INTRUSION ALARM SYSTEMS

General

1. Provide submittal and shop drawings to District Architect for review with Facilities prior to acceptance.

PART 1 GENERAL

1.1 GENERAL AND SPECIAL CONDITIONS

A. General and Special Conditions apply to all work under this section.

B. The Contractor shall furnish all labor, equipment, tools, material, drawings, et cetera, necessary for a complete intrusion alarm system. The system shall be as designed by the Owner. The purpose of the furnished specifications and drawings is to convey to the Contractor the scope of the work required, all of which the Contractor is responsible to furnish.

C. The Contractor shall examine all existing physical conditions which may be material to, or affect, the performance of his work. No extra payments will be allowed made necessary by his failure to do so. Any omission, discrepancy, or lack of clarity shall be promptly identified to the Owner and Engineer for clarification prior to bidding the project.

D. The Contractor shall provide all devices and equipment required by these specifications and drawings. Under no circumstances shall the Contractor omit or delete any devices or equipment without the written directive of the Owner or Engineer.

1.2 DEFINITIONS

A. AHJ – Authority Having Jurisdiction (DSA-Inspector)

B. Approved – Unless otherwise stated, materials, equipment, or submittals approved by the Owner, Architect, or AHJ

C. Communicator – The Control/Communicator

D. Concealed – Hidden from view

E. Contractor – The Company awarded the primary contract for this work and any of its subcontractors, vendors, suppliers, or fabricators.

F. Device – any peripheral equipment including, but no limited to, door contacts, motion detectors, keypads, expansion modules, sounders, etc.

   1. Applied to wiring, conduit, etc. – installed or run above drop ceilings, in chases, inside walls, etc.

   2. Applied to door contacts, installed inside the top of door frames and doors.

G. Dispatch – The San Diego Community College Police Dispatch Center.

H. District - The San Diego Community College District.

I. Engineer – The system designer or engineering company designated by the owner.

J. EOL – End-of-line resistor. Comply with factory instructions for selected equipment.

K. Exposed – Visible or not concealed

1. Applied to wiring, conduit, etc. – installed or run on walls, ceilings, etc. where it is visible.

2. Applied to door contacts, installed on door frames and doors at the top of the door.

L. IAC - Intrusion Alarm Communicator, see 'Communicator' above.

M. Intrusion Alarm System – the entire system including all panels, devices, wiring, etc.

N. Owner – San Diego Community College District.

O. Panel – see 'Communicator' above.

1.3 SCOPE OF WORK

A. The Contractor shall furnish and install, unless otherwise indicated, all items required for a complete Intrusion Alarm System(s) as described in these specifications and drawings.

1. Provide a new, state of the art BOSCH Intrusion Alarm System. This is to include all wiring, communicators, modules, door contacts, motion detectors, keypads, panic/hold-up switches and any other devices and equipment specified either in these specifications or on the blueprints.

2. Provide a network connection for each Panel from the nearest available connection to the District network. Cable to be run by others.

3. Provide an on-site, factory trained technician acceptable to the Owner and AHJ to supervise the installation.

4. Provide an on-site project manager.

5. Conduct weekly progress meetings and issue monthly written job progress reports to the Owner's Representative and Engineer.

6. Submit shop drawings to the Engineer or Owner's Representative for approval by the Engineer and Owner.

7. The contractor shall provide any x-ray of walls or slabs prior to core drilling and any required fireproofing or sealing of the cores.

8. Prior to the final acceptance test and pre-testing by the Contractor, conduct a complete test of the entire system upon completion of the installation to assure the Owner's Representative and Engineer that the system is operational.

9. Conduct the final acceptance test. The Alarm Contractor shall furnish personnel who are familiar with the installation at a time convenient to the Owner's Representative, the Engineer, and the AHJ. This test shall take place as soon as convenient after the completion of the installation and prior to the building being turned over to the Owner for occupation. If necessary, any punch list items shall be corrected and the entire system re-tested at the Contractor's expense prior to final acceptance of the system. The two-year warranty shall begin upon acceptance of the system by the Owner's Representative, the Engineer, and the AHJ.

10. Provide training of the Owner's personnel as required by the Owner. A maximum of two days shall be required for this training.

11. Provide a two-year job site warranty of all materials and labor as specified elsewhere in this section.

1.4 RELATED WORK

A. Materials and work specified in other sections.

1. Fire stopping

2. Basic electrical materials and work

3. Mechanical (heating and air-condition duct locations, etc.)

1.5 SYSTEM DESCRIPTION

A. The BOSCH Intrusion Alarm System shall be a state-of-the-art, networked system and shall be programmable using the District's current software over the District network (WAN).

B. The Intrusion Alarm System shall communicate to Dispatch via the District WAN.

C. Each Alarm Initiation Device shall be on its own zone either on the Communicator or on a zone expansion module connected to the Communicator.

1.6 APPLICABLE STANDARDS

The latest adopted issue of the following standards is hereby made a part of this specification:

A. NFPA 70 – National Electrical Code

B. Uniform Building Code (with California Amendments)

1.7 SUBMITTALS

A. Provide complete product data (including manufacture's descriptive and technical literature) and catalogue cut sheets clearly marked to indicate the model and catalogue number of each device for approval by the engineer and Owner's Representative.

B. Provide shop drawings including building floor plans showing device locations, complete wiring and schematic diagrams, conduit size, wire routing, and field terminations; panel layout including all modules and interconnections with the panel. The shop drawings shall show the proposed layout of

the panel and all peripheral equipment and devices, its location in relation to other equipment in the area, and clearances for maintenance and serviceability. Shop drawings shall be prepared using a minimum scale of 1/8" = 1 foot for plans and ¼" = 1 foot for details.

C. Provide substantiating calculations showing the adequacy of power supplies and back-up batteries. If additional power supplies are required, provide calculations for those as well. All power supplies shall have a minimum of 20 percent additional capacity for later expansion if necessary.

D. Provide submittals within two weeks of notice to proceed. Partial submittals are NOT acceptable and will be returned to the contractor unreviewed.

E. All costs to review additional submittals resulting from an initial rejection shall be the responsibility of the submitting contractor. The Owner shall back-charge the Contractor for additional review(s).

F. Submittals rejected by the Owner's Representative and the engineer shall be corrected and resubmitted within seven (7) days of the review letter date.

1.8 DELIVERY, STORAGE AND HANDLING OF MATERIALS

A. Contractor will deliver all materials to area of project designated by the Owner's Representative. Vehicles shall not block fire lanes or fire doors during delivery of materials

B. Owner will not accept deliveries for the Contractor

C. The Owner's Representative will designate an area within the facility for storage of all materials. At the end of each working day, all materials shall be returned to the designated area. Material, equipment, tools, etc will not be left outside the storage area without the consent of the Owner's Representative

D. The cost of all material handling, delivery and freight is the Contractor's responsibility. The Owner or his representatives will not be responsible for material delivered to the site.

E. Maintain premises free from accumulation of waste materials or rubbish caused by this work. At the end of each day, remove from the site all surplus materials, tools, and all waste. The Contractor shall leave the premises clean to the Owner's satisfaction.

F. The Contractor shall arrange and pay for parking

1.9 WARRANTY

A. The Contractor shall provide a two (2)-year written guarantee against defects in material and workmanship furnished under this Contract. The costs of such guarantee shall be part of the purchase price. The guarantee commences when the Owner's Representative and Engineer accept the system and installation

B. The guarantee shall include all necessary material, travel, labor and parts to replace defective components or materials at the job site. The Contractor shall commence repair of any "in guarantee" defects within 24 hours of notification of such defects.

C. The Contractor shall make allowances in his guarantee to cover diagnosis of system defects, which might ultimately be the responsibility of others to correct. When this occurs, the Owner's

Representative and other affected trades shall be notified.

D. The Contractor shall keep in effect the performance bond for one year after the system has been accepted by the Owner's Representative and the Design Professional

1.10 AS-BUILT DRAWINGS

A. Maintain at the site an up-to-date, marked set of as-built drawings, which shall be corrected and delivered to the Owner's Representative upon completion of the work

1.11 CHANGES

A. No changes are to be made in the installation from the layout unless specifically approved by the Owner’s Representative. This does not include minor revisions for the purpose of coordination of work.

1.12 DAMAGE

A. The Contractor shall be responsible for all damage to the building, its contents, systems, etc. caused by his work during or after installation, testing, clean-up, etc.

1.13 CLEAN-UP

A. Maintain the premises free from accumulation of waste materials or rubbish caused by this work to the Owner's standard for cleanliness. Carpeting shall be protected from damage and clean up will be the responsibility of the Contractor.

B. At the completion of work, remove all surplus materials, tools, etc. and leave the premises clean to the Owner's standard of cleanliness.

1.14 SAFETY

A. All work shall be performed in compliance with the Occupational Safety and Health Act of 1970 (OSHA) and Construction and Safety Act Standards.

1.15 QUALITY ASSURANCE

A. The Intrusion Alarm Contractor shall maintain a fully staffed branch office including application engineers, drafters and technical service personnel within 30 miles of the San Diego metropolitan area.

B. The electrical contractor shall perform installation of all electrical circuits for the Intrusion Alarm System, including wire installation and terminations. The Intrusion Alarm Contractor shall install all intrusion alarm wiring related devices and make all connections associated with them.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Acceptable equipment for this project must be suitable for use with the District Wide Area Network (WAN)

B. Acceptable equipment for this project must be compatible with the Bosch RPS programming software and be downloadable over the District WAN.

C. Acceptable equipment for this project shall have sufficient zone and user capacity to handle the usage for which it is intended.

D. Product data information for alternate products shall be submitted to the Engineer and Owner's Representative within seven (7) days after the pre-bid meeting for product equivalency approval.

E. Products for this project shall be of the latest design; obsolete or discontinued products will not be accepted.

2.2 INSTALLATION MATERIAL

A. Wiring

1. All wiring is to be solid jacketed: stranded wire is not to be used.

2. All field wiring is to be 22-4 solid station wire with a white outer jacket. Conductor shielding shall be Red, Black, Yellow and Green.

3. Wiring between the panel (and peripherals) and the punch blocks shall be 22-10 or 22-12 solid station wire. Conductor shielding shall be Black, Brown, Red, Orange, Yellow, Green, Blue, Violet, Gray, and White. Pink and Tan shielding are the standard for the additional wires for the 12-conductor wire (22-12)

4. All field wiring is to be clearly labeled with permanent marker to be readily identifiable at punch blocks. Each wire is to be labeled with the type of device and its location in such a way as to identify the specific device to which it is connected..

5. No splices shall be made. Cables are to be home run from the device to the panel.

B. Conduit

1. Where used, conduit shall be 1/2" minimum and shall conform to NFPA 70 for the specific application

2. Conduit that is concealed or installed in unfinished areas shall be electric metallic tubing and flexible conduit in conformance with NFPA 70.

3. Conduit exposed to weather shall comply with NFPA 70 and the requirements of the AHJ.

4. All fittings shall be listed and approved for the specific conduit. For threaded rigid steel conduit do not use threadless or compression-type fittings.

5. All EMT conduit fittings shall be steel or malleable iron compression couplings and connectors.

6. Maximum conduit fill shall be fifty (50) percent of that permitted by the California Electrical Code

7. All concealed system conduit shall be blue in color or externally identified at 10-foot intervals, in each space, and at junction box covers, by permanent blue paint suitable for the purpose.

8. Exposed conduit in finished areas shall be plastic wiremold type as specified elsewhere or on the blueprints. Fill shall not exceed fifty (50) percent of its rated capacity. Wiremold not closely matching the surface on which it is installed shall be painted to match the surface on which it is installed.

C. Terminal Cabinets

1. Minimum size shall be 11 inches x 15 inches x 4 inches deep with a hinged lockable cover. For cabinets 24 inches x 24 inches or larger plate covers mounted with tamper resistant screws may be used.

2. Terminal cabinets shall be identified as part of the Intrusion Alarm System on the outside face of the cabinet with an engraved plastic label using ½ inch white letters on a blue background.

D. Plenum Cable

1. Shall be installed per National Electrical Code, Articles 725 and 760.

2. The cable shall be marked with the wire model number, wire gauge, and number of conductors.

3. The cable shall be UL listed for low voltage signaling applications.

2.3 CONTROL EQUIPMENT

A. Communicator (Intrusion Alarm Communicator, Panel)

1. The communicator shall be a Bosch B9512G.
In the event this communicator is no longer available another communicator may be used provided that it has at least the same capabilities and is compatible with the Bosch RAM/RPS programming software. Otherwise the communicator shall be supplied with at least two (2) computers, to be specified by the District IT department and include all software necessary for trouble shooting, upgrading, and programming the new equipment. These computers are to be installed (1 in the College Police dispatch center and the other in the Alarm Technicians' office), programmed and tied into the District network by the contractor in cooperation with the District Alarm Technicians and the District IT department.

2. The communicator shall be capable of communicating to the alarm monitoring system in Dispatch via the District network and include all equipment necessary for such communication.

3. Unless otherwise specified the communicator shall be manufactured by Bosch and be the model specified.

4. The communicator shall be programmable via the District network using the Bosch RPS software.

5. A separate electrical outlet shall be provided for each communicator. The outlet shall be a duplex

type mounted in a single gang box with the grounding terminal at the bottom. Outlets for the alarm systems shall be on a separate dedicated circuit. The circuit breaker shall be clearly marked and have a breaker lock to prevent the breaker from being accidentally turned off.

B. Power Supplies

1. All power supplies shall be designed with a capacity of at least 20 percent more than currently used.

2. If more power is required than is available from the communicator, additional auxiliary power supplies shall be used. Each auxiliary power supply shall be 12 VDC and a minimum capacity of 5 amps. (Altronix LCS5C12X or approved equal.)

3. Back-up power supplies (batteries) shall be of sufficient capacity to operate the system for a minimum of eight (8) hours. A common reference wire shall be provided from the communicator to the power supply.

C. Keypads

1. Keypads shall be Bosch B920 unless otherwise specified.

2. A maximum of eight (8) keypads shall be connected to each communicator.

3. Each keypad shall be assigned a unique address. Where possible the keypad address shall correspond with the area to which it is assigned

D. Modules

1. The Bosch B9512 built-in IP communicator. Used to connect the communicator to the District WAN.

2. Zone expansion module - Bosch B208. Eight (8) zone module used to connect additional zones to the communicator. One required for each additional eight zones or portion thereof in excess of the eight zones available on the main board of the communicator.

3. Relay module – Bosch B308. Used to add additional outputs to the communicator. One is available (relay A) on the main board of the communicator.

2.4 ALARM INITIATING DEVICES

A. Door Contacts – GE/Sentrol 1087T

1. Unless otherwise indicated, are to be surface mount, spdt (form C) type - Sentrol 1087T or approved equal.

2. Flush mounted contacts may only be used where aesthetics is a concern. In aluminum or silver colored frames use USP 270 spdt or approved equal. Under no circumstances are flush mount contacts to be used in steel doors or steel door frames. A printed zone label shall be installed on the door frame above the door contact.

3. Are to be of a color that most closely matches the door and frame on which they are mounted

B. Roll-up Door Contacts – GE/ Sentrol 2207AU

1. Unless otherwise indicated, are to be floor mounted.

2. The magnet is to be mounted magnet side down and may need a mounting bracket for proper orientation.

C. Explosion-proof Door Contacts – GE/Sentrol 2807T

1. To be used where the potential of explosion exists: for example welding gas or gasoline storage areas.

D. Motion Detectors Bosch ISC-BPR2-WP12 motion detector

1. Unless otherwise indicated are to be wall mounted and be of the dual technology (combination PIR and microwave) type – Bosch ISC-BPR2-WP12 motion detector series or approved equal.

2. In very large open areas (fifty feet or more in each direction) a ceiling mounted detector may be used with the approval of the Engineer and Owner's Representative – Bosch ISC-BPR2-WP12 motion detector or approved equal.

3. In all cases, motion detectors are to be of a range appropriate to the area being protected. A printed zone label shall be installed on the door frame above the door contact.

E. Hold-up/Panic Switches

1. Unless otherwise specified, are to be of the latching type using a metal forked key to reset. – Amseco HUS-7AI or approved equal.

2.5 OTHER EQUIPMENT

A. Sounders

1. Minihorns – ATW SGST-W or approved equal.

2. Sirens – ATW 508 or approved equal. Only to be used in area where the ambient noise level is such that a minihorn could not be readily heard.

PART 3 INSTALLATION

3.1 EQUIPMENT

A. General

1. The Contractor shall provide factory trained and authorized personnel for on-the-job supervision of the proper installation of devices in cooperation with, or as may be required by, other trades. This shall include the following:

a. Provide specific on-site instructions to others on mounting and installation of each type of device by

physically observing the installation of one or more of each type of device, as required, to assure that the installer is properly instructed in the work.

b. Provide supervision as required by others to properly perform alarm installation work.

c. Coordinate with the Engineer and District alarm technicians the programming of the communicator and all related equipment.

d. Perform a complete test of the system, certifying that all devices have been activated and that the devices and systems have performed in accordance with the requirements of this specification.

e. Provide as-built layout drawings and detailed wiring diagrams to the Engineer and Owner's Representative.

2. All mounting screws, except those supplied with the equipment, shall be combination phillips/slotted head. When mounting hardware is supplied, the equipment shall be mounted using the supplied hardware where feasible.

3. All communicators, panels, terminal cans, punch blocks, modules, etc. shall be mounted no lower than 48 inches (to the bottom) nor more than 78 inches (to the top) above the finished floor.

4. All Bosch equipment is to only be installed by Bosch trained and certified installers or under the direct supervision of the District Alarm Technicians.

B. Wiring

1. All device wiring is to be home run from each device to the room where the communicator is located or other designated centralized location (such as a remote telecommunications room) and terminated on a 50 pair #66 punch block. Each alarm initiating device (motion detector, door contact, hold-up button, etc.) shall be on its own zone on the communicator. Wiring from the communicator (or modules) is to be on the left side of the punch block. Wiring out to the devices is to be on the right side of the punch block. Connection between the left and right sides shall be made using bridging clips.

2. Loop wiring is to be #22-4 solid white jacket station wire unless otherwise specified. The conductor insulation shall be red, black, yellow, and green. The red/black combination is to be used for power only. Each wire is to be labeled at the punchblock with the type of device and its location in such a way as to identify the specific device to which it is connected.

3. Loop wiring for devices not requiring power shall be yellow/black for the primary loop and, if a second loop is used on the same wire, red/green for the second loop. The yellow (or red) shall be the loop feed and the black (or green) shall be the loop return or common.

4. Motion detectors and other devices requiring power shall use the red as positive power, black as negative power, yellow as loop feed, and green as loop return or common.

C. Communicator

1. The communicator is to be mounted on a ¾" plywood backboard using four #10, ¾" or 1" long, pan head screws with combination flat/Phillips head using the cabinet furnished by the manufacturer of the communicator.

2. Wiring from the punch block to the communicator shall be #22-10 or 22-12 solid station wire. If 22-12 is used the tan and pink wire may not be utilized. Conductor insulation colors shall be as listed below. Wires shall be run and be connected as follows:

	Wire	Use	(7412)	(9412)
Black	Common (#12)	-Power	(#29)	(#29)
Brown	Zone #1 (#11)	Zonex 2 out	()	(#26)
Red	Zone #2 (#13)	+ DC Power	(#32)	(#32)
Orange	Zone #3 (#14)	Zonex +Power	(#32)	(#24)
Yellow	Zone#4 (#16)	Data Out	(#31)	(#31)
Green	Zone #5 (#17)	Data In	(#30)	(#30)
Blue	Zone #6 (#19)	Zonex 2 in	()	(#25)
Violet	Zone #7 (#20)	Zonex 1 out	(#28)	(#28)
Grey	Zone #8 (#22)	Zonex 1 in	(#27)	(#29)
White	Common (#12)	Zonex -Power	(#29)	(#23)

3. Zone expansion may be accomplished by using a Bosch B208 OctoPOPIT 8-zone module for each additional 8 zones or portion thereof. Up to eight OctoPOPITs may be used for the 7412 or 15 per Zonex loop (30 total) for the 9412.

D. Modules

1. Bosch B208 OctoPopit

a. This is an 8-zone expansion module used for adding addition zones to the Communicator. One module is needed for each additional eight (8) zones or portion thereof.

b. Bosch B208 OctoPOPIT modules may be added to the communicator. Each OctoPOPIT must be programmed sequentially (i.e. the first for zones 9 thru 16, the second for zones 17 thru 24 etc.) prior to power up. All zones on each OctoPOPIT require an EOL resistor.

c. If installed remotely, may need to be wired directly to the Zonex loop on the main board of the communicator without going through a punch block. If more than one OctoPopit is used, the jumper supplied with the unit may be used to interconnect the additional units.

d. Wiring between the OctoPOPIT and the punch block shall be 22-10 or 22-12 (see Communicator above) solid wire and connected as follows:

Brown	1st Zone (9, 17, etc.)	Loop Feed
Red	2nd Zone (10, 18, etc.)	Loop Feed
Orange	3rd Zone (11, 19, etc.)	Loop Feed
Yellow	4th Zone (12, 20, etc.)	Loop Feed
Green	5th Zone (13, 21, etc.)	Loop Feed
Blue	6th Zone (14, 22, etc.)	Loop Feed
Violet	7th Zone (15, 23, etc.)	Loop Feed
Gray	8th Zone (16, 24, etc.)	Loop Feed
Black	Common	Loop Return
White	Common	Loop Return

2. Bosch B308 Relay Module

    a. This is an 8-relay output module. One module is needed for each additional eight (8) outputs or portion thereof.

    b. Each module needs to be programmed prior to power up.

    c. If used for minihorns, the relay address must correspond with the address of the keypad with which the minihorn is associated.

    d. If used for minihorns do not use relay A on the main board for a keypad associated minihorn, use the corresponding relay from the D8129 instead.

    e. Install a jumper wire from the positive (+) power terminal of the D8129 to the common terminal of each relay.

    f. Use the same wiring configuration as for the D8128D OctoPopit (section 3.3.A.3 above). Connect the black and white (common) wires to the negative (-) power terminal on the D8219 and the 'loop' wires to the Normally Open (NO) terminal for each relay.

3. Bosch B9512 Communicator

    a. To be programmed by the District alarm technicians.

E. Keypads

1. Keypads shall be mounted 48 inches above the finished floor maximum to the highest operating component of the keypad.

2. Wire to the keypads shall be 22-4 and have the specified colors from the SDI bus tied to the corresponding colors on the keypad harness.

3. A minihorn shall be installed directly above each keypad either four (4) feet above the keypad or maximum of 12 inches (to the bottom of the minihorn) below the ceiling, whichever is lower.

F. Door Contacts

1. Door contacts shall be installed on (or in) the door frame approximately four (4) inches from the latch side of the door.

2. The yellow and black wires are to be used. The red and green wires are spares and may be cut off at the contact. If a second contact is connected to the same wire the red and green wires may be used for the second loop.

3. The yellow (or red) wire shall be tied to the Closed Loop (CL) terminal and the black (green) wire to the Open Loop(OL) terminal.

4. The EOL shall be installed between the Open Loop (OL) and Common terminals on the contact.

G. Motion Detectors

1. Unless otherwise specified motion detectors shall be installed using #6 pan head sheet metal screws seven feet six inches (7'6") to eight feet (8') above the finished floor or six inches (6") below the ceiling whichever is lower measured to the top edge of the detector.

2. The motion detectors shall be installed in such a way as to cover the area for which they are intended to protect (e.g. windows). If necessary they are to be corner mounted or mounted using swivels designed for use with the motion detector.

3. Motion detectors shall be wired as follows:

Conductor	Punch Block	Contact
Red	+ DC Power	Positive power (+) terminal
Black	- DC Power	Negative power (-) terminal
Yellow	Loop Feed	Closed loop (CL) terminal
Green	Loop Return	One side of the tamper switch

4. The EOL shall be tied between the Common alarm terminal and the opposite side of the tamper switch from the green wire.

H. Panic/Hold-up Switches

1. Panic/Hold-up switches shall be installed in such a way as to prevent accidental activation of the switch. They should not be mounted facing directly out or up, unless specifically designated.

2. The same wiring scheme shall be used as for door contacts (section 3.4 above)

I. Sounders

1. Sounders shall be mounted directly above each keypad either four (4) feet above the keypad or maximum of 12 inches (to the bottom of the minihorn) below the ceiling, whichever is lower and elsewhere as indicated.

2. A 22-4 wire shall be used to connect the sounder to the relay.

3. The red wire shall be for the positive (+) power and tied to the positive terminal on the sounder. The black wire shall be for the negative (-) and be tied to the negative (-) terminal on the sounder.

4. For sounder circuit requiring greater power (multiple minihorns, sirens, etc.) the yellow wire may be tied in parallel with the red wire and the green wire in parallel with the black wire. In such cases the red and yellow wires shall be twisted together as shall the black and green wires.

J. Other Devices

1. Other devices not requiring power shall be installed per manufacturer's instructions or as directed by the District Alarm Personnel. The same wiring scheme shall be used as for door contacts (section 3.4.B through 3.4.D above).

2. Other devices requiring power (such as glass break detectors) shall be installed per manufacturer's instructions unless otherwise specified or instructed by the District Alarm Personnel. The same wiring scheme shall be used as for motion detectors (section 3.5.D above).

3.2 TESTING / QUALITY CONTROL

A. The final alarm acceptance test shall be coordinated with the Owner's Representative and the Engineer. A letter certifying that the installation is complete and fully operational shall be forwarded to the Owner and Engineer.

B. The Contractor, the Engineer, Owner's Representative, and an authorized representative from each supplier of equipment shall be in attendance at the final acceptance test to make necessary adjustments. The final test shall include, but not be limited to:

1. A test of the complete system for grounded, open and shorted circuits.

2. A test of each device for functions specified and for the required alarm actions.

3. All communications equipment shall be tested to ensure that all signals are received the SDCCD Police Dispatch Center. This includes, but is not limited to, all network and digital communications.

4. A test of the system for electrical supervision.

5. A test to verify that the emergency power source (back-up battery) is capable of operating the system for specified periods.

6. A test to verify that the system will operate under specified trouble conditions.

7. A test to verify that the system will perform all specified tasks

8. A test to verify that a hard copy of all required system actions will be properly provided.

C. A minimum of 2 day(s) may be required for these tests.

D. If the system requires a retest by the Engineer or Owner's Representative, all costs for the retest shall be the responsibility of the Contractor.

E. The Contractor shall pay all overtime pay required by the Owner's Representative for witnessing the acceptance test.

3.3 TRAINING

A. Provide training of Owner's personnel in the proper operation procedures. The training program for the Owner's personnel shall include the following:

1. Operations and Maintenance Manuals containing complete operating instructions, outline step-by-step procedures required for system start up, operation, and shut down, including the manufacturer's name, model number, service manual, parts lists, and brief description of all equipment and their basic operation features. Complete maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, trouble-shooting guide, and as-built blueline drawings of the complete system, including conduit layout, equipment layout, device labels, and simplified wiring and control diagrams of system. Operations and Maintenance Manuals shall be submitted and approved prior to conducting the training course.

2. Three separate 2-hour training sessions for operating personnel. The sessions are to cover proper

operating and response procedures. These instructions shall be sufficient to enable an untrained person to properly operate the system.

3.4 AS-BUILTS

A. Provide a complete set of reproducible, two (2) blue line prints, and a set of disks in AutoCAD of the drawings and wiring diagrams reflecting "as-built" conditions.

B. Provide a complete set of "as-built" data sheets for all equipment connected to the system.

C. Provide complete “as-built” software for all relevant components.

D. All items of this section shall be provided prior to final payment request.

3.5 SPARE PARTS

A. All spare parts shall be directly interchangeable with the corresponding components of the installed system

B. The following spare parts shall be furnished to the Owner. Quantities shall be five (5) percent of the total of all devices installed, but no less than one (1) of each.

1. Door contacts
2. Motion detectors (of each type)
3. Panic/Hold-up witches
4. Keypads
5. Expansion modules
6. Any other device(s) specified

END OF SECTION