop as shown in the illustration below.

Continue ty-wrapping the sensor cable to the fence fabric for the entire length of the zone.



**Step 12.** At this point you should have all the sensor cable mounted for this particular zone. The sensors should be securely mounted to the fence fabric and the sensor wire ty-wrapped neatly in a straight line as pictured below. The cable loop at the fence post should be neatly ty-wrapped as close to the fence as possible. Cut off the ends of the ty-wraps, and discard appropriately.



**Step 13.** Should you need to remove a sensor, simply use a wide blade screwdriver to pry the back plate away from the rear of the sensor body. Carefully remove the back plate as pictured below.



## **4.2 Perimeter Fence Corner Areas**

Many fence corners include diagonal and/or horizontal stiffeners. This may make the fence fabric near the corner quite rigid, reducing the ability of a single run of sensor cable to detect a climb-over attempt in this area. Therefore, it is a good practice to add an additional sensor cable on each side of the corner post if necessary.

## 4.3 Slide Gate Installation

To provide continuous security across a sliding gate, use the Integrated Security Corporation Wire Transfer Assembly. With this device, the gate may be secured in the closed position. When the gate is opened, the transfer assembly follows the opening of the gate (see figure 1 below).

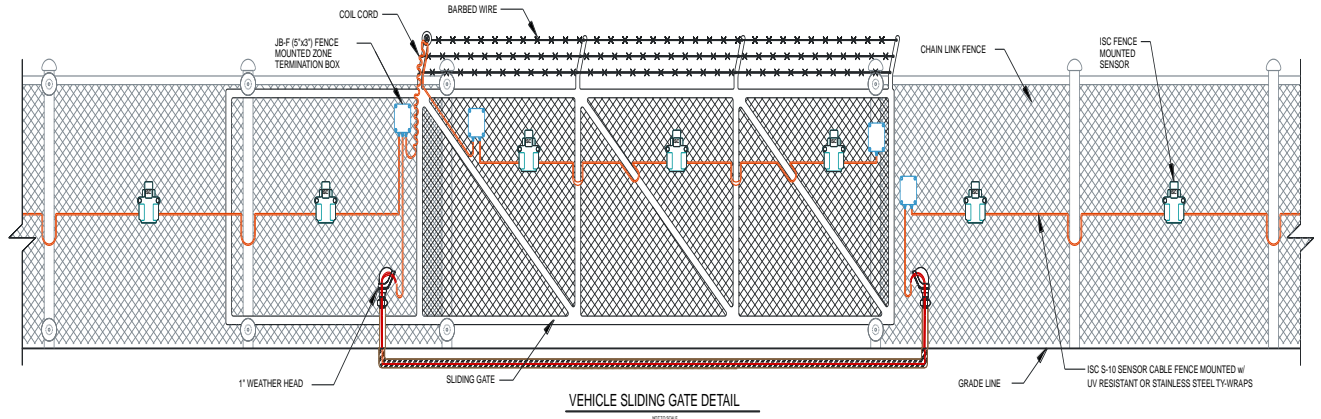


Figure 1: ISC Slide Gate Transfer Assembly

## 4.4 Concertina/Barbed Tape Sensor Cable Installation

- Step 1.** Select correct spool for zone being installed.
- Step 2.** Anchor the start of the sensor cable to the beginning of the run. Make sure the first sensor is within five (5) feet of the start of the coil being protected.
- Step 3.** Reel off 100 feet of sensor cable or approximately ten sensors in a parallel path along the media to be secured. Maintain a distance as close to the fence as possible to prevent any unnecessary stress on the cable.

- Step 4.** Leaving the spool on the ground, return to the anchor point and begin to mount the sensor body to the concertina coil. Use the back plate and securing pins provided by ISC. Insure that you leave a shallow loop in the cable for easy attachment when the sensor line is ty-wrapped to the concertina coil. When possible, attach the sensor in a vertical position at approximately the 10 o'clock or 2 o'clock position on the coil. ISC will supply a diagram for each site configuration detailing where to position sensors. Remember to stay "redundant" during this procedure. System sensitivity will be easier to set or adjust if all sensors act similarly.
- Step 5.** Using "Channel Lock" pliers, (tape jaws with electrical tape to prevent scratching sensor body) crimp the back plate securely to sensor body. Make sure back plate is tight enough to prohibit any movement of the sensor on the coil. Insert the securing pins into the sensor body securing holes while tightly crimping the back plate to the sensor body.
- Step 6.** After crimping all sensors onto the concertina coil, return to anchor point and begin ty-wrapping the sensor wire to the coil. Install one ty-wrap directly next to the sensor at the nearest intersecting strand of the coil. Always ty-wrap between the barbs and not directly on top of them. With long nose pliers bend back and away any barbs, which may possibly spear or cut the sensor wire. Ty-wrap the sensor wire to every intersecting strand, working away from the sensor body until you reach midway between sensors. If any excess cable is found after ty-wrapping is complete, simply secure the excess directly onto the coil to prevent abrasion.

## **4.5 Other Media Sensor Cable Installation**

Any media such as brick, aluminum, welded mesh, wood, concrete, wrought iron or other physically protective barriers, which generate vibration when scaled, can be monitored by the ISC S-10 sensor cable. The specific installation instructions for these applications are available upon request.

## **4.6 Termination Devices**

Before connecting the field input cables to the transponder zone input connections and terminating zones with the end of line resistors, verify the installation of the sensor cable by performing the Sensor Cable [Discontinuity Test](#) listed in Section 6 – System Test and Checkout, Part 6.3 test number 2.

All Integrated Security Corporation zone inputs require termination resistors. The termination resistor can be mounted in a standard tamper resistant, moisture-proof enclosure, which is ty-wrapped directly to the fence perimeter.

If there is an excess of sensor cable at the terminator, do not coil the cable. Such a coil can provide hypersensitive detection, with resultant nuisance alarms. Either cut the cable to the proper length, leaving a moisture drip loop outside the termination device enclosure or terminate the zone at the correct length inside the last sensor body for that particular zone.

## **4.7 Junction Devices**

The junction box can be any tamper resistant, moisture proof splicing-kit/junction that is used to splice the sensor cable or to connect the sensor cable to the insensitive communication feed cable. It may also be used in splicing or repairing the sensor cable and in gate applications.



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# ***Perimeter Security System***

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***Section V: Engineering Specifications***



## ***Section V: Engineering Specification ISC Infinity 2020***

### **PART 1: General**

#### **5.1.1 Introduction**

Provide and install a perimeter security system as herein specified for the purpose of detecting entry into a designated security area. The perimeter security system is to be installed complete with appropriate controls, wiring and mounting hardware per the manufacturer's recommendations. All installation work shall be accomplished in a professional manner by manufacturer trained installers.

#### **5.1.2 System Description**

The perimeter security system shall be an electronic shock vibration type system as manufactured by Integrated Security Corporation of Walled Lake, Michigan. The system shall incorporate a meteorological device. This fully integrated monitoring sub-system shall detect environmental changes resulting from wind and precipitation and supply the necessary "real-time" data to the system processor. Based on this continuously updated flow of information the system processor shall constantly adjust sensor operating parameters to minimize the generation of environmentally induced false alarms.

This specification is to provide an operating perimeter security system complete with central monitoring computer, processor, controlled weather notification device, sensor cable, accessories and such other peripheral equipment as the site may require. The perimeter security system shall detect perimeter intrusion attempts and indicate alarms on a color graphic display on a central monitoring computer with flashing alarm zones, custom digital audio annunciation of alarms, command and a hard copy printout of alarm activity on the system printer. The system shall provide relay outputs for each zone, power/communication failure and tamper from the system processor to other site monitoring systems (if required).

The field sensors shall be installed on the fence material, concertina, razor ribbon, barbed wire or other such media as required. The sensor cable shall be mounted on the fence material, concertina, razor ribbon, barbed wire, or other such media using UV resistant cable ties.

The length of a detection zone is variable and depends to a large degree on the need for a certain section of perimeter to require extra accuracy in locating an attempted intrusion. The ISC S-10 sensor cable shall come pre-assembled with shock vibration sensors installed at regular intervals. Sensitivity shall be software adjustable individually by zone from the central computer keyboard. No field sensitivity adjustments shall be required. The system shall have separate adjustable wind and precipitation compensation settings for each zone from the central computer keyboard. No field adjustments required.

All sensor cable shall be UV resistant to sunlight and rated for direct burial cable. All sensors shall come encased in UV resistant high impact plastic with gold plated internal contact points. All sensor cables shall be fully supervised and an alarm shall be generated if any cable is cut, shorted to ground or each other. A tamper alarm shall be generated if the processor enclosures are opened via enclosure tamper switches.

The processor unit shall include the controller and shall contain all required electronics, standby battery, power supply and other accessories as necessary. The processor unit shall contain power on indicator with power-reset switch.

## **PART 2: Products**

### **2.1 Central Monitoring Computer System**

**Host computer:** Pentium Processor E5300 (2.60 GHZ,2M,800MHZ FSB) with 2GB DDR2 Non ECC SDRAM, Integrated Video, Intel GMA 4500, 80 GB SATA Hard Drive/8MB Data burst Cache, 8X DVD-ROM and color VGA Flat screen Monitor.

The software shall be capable of constantly monitoring the site for intrusions regardless of the operation being performed within the system software. The system software will provide a custom VGA site map with flashing alarm zones, custom digital audio messages for each alarm and on screen video of alarmed zones. The central monitoring computer shall have "data log" retention of alarm activity on the computer hard drive as well as a hard copy printout of alarm activity on the system printer. The site monitoring system shall provide multi-level password access and have software adjustable sensitivity settings for each zone from the central monitoring computer keyboard, no field adjustments required. The site monitoring system shall provide software adjustable wind and precipitation compensation settings for each zone individually from the central

computer keyboard, no field adjustments required. The site monitoring system shall include software adjustable event/condition zoning for each zone or software adjustable dual domain zoning for each zone from the central computer keyboard. Event/condition zoning will allow individual gate zones to be shunted when related activities occur (such as a valid card read from an access control system) during a software programmable "Time Window". The Dual Domain programming shall allow an alarm to be generated only when multiple related activities occur during a software programmable "Time Window".

The site monitoring system shall include manual keyboard access to instantaneous spot weather conditions including current wind speed and precipitation values. Automatic logging of wind speed and precipitation values to the site monitoring system database will take place at software programmable regular intervals. The site monitoring system shall include logged wind and precipitation values taken in real time when an alarm occurs.

## **5.2.2 System Processor**

The system processor shall monitor electronic signals from perimeter sensors and continually analyze and evaluate these signals. The processor shall also analyze inputs from a meteorological device and dynamically calibrate the system for each zone individually during adverse weather conditions to reduce the possibility of weather induced false alarms. The processor shall support relay outputs for each zone and relay outputs for power/communication failure, tamper and one general output relay. The processor shall facilitate a battery backup capable of supplying 24 VDC at 500 ma. The battery will automatically recharge when 120 VAC power is restored. The processor shall require no field calibration and or routine maintenance and adjustment. The processor shall indicate alarms to a central monitoring computer via Ethernet or fiber optic link or RS-232 communication.

## **5.2.3 Sensors And Sensor Cable**

The sensor device shall be shock vibration type, weather resistant and UV protected. The sensor device shall detect in the X, Y and Z axis. The sensor device shall be capable of operating at -55 degree to +155 degree C. All internal contact points shall be gold plated to MIL Spec #MIL-G-45204-B Type 2 Grade C. The sensors shall be weather resistant and come pre-assembled on a multi-conductor cable. The sensor cable shall be an overall foil wrapped UV resistant PVC jacketed cable suitable for direct burial and EMI/RFI protected. Fence sensors shall require no field calibration and or routine maintenance and adjustment.

## 5.2.4 Meteorological Assembly

The meteorological assembly shall be capable of detecting wind speed and precipitation intensity. The meteorological device shall be a fully integrated monitoring sub-system that detects environmental changes resulting from wind or precipitation and supplies the necessary data to the system processor. The output signals from this device shall be transmitted through a communication cable to the processor, which in turn automatically calibrates the system's thresholds for each zone individually according to the weather conditions. The processor shall constantly adjust sensor-operating parameters to minimize the generation of environmentally induced false alarms. Through password control the system operator shall be able to adjust wind and precipitation compensation values separately for each zone individually from the central monitoring computer keyboard.

## 5.2.5 General

- a) **Zone Length**- Recommended 60 Ft. to 400 Ft. With the ability to be installed on fences of chain link or welded mesh construction, concertina, barbed wire, razor ribbon and all types of gates.
- b) **Electrical Components** - Electrical construction shall be with high reliability and wide temperature range components.
- c) **Environmental Conditions** - The perimeter detection system shall be capable of operating to specification in fog, rain, snow or other adverse weather conditions.
- d) **Power Requirements** - 110/220 VAC; 50/60 Hz, backup battery - 24VDC.
- e) **Battery Charger** - Integral to system processor.
- f) **Relay Outputs** - Alarm for each zone, tamper, power/communication failure and one general output relay.
- g) **Supervision** - Opens, shorts, grounds; change in sensor line voltage.
- h) **Sensitivity Control** - Fully software programmable from the central computer keyboard. No field adjustments required.
- i) **Indicators** - Power indicator.
- j) **Lightning Arrestor Package** - Semi conductor transzorsorbs, effective against both high energy and fast rise transients.



INFINITY  
PERIMETER  
SYSTEMS

# ***Perimeter Security System***

**Infinity 2020 “The Smart Wall”  
PRODUCT DATA**

***Section VI: System Test and Checkout***



## ***Section VI: System Test and Checkout***

### **6.1 Introduction**

This section pertains only to the ISC System sensor cable and processor checkout. Prior to system checkout the sensor cable and processor enclosure should have already been installed (See Sections 3 and 4 for installation instructions). The security perimeter should already have been defined and a zone breakdown established. See the drawings supplied by ISC for each site installation.

### **6.2 Requirements for Installers**

Technicians must be trained and certified by Integrated Security Corporation.

### **6.3 Sensor Cable Tests**

To determine that the sensor cable is operationally ready, perform the following procedures:

- 1) **Visual Inspection:** The sensor cable is designed to withstand years of weather and environmental conditions. It is important, however, that you perform a visual inspection of the fence-mounted cable to verify proper installation. During this inspection verify the following:
  - Cable is taut
  - All cable ties are intact
  - End of the line resistor and any splices are properly sealed
  - Cable is free from cuts or abrasions in the outer insulation jacket
  
- 2) **Discontinuity Test:** During the following test, ensure the opposite end of the cable under test does not have conductors making contact with each other. Prior to terminating zones and connecting zone inputs to the Transponder CCA, perform the following discontinuity tests with an ohmmeter capable of reading up to 75M $\Omega$ :

<u>Test Point 1</u>	<u>Test Point 2</u>	<u>Normal Reading</u>
A) Red Center Conductor	Drain Wire	45MΩ to 75MΩ
B) White Center Conductor	Drain Wire	45MΩ to 75MΩ
C) Green Center Conductor	Drain Wire	45MΩ to 75MΩ
D) Yellow Center Conductor	Drain Wire	45MΩ to 75MΩ
E) Blue Center Conductor	Drain Wire	45MΩ to 75MΩ
F) Orange Center Conductor	Drain Wire	45MΩ to 75MΩ
G) Violet Center Conductor	Drain Wire	45MΩ to 75MΩ
H) Brown Center Conductor	Drain Wire	45MΩ to 75MΩ
I) Black Center Conductor	Drain Wire	45MΩ to 75MΩ
J) Red Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
K) White Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
L) Green Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
M) Yellow Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
N) Blue Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
O) Orange Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
P) Violet Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
Q) Brown Center Conductor	All Other Center Conductors	45MΩ to 75MΩ
R) Black Center Conductor	All Other Center Conductors	45MΩ to 75MΩ

If readings are not within the prescribed limits, probable causes are:

- ! A short between the center conductors and the shield
- ! A short between center conductors

3) **Continuity Test:** Zones are terminated with an end-of-the-line resistor between the corresponding color center conductor for that zone and the common black return center conductor. This resistor value is ~~4.7~~ 5.6 KΩ. Each zone has this resistor installed in a junction box at the end of the zone. With a multi-meter, perform the following continuity tests for each cable run prior to connecting the zone inputs to the Transponder CCA:

<u>Test Point 1</u>	<u>Test Point 2</u>	<u>Normal Reading</u>
A) Red Center Conductor	Black Common Return	5.6KΩ
B) White Center Conductor	Black Common Return	5.6KΩ
C) Green Center Conductor	Black Common Return	5.6KΩ
D) Yellow Center Conductor	Black Common Return	5.6KΩ
E) Blue Center Conductor	Black Common Return	5.6KΩ
F) Orange Center Conductor	Black Common Return	5.6KΩ
G) Violet Center Conductor	Black Common Return	5.6KΩ
H) Brown Center Conductor	Black Common Return	5.6KΩ



## ***Infinity 2020 Testing Procedures***

Because the Infinity 2020 system is totally supervised, most problems that affect operation of the Infinity 2020 system generate an immediate alarm. Examples include an open circuit alarm which is generated if the cable is cut or otherwise disconnected. A communication alarm will be generated if communication to any of the Vision Boards installed is lost. Therefore, the required maintenance and testing is minimal.

### **Regular Basis**

#### Fence

Test 3 fence panels in each zone for alarms by simulated climb test and 3 tap test with a large screwdriver in one or more corners of the fence panel. If an alarm is not generated, increase the sensitivity and re-test.

Walk the fence line to visually inspect all cable, sensors, junction boxes and cable ties for wear and to verify that all are securely connected to the fence.

### **Annual**

#### Processor

Verify that a tamper alarm is generated when the cover is opened.

Turn off the AC power in the processor to verify that the power is switched to back-up battery power. The AC LED on the blue power supply board will go off while the CD LED will remain on. Turn the AC power back on.

#### Weather Station

Check the wind speed on the software and compare it to actual conditions to verify that the weather station is operating properly.

## NOTES