

# LIGO Laser Safety Interlock Plan

The goal of the laser interlock is to provide a system of positive access controls that positively prevents exposure to harmful laser beams. It must also accommodate our required operations without unnecessarily impeding them.

The plan is to:

- Exercise full control over Laser Hazard areas, LVEA and VEAs.
- Permit or deny entry to Laser Hazard areas with the use of access cards.
- Restrict entry to PSL, ISC tables and End Transmission Monitors only to Registered Laser Users.
- Use Activity logs to generate Time and Activity sheets.
- Monitor alarms triggered by predefined events.
- Track and record the activities of all Basic Laser Trained personnel in the Laser Hazard Areas.
- Monitor every activity, every card transaction and maintain logs with complete statistics.

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**This will be accomplished by using the encoded information of an access card read by a reader**

Information is transmitted from the readers through the system wiring to an electronic control unit for evaluation. Access is then granted or denied after the electronic control unit has confirmed the information as valid and checked it against its authorization profile. Authorization profiles actually define the ability of the encoded card number to gain access throughout the Laser Hazard Areas based on one or more of the following criteria:

- Access level
- Door
- Time of day
- Day of week
- Time schedule
- Previous events (i.e., a table enclosure left open)
- Alarm conditions

If the information has passed these checks, then access is granted by means of a signal or contact closure that allows passage through the entry way or access to a laser enclosure. If the information is not valid, the system response may range from denial of entry to dispatching guards.

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The system will provide a central point of control using the facility monitoring computer in the Control Room, and will monitor all card reader transactions and alarm inputs. It will incorporate an Anti-Passback feature, which prevents successive use of one card to pass through any door in the same direction. Anti-Passback is the term describing the act of passing a card back to another person for the purpose of unauthorized access. To attain this type of protection, a separate reader is required at each entry and exit point. The doors which personnel pass through are those entering our three VEAs (LVEA, X and Y endstations) as well as the PSL enclosure in the vertex. Operationally, the system will view the laser table enclosures as passage doors. The logic of the system is straightforward. To enter a VEA, an authorized person will hold their passcard ~3" from the cardreader located on the wall adjacent to the entrance door. The LED indication will change from red to green, signaling that the person may enter the VEA without triggering an alarm. Imagine now that the same person intends to work on one of the ISC tables. Before opening the table enclosure's door, he will need to hold his passcard near the cardreader at the table. If the authorization profile is met, the system will respond with a green LED and the table enclosure contacts will be disarmed permitting the doors to be opened without generating an alarm. Here is where the Anti-Passback feature comes into play. Suppose our user completes his task, and attempts to leave the LVEA without rearming the table enclosure.

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At the exit door the system will not yield a green LED when the passcard is offered. This is the reminder that he must retrace his steps and rearm the laser table. Likewise, assume the user wants open the PSL table for a moment to change the laser power. If he has not rearmed the first enclosure, he will not receive a green LED when he attempts to open the second. Neither of these sequences will generate an alarm, unless the user ignores the lighted indication and exits the LVEA or opens a second enclosure.

The system will not prevent a second user from independently opening another table enclosure, but it will prevent a single user from opening multiple enclosures simultaneously. If an individual operator needs to open multiple laser table enclosures simultaneously, they will need to coordinate this through the Laser, or Site Safety Officer and the monitoring computer in the Control Room will be used to permit the required activities.

The system may also be used to automatically enable the Laser Safety Warning Signs when an enclosure is opened, or to automatically direct the LVEA dome cameras to the location of an alarm trigger.

# Proximity Readers and Cards by Motorola-Indala

Proximity is the most User Friendly card access technology on the market today. Motorola-Indala has been a pioneer in this field since its inception.

Motorola provides a full array of card readers (with varying read ranges) and a complete selection of cards and tags. Cards are available in standard format or in the Direct Print format for high volume Photo-ID badging applications. Key chain mountable tags are also available. Proximity Readers and Cards are preferred because they are extremely User Friendly (many times you don't even need to take them out of the wall or purse), vandal-resistant, secure and reliable. They can be individually coded and canceled, and can be used with most access control panels. Note: Read range shown below with photos is achievable with ASC-121T hard plastic lifetime cards. Range with other cards and tags will be lower.



## Contact-less Operation

Long Life and secure. No wear & tear. Can hide reader behind wall to make it vandal resistant.

## Easy to Use

Extremely user friendly. Don't even have to take the card out of the wallet or purse.

## Card + Code Models Available

Models available to handle higher security applications requiring card+code access control.

## Low Power Consumption

Easy operation with most panels. Up to 500 ft. cable runs possible.

## Audible Read Indicator

Audible alert offers feedback every time the card is used.

## LED Indicators

Multicolor LED indicators offer status and diagnostic data.

## Unique ID Codes

Up to 137 billion unique codes available. 26, 30, 32 bit or other data formats available.

## Indoor or Outdoor

Designed for indoor or outdoor operation, in extreme weather conditions.

## Thin Cards

Direct print PVC Cards are almost as thin as the credit cards for ease in handling.

## Combined Photo-ID Cards

Can print directly on cards designed for dye-sublimation printers.

## Key Tags

Special tags can fit on a key chain but perform like a card.

## UL / CSA Approved

Tested for safe use in most applications. Worldwide.



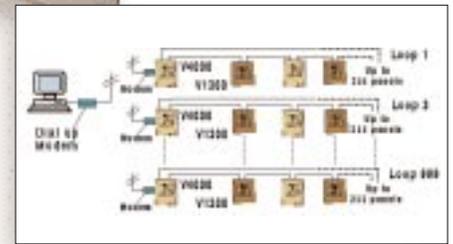
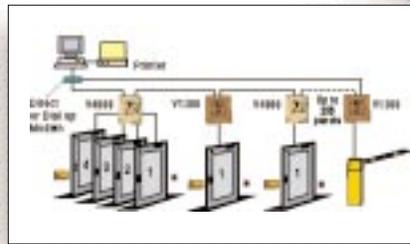
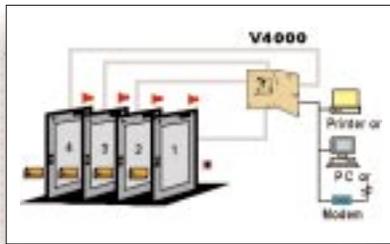
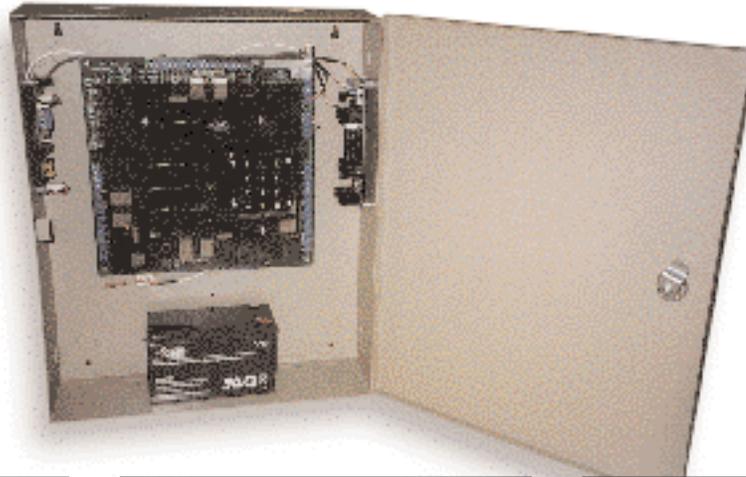
**One Amtel Plaza**  
 1691 NW 107 Avenue  
 Miami, FL 33172-2738  
 (305) 591-8200  
 1-800-22AMTEL  
 Fax: (305) 470-AMTEL  
 e-mail sales@amtel-security.com

For detailed specifications on this product, visit:  
[www.amtel-security.com](http://www.amtel-security.com)

# Voidex 4000 Access Control & Monitoring Panel

Full Control of up to four (4) doors. Stand-Alone or PC operation.

The Voidex 4000 Access Control Panel offers up to 4 Wiegand ports, up to 2 serial ports, 16 inputs and 16 outputs to provide all the control that may be required at any four doors or gates. It can be used on a Stand-Alone basis or can be on-line component of a larger PC-controlled facility management system. All decisions are made at the panel, making it a truly distributed system. The built-in programming keypad gives it full control in stand-alone mode and is available as a back-up in an On-Line system in case communication between the computer and panel is lost. The Voidex 4000 uses a powerful micro-computer along with all the peripherals like crystal clock, powerfail protected memory, time zones, time clocks (Y2K compliant), access levels, individual or group void ability, LED feedback, 16 inputs, 16 outputs, transaction buffer and surge protection. It can accept devices with practically any technology (Bar Code, Magnetic Stripe, Proximity, Code, Clicker, Biometric & Wiegand) provided they have a Wiegand or serial interface.



## Complete 4 Door Control

Panel supports 4 doors completely with readers, free egress, relays, door monitor contact, etc.

## Multiple Outputs

Panel provides up to 16 individually programmable outputs (8 Relays & 8 Transistors).

## Multiple Inputs

16 User-Defined inputs with flexible programming of Input / Output relationship.

## Built-in Keypad Programmer

Allows full programming and diagnostics at panel level. Also usable for backup in on-line systems.

## Stand-Alone, Dial-Up or On Line

Control from 4 doors to 1020 doors in practically any configuration that fits your needs.

## 4000 Card Memory

Sufficient memory to store all data for up to 4,000 users. Higher memory available on a custom basis.

## 1500 Transaction Memory

Buffer can store the last 1500 transactions for later retrieval by PC.

## Time Zones

255 multiple slot time zones with 7 day + Holiday programming ability.

## Unlimited Access Levels

Practically unlimited Access Levels can be used to control doors or zones.

## Mix & Match V1300/V4000

Use either of the panels as needed in the system to minimize equipment and installation costs.

## Flexible I/O Programming

Very flexible and versatile programming based on input, time, event, Card # or door number.

## Anti-Passback 3 Ways

Hard APB (No Entry) Soft APB (Entry w/ notification) or Timed APB (up to 70 min.) to meet specific application.



**One Amstel Plaza**  
1691 NW 107 Avenue  
Miami, FL 33172-2738  
(305) 591-8200  
1-800-22AMTEL  
Fax: (305) 470-AMTEL  
www.amstel-security.com  
e-mail sales@amstel-security.com

For detailed specifications on this product, visit:  
[www.amstel-security.com](http://www.amstel-security.com)

**JOHN KERN - L I G O**  
**Access System**

Proposal: 7400-99

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**METROPOLITAN ELECTRONICS**

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***SYSTEM DESIGN***

This proposal covers the installation of the access control system as follows.

- A. Main entrance to equipment area. (reader and magnetic lock.)
- B. Entrance door to laser room (door strike and reader)
- C. Laser table (connection to customer owned switches and installation of a new reader) This reader will shunt the contact that is used to drop the damper to block the laser if there is a valid card swipe when the door is open, the system will re-arm when there is swipe on the second reader.
- D. 4 Laser tables in the equipment area (install two contacts on two doors and one card reader per table) these will operate the same as C.
- E. The software to operate the system is windows 95 or 98 compatible. The computer does not have to be on line to operate the systems. The computer is used to download information that has been stored and to update schedules or card changes.

I have been given assurances by the factory that the system will operate as we discussed.

THIS SYSTEM DIFFERS FROM THE OTHER IN THAT IT WILL TAKE A SWIPE FROM A SECOND READER TO RE-ARM THE SYSTEM ON EACH TABLE. THERE WILL ALSO BE A SECOND READER INSTALLED AT THE ENTRANCE DOOR TO EXIT THE ROOM. THIS WILL BE SETUP WITH A FEATURE CALLED ANTI-PASSBACK THAT WILL ONLY ALLOW THE CARD TO BE USED IN A CERTAIN SEQUENCE AS FOLLOWS.

1. When entering the large room the individual will swipe his card to gain entry into the area. If the person does not go into the laser boxes he or she will be able to exit the area with their access card.
2. When entering the large room the individual will swipe his card to gain entry into the area. If they swipe their card to disarm a laser box they will have to swipe their card through the arming reader when finished or the system will not allow them to leave the main room through the exit reader.

This system should insure against anybody leaving a laser box disarmed when they leave.

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**METROPOLITAN ELECTRONICS****ACCESS SYSTEM - Zone 1**

The customer is to provide ac power for the main controls

**GENERAL FACTS ABOUT THE ACCESS SYSTEM**

- 1 It can be programmed by an an IBM compatible computer using windows or NT.
- 2 Does not have to be online with the computer to operate. The controllers will automatically download the information to the computer during off peak hours.
- 3 It will automatically lock and unlock doors at predetermined times by date to include special holiday schedules. This is done on a per door basis.
- 4 Individuals can have access to doors on a 24 hour basis or by time and date. (8:00 to 5:00 Monday through Friday and 8:00 to 12:00 Saturday) This feature allows you to tailor the system to shift work by only allowing employees in on their shifts.
- 5 The card can be used as an I.D. with the addition of a picture.
- 6 The systems is expandable to photo I.D. badging if required at a later date.
- 7 Total capacity of system is dependent upon the number of controllers.
8. The controllers can be direct wired on an open port or use modems if required.

4 ea	AMTEL - 311-4K - 4 DOOR CONTROLLER	1,696.00	6,784.00
	4 Door panel including 256 time zones, 100 access levels, 16 inputs, 16 outputs, time clock controlled time zones, buffer memory, built in programming keypad, use as stand alone or up to 64 units interconnected. Supports Proximity, Weigand, Barcode, Magnetic Stripe, Laser Scanner, Vehicle I.D. , RF/IR Transmitters, Ba Fe and Biometric devices.		
5 ea	AMTEL - 331-CLIF - HARDWIRE MODEM	191.00	955.00
	extends inhouse wiring connection too controller up to 4000'		
14 ea	AMTEL - 221-500 - PROXIMITY READER	423.00	5,922.00
	proximity card reader wiegand shape		
100 ea	AMTEL - 222 - PROXIMITY CARD		334.40
	proximity card reader wiegand shape		

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**Access System**

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**METROPOLITAN ELECTRONICS**

1 ea	AMTEL - 342-AMWATCH - WINDOWS 95 & 98 PKG.	1,034.69	1,034.69
1 ea	SECURITY DOOR CONTROLS - 491 - EMERGENCY DOOR RELEASE	187.38	187.38
10 ea	SYSTEK - DOOR CONTACT - DOOR SWITCH	82.50	825.00
2	SYSTEK - DOOR STRIKE - DOOR STRIKE	681.25	1,362.50
1 ea	SYSTEK - POWER SUPPLY - 12 VOLT POWER SUPPLY	125.00	125.00
2500 ft	WIRE & CABLE - 5504FE - 6 COND 22 SHIELDED	0.98	2,446.46
1000 ft	WIRE & CABLE - 8010WHT - 4 CONDUCTER STATION WIRE 22 gauge	0.89	893.33
5 ea	BATTERY - PS12V7 - 12 VOLT 7 AMP HOUR	48.50	242.50
		Unit	Total
ACCESS SYSTEM INSTALLED TOTAL:			\$21,112.26

**REMOTE END OF WINGS - Zone 2**

This area will cover the installation of readers on the lasers at the end of the tunnels. They would be set up basically the same as the other tables but there would only be one door to each end. They would operate the same as the other tables. to in

8 ea	AMTEL - 221-500 - PROXIMITY READER proximity card reader wiegand shape	373.00	2,984.00
2 ea	AMTEL - 311-1K - 4 DOOR CONTROLLER 4 Door panel including 256 time zones, 100 access levels, 16 inputs, 16 outputs, time clock controlled time zones, buffer memory, built in programming keypad, use as stand alone or up to 64 units interconnected. Supports Proximity, Wiegand, Barcode, Magnetic Stripe, Laser Scanner, Vehicle I.D. , RF/IR Transmitters, Ba Fe and Biometric devices.	1,346.06	2,692.12
2 ea	AMTEL - 331-CLIF - HARDWIRE MODEM extends inhouse wiring connection too controller up to 4000'	116.00	232.00
2 ea	FIBER OPTIONS - 2243D1-R/155 - FIBER RECEIVER/SINGLE M	2,745.00	5,490.00
2 ea	FIBER OPTIONS - 2243D1-T155 - FIBER TRANSMITTER/SINGLE M	2,745.00	5,490.00
		Unit	Total
REMOTE END OF WINGS INSTALLED TOTAL:			\$16,888.12

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### Access System

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## METROPOLITAN ELECTRONICS

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### PRODUCT SUMMARY

- 22 ea **AMTEL - 221-500 - PROXIMITY READER**  
proximity card reader wiegand shape
- 100 ea **AMTEL - 222 - PROXIMITY CARD**  
proximity card reader wiegand shape
- 2 ea **AMTEL - 311-1K - 4 DOOR CONTROLLER**  
4 Door panel including 256 time zones, 100 access levels, 16 inputs, 16 outputs, time clock controlled time zones, buffer memory, built in programming keypad, use as stand alone or up to 64 units interconnected. Supports Proximity, Weigand, Barcode, Magnetic Stripe, Laser Scanner, Vehicle I.D. , RF/IR Transmitters, Ba Fe and Biometric devices.
- 4 ea **AMTEL - 311-4K - 4 DOOR CONTROLLER**  
4 Door panel including 256 time zones, 100 access levels, 16 inputs, 16 outputs, time clock controlled time zones, buffer memory, built in programming keypad, use as stand alone or up to 64 units interconnected. Supports Proximity, Weigand, Barcode, Magnetic Stripe, Laser Scanner, Vehicle I.D. , RF/IR Transmitters, Ba Fe and Biometric devices.
- 7 ea **AMTEL - 331-CLIF - HARDWIRE MODEM**  
extends inhouse wiring connection too controller up to 4000'
- 1 ea **AMTEL - 342-AMWATCH - WINDOWS 95 & 98 PKG.**
- 5 ea **BATTERY - PS12V7 - 12 VOLT 7 AMP HOUR**
- 2 ea **FIBER OPTIONS - 2243D1-R/155 - FIBER RECEIVER/SINGLE M**
- 2 ea **FIBER OPTIONS - 2243D1-T155 - FIBER TRANSMITTER/SINGLE M**
- 1 ea **SECURITY DOOR CONTROLS - 491 - EMERGENCY DOOR RELEASE**
- 10 ea **SYSTEK - DOOR CONTACT - DOOR SWITCH**
  
- 2 **SYSTEK - DOOR STRIKE - DOOR STRIKE**
- 1 ea **SYSTEK - POWER SUPPLY - 12 VOLT POWER SUPPLY**
- 2500 ft **WIRE & CABLE - 5504FE - 6 COND 22 SHIELDED**
- 1000 ft **WIRE & CABLE - 8010WHT - 4 CONDUCTER STATION WIRE**  
22 gauge

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## Access System

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### METROPOLITAN ELECTRONICS

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#### AREA SUMMARY

ACCESS SYSTEM - Zone 1	\$21,112.26
REMOTE END OF WINGS - Zone 2	\$16,888.12

	<u>System Price</u>
<b>Products:</b>	38,000.39
<b>Installation:</b>	0.00
<b>Parts &amp; Materials:</b>	0.00
<b>Sub Total:</b>	\$38,000.39
<b>Tax:</b>	0.00
<b>Grand Total:</b>	\$38,000.39