START-UP MANUAL

RS-200/300/400

Radiation Portal Monitoring Systems

START-UP MANUAL

Part Number P-1327.02.00

Revision 2.0

RADIATION SOLUTIONS INC.

A New Generation of Radiation Detection Technology

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Revision History			
Date	**Rev level**	**ECO #**	**Description**
May 30, 2010	00.00	NA	Separated from Install manual and cleaned up
Jun 2010	01.04	NA	Fine tuning
June 2010	01.05	NA	Added check sheet
Oct 2010	01.06	NA	review
Dec 2010	01.07	NA	General fix-up
Dec 2010	01.07	NA	Added CB s/w notes as an Appendix
Apr 2011	01.08	130	OS wiring color changes
Sep 2011	01.09	NA	Extra OS details, improved start-up, added new DataCentre setup capability, Grounding details
Sep 2011	01.09	NA	Improved OS figures
Jan 2013	01.10	NA	Update with current data and change document format
Apr, 2013	02.00	NA	Current Release, remove version level from Rev History

Product Manual - Disclaimers:

Due to our efforts to continuously improve this product; specifications, dimensions, operating features and procedures described in this manual are subject to frequent changes. The printed version of this manual reflects only the configuration current at the time of printing. The most current version of the manual is provided in electronic format on the Product Support CD supplied with the instrument. Please refer to the electronic version of the manual for the most accurate interpretation.

RS-200/300/400 - MANUALS in this series:

a) **P-1324** – INSTALLATION manual
b) **P-1327** – START-UP manual
c) **P-1323** – OPERATORS' manual
d) **P-1322** – RSO manual
e) **P-1328** – MAINTENANCE manual

CONFIDENTIAL DISCLOSURE

USERS ARE HEREBY NOTIFIED THAT THIS MANUAL CONTAINS TECHNICAL INFORMATION OF A PROPRIETARY NATURE. THIS INFORMATION IS NECESSARY FOR TECHNICALLY KNOWLEDGEABLE USERS TO UNDERSTAND SYSTEM OPERATION AND TO SATISFY THEMSELVES THAT THE SYSTEM IS PERFORMING CORRECTLY.
RADIATION SOLUTIONS INC ACCEPTS THAT IT IS THE RIGHT OF SUCH USERS TO BE PRIVY TO THIS INFORMATION. HOWEVER THIS DOCUMENTATION IS PROVIDED SOLELY FOR THE BENEFIT OF OWNERS OF THE RS-200/300/400 SYSTEM AND DISSEMINATION OF THE DETAILED TECHNICAL INFORMATION PROVIDED MAY BE CONSIDERED AS LEGALLY CONTRAVENING THE NORMAL SUPPLIER/CUSTOMER RELATIONSHIP.

UNAUTHORIZED RELEASE OF DETAILED TECHNICAL INFORMATION TO A THIRD PARTY WILL BE CONSIDERED AS A CONTRAVENTION OF USER AGREEMENTS.

Manufactured by Radiation Solutions Inc, 386 Watline Ave, Mississauga, Ontario, Canada, L4Z 1X2

Table of Contents

1.0 INTRODUCTION

1.1 General

This manual is intended for use after the system has been physically installed and all of the conduit, cables and wire pulled.

Subjects covered are cable TERMINATION, System Start-up, System Verification, DataCentre Installation and LAN connectivity.

1.2 Acronyms

The following Acronyms are used throughout this manual:

Hardware	**SDM**	Steel Detector Module
	SIM	Steel Interface Module
	SIB	Steel Interface Board
	VPM	Vehicle Presence Module
	SCT	Steel Controller Termination
	CPU	Computer Processing Unit
	LED	Light Emitting Diode
	OS	Optical Sensor
	TLC	Traffic Light Controller
	UPS	Uninterruptable Power Supply
	RCV	Receiver
	XMITTER	Transmitter
	XFORMER	Transformer
	S.S.	Stainless Steel
Connections	**AUX**	Auxiliary
	DB9	RS-232 9 pin Connector
	RJ45	Ethernet Connector
	ETH	Ethernet
	GND	Ground
	PWR	Power
	AC	Alternating Current
	TRM	Termination
	COMM	Communication
General Names	**RSI**	Radiation Solutions Inc.
	RSX	Radiation Solutions Detector

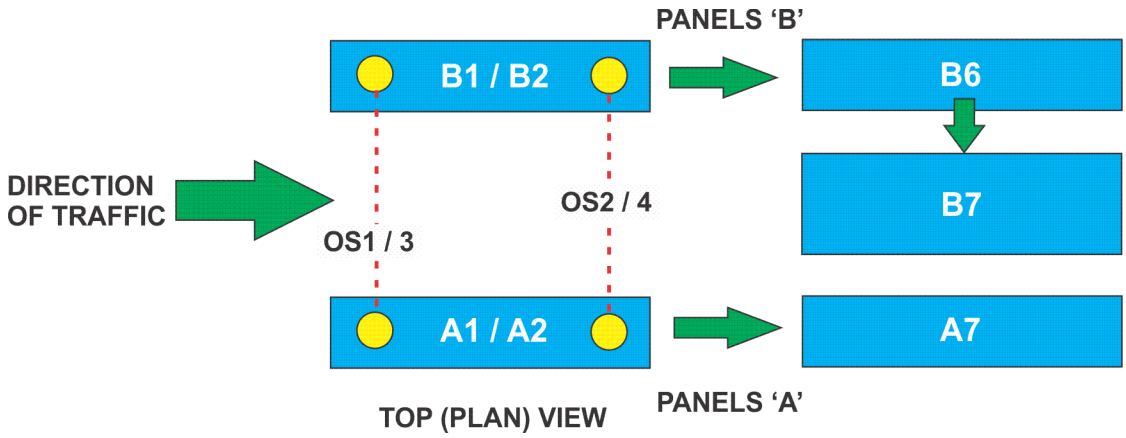
2.0 SYSTEM STARTUP

The following assumes that all Site Preparation work has been completed as per the INSTALLATION manual.

2.1 Detector Labeling Conventions and Configurations

NOTE: RSI LABELS ALL DETECTORS PRIOR TO SHIPMENT AS **A1, A2, B1, B2** etc. USERS SHOULD CLEARLY IDENTIFY THESE LABELS PRIOR TO INSTALLATION TO ENSURE THAT THE APPROPRIATE CONFIGURATION IS ESTABLISHED. USERS ARE URGED TO FOLLOW THE PROPER CONVENTION TO AVOID THE DETECTORS FROM BEING "MIXED UP" AS THIS WOULD MEAN ADDITIONAL UNNECESSARY WORK.

The detector orientation and labeling are important to be standardized to ensure that future tech support fully understands detector positioning and labeling. For this reason – RSI has adopted a Standard Convention shown in the figure below.



Mount Detector **A1** - on the PASSENGERS (NA), (or the DRIVERS (EURO)) side as they enter the plant as shown.

NOTE: The figure above shows the standard detector naming convention.

2.2 Detector Orientation

The following figure illustrates the proper positioning of the detectors. Up to 7 detectors can be connected to each side (A or B). Detector side **A** or **B** is established by the detector connector on the SCT CCA in the Controller. The factory electronically addresses each detector with a specific number (Detector #1 to 7) and they must be connected in that sequential order.

It is imperative that the detectors are configured correctly so that RSI-Service can assist you in troubleshooting and for correct parts replacement.

The following sequence should achieve success:

a) All detectors shipped from RSI have a detector designation predefined, labels are placed on the detectors to facilitate installation, they are labeled A1, B1...C7 etc. as required.

b) Figure 2-1 shows the correct designations – **NOTE that the figure shows a vehicle ENTERING the detector poratl on the way INTO the plant**. A (5 detector) system is shown to cover most possibilities, note that a 2 detector system would only be detectors A1 and B1.

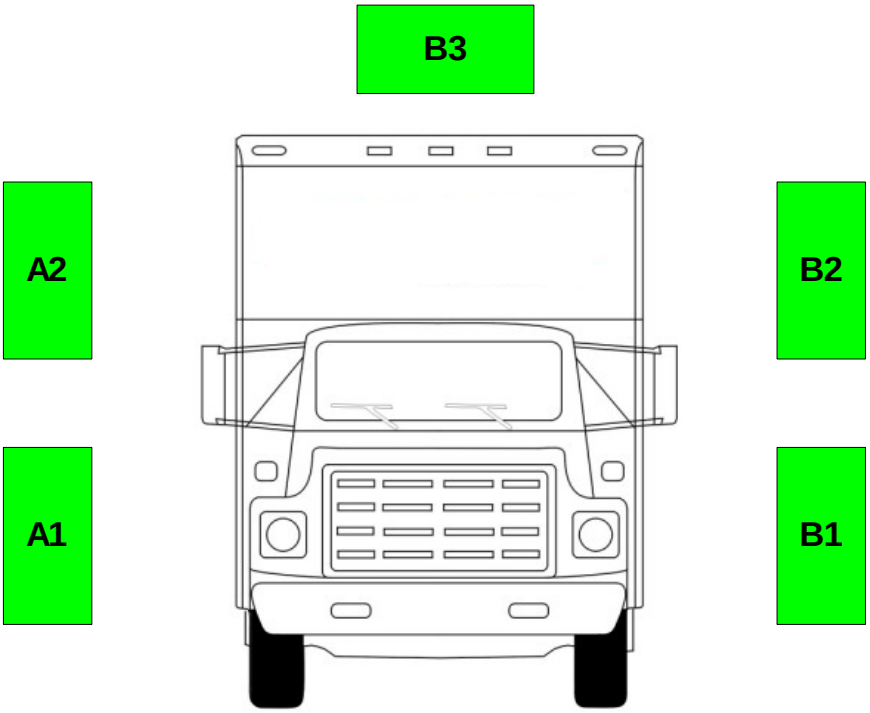


Figure 2-1 Detector Orientation

NOTE: The detector on the DRIVERS (NA) side is **B1**, (or the PASSENGERS (EURO)) side is then **B1**.

2.3 Installing Optical Sensors (OS)

OS Unistrut (supplied by customer) to mount the OS

Unistrut should be mounted onto the detector stand prior to start-up – **see installation drawing M-1131-Sheet 2 in Installation Manual for details.**

Optical Sensors (OS) Mounting Position

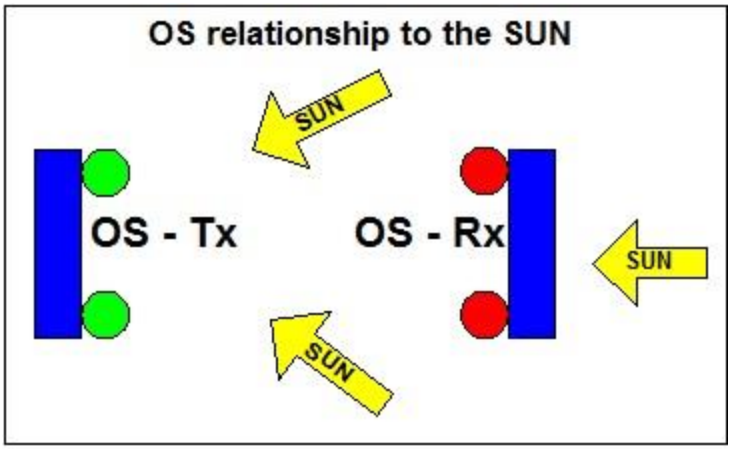
Optical sensors have a high level of sunlight immunity but experience has shown that during installation direct sunlight into the beam should be avoided or minimized. The Optical sensor system comprises 2 parts – the RECEIVER (Rx) and the TRANSMITTER (Tx).

The TRANSMITTER is essentially immune to sunlight so as the sketch shows, the Tx should be positioned on the detector side that faces the most direct sunlight.

The **RECEIVER** is somewhat susceptible to sunlight so it should be mounted on the opposite side from the nominal sunlight direction.

This type of placement normally solves most OS sunlight issues. However for special situations where sunlight interference is experienced, RSI can supply a special OS shield to prevent this issue. Contact RSI if required.

To minimize confusion the following OS drawings cover both configurations.



2.3.1 OS Position

The RS-200 uses 2 OS units (OS1, 2) standard (with OS3, 4 optional) and the RS-300/400 systems use 4 Optical Sensor (OS4-4) units to achieve maximum vehicle coverage. The Upper OS units are intended to see the primary vehicle and the Lower OS units are intended to see flat-beds etc. so no part of any vehicle can pass undetected.

OS Transmitter on the A detector

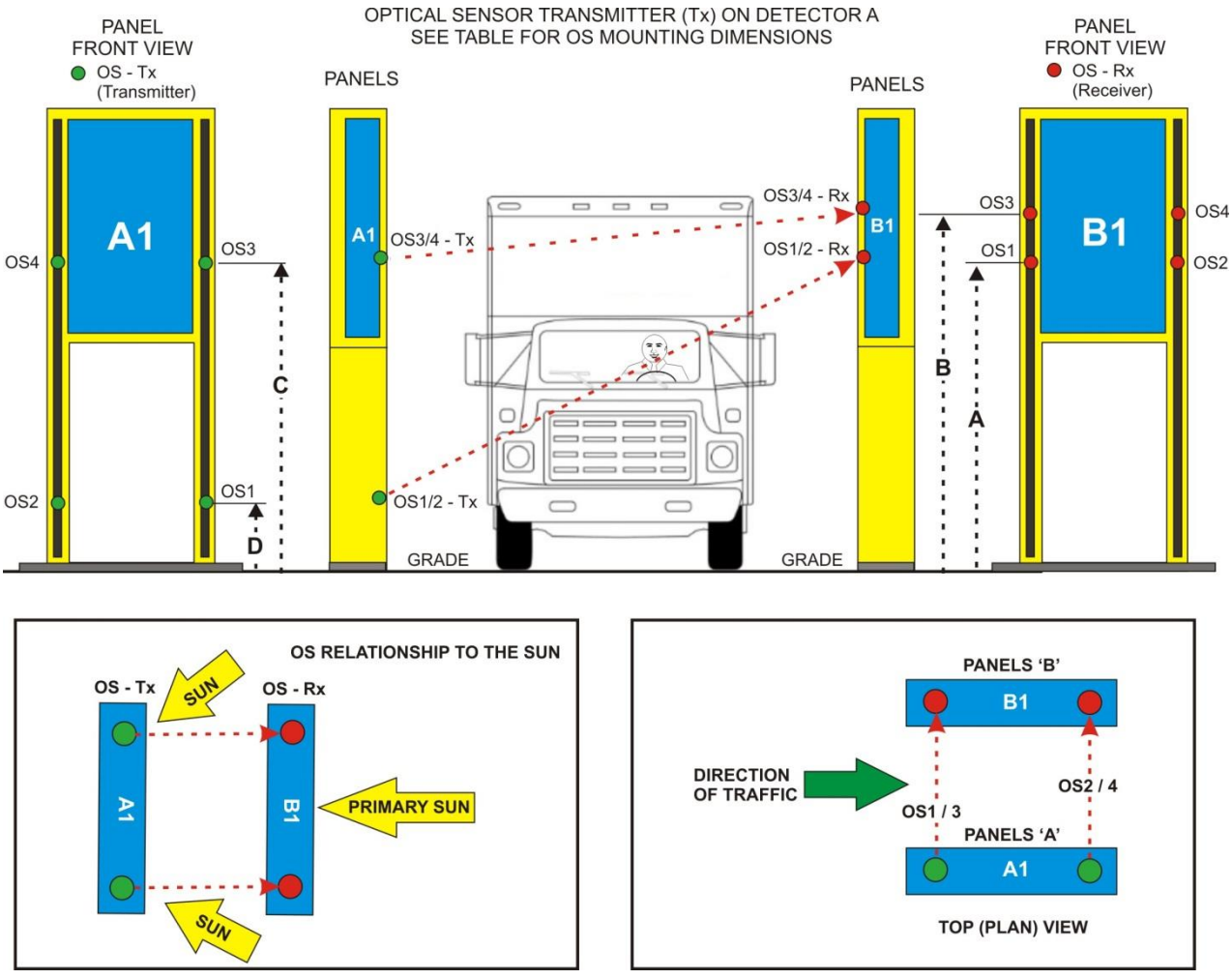


Figure 2-1 OS Position with Transmitter on Detector A

OS Transmitter on the B detector

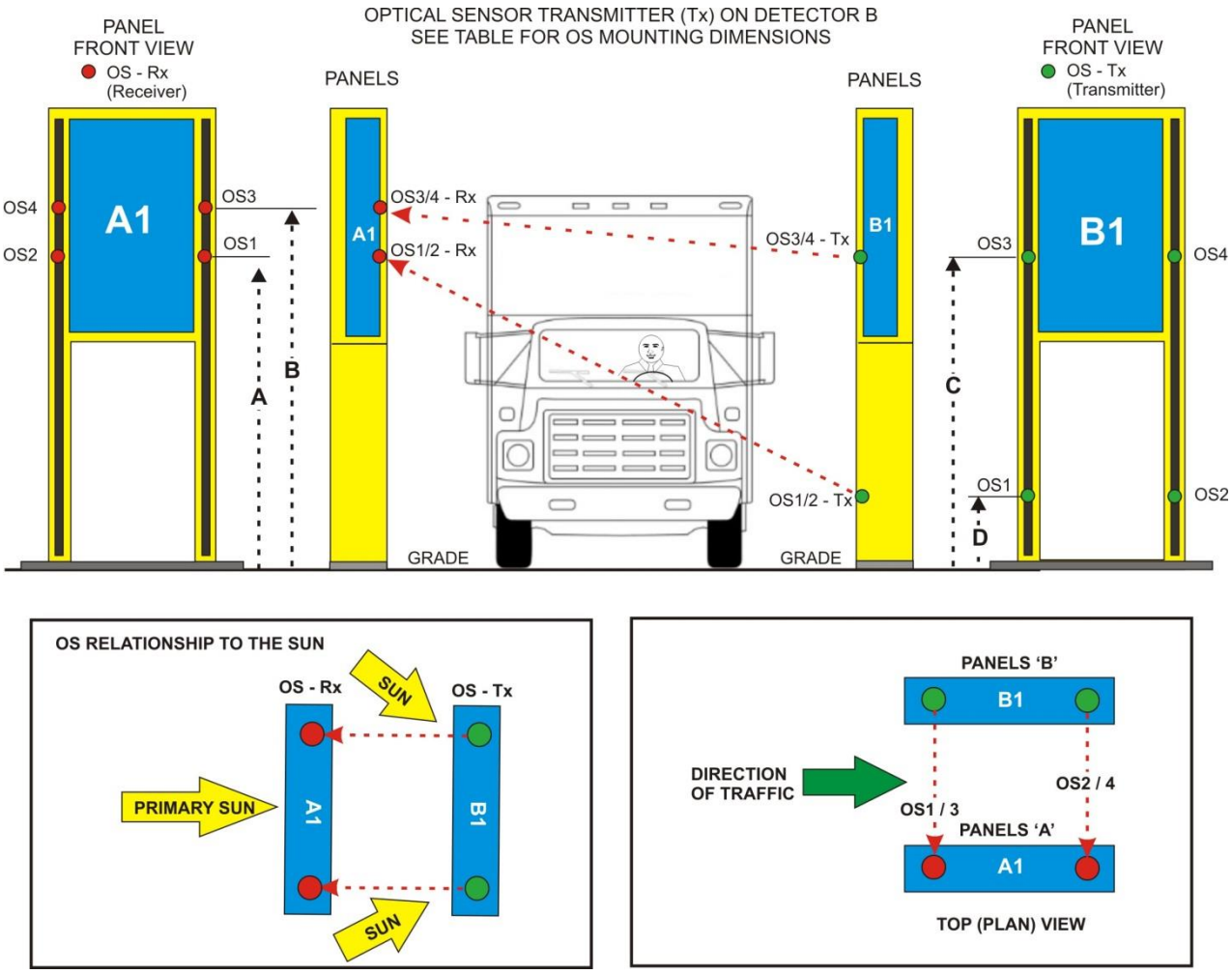


Figure 2-2 OS Position with Transmitter on Detector A

2.3.2 OS Position Dimensions

RSI uses 4 Optical Sensor (OS) units to achieve maximum vehicle coverage.

NOTE: some installations use 2 OS systems but can be upgraded if required.

Various factors affect proper OS placement. The table below shows typical applications. If none of these fit your requirements, contact RSI for more details (see **Appendix Z** for Contact Information).

Application	Detector Spacing	A	B	C	D
Truck	**14 ft (4.3m)**	**69" (1.8m)**	**92" (2.3m)**	**86" (2.2m)**	**15" (0.4m)**
Rail	**17 ft (5.2m)**	**36" (0.9m)**	**92" (2.3m)**	**86" (2.2m)**	**36" (0.9m)**

NOTE: Refer to **Figure 2-1** and **Figure 2-2** for OS positions A, B, C, and D.

For Rail configuration, OS1 (A + D) and OS2 (A + D) must be covered at all times when rail cars are present/passing through the system. 36" (0.9m) is an approximate dimension based on the height of the rail cars' mechanical link.

NOTE: IN THE MAJORITY OF CASES THE ABOVE DIMENSIONS SUIT ANY INSTALLATION BUT THE NOTES BELOW EXPLAIN THE ISSUES.

The key factor in OS mounting is to achieve OS positions such that **ANY vehicle passing the system is seen as a single vehicle**. The empirical way to verify this is to manually eyeball the OS4 and OS3 track on one side of the detector as vehicles pass and ensure that **always ONE of the 2 OS saw the vehicle** (OS1+3 are recommended as these are on the incoming side). The problem areas are usually FLATBEDS, Vehicles with gaps between the Cab and the Trailer and sometimes vehicles whose trailer is mounted unusually high above the ground. **In ALL cases at least ONE of the 2 OS (OS1 and OS3) MUST BE interrupted for ALL parts of the vehicle**. Usually both are activated on most of the vehicle which is fine but AT LEAST ONE OS MUST BE INTERRUPTED AT ALL TIMES for the OS placement to be correct.

NOTE: IF CORRECT OS POSITION IS NOT ACHIEVED THEN PROPER RADIATION ANALYSIS WILL STILL OCCUR IN MOST CASES, BUT THE VEHICLE COUNT WILL BE WRONG AS A SINGLE VEHICLE MAY BE BROKEN UP AND ANALYZED AND RECORDED AS DIFFERENT VEHICLES WHUICH MAY CAUSE CONFUSIOON.

2 OS USAGE

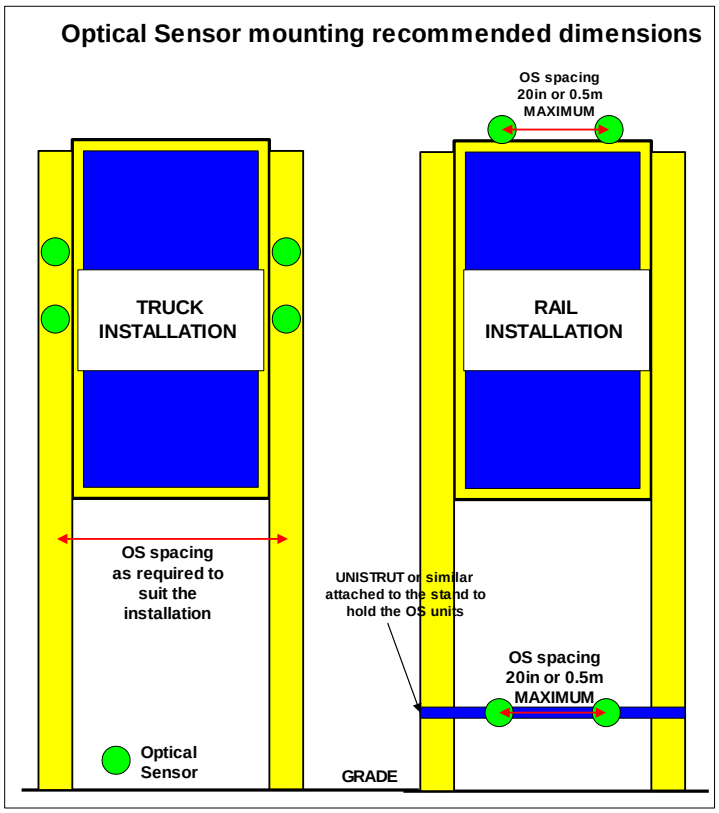
In smaller systems and Upgrades where only 2 OS units are used, sometimes NO successful OS position suits all cases. In this case consult with RSI-Service to resolve these issues. See **Appendix Z** for Contact Information.

RSI RECOMMENDS ALWAYS INSTALLING 4 OS FOR ALL SYSTEMS AS SOME 2 OS SYSTEMS HAVE HAD ISSUES WITH MISSING VEHICLES IF A WIDE VARIETY OF VEHICLES ARE SEEN AT THE SITE. FOR THIS REASON RSI NOW SUPPLIES ALL SYSTEMS WITH 4 OS. IF BY ANY CHANCE YOU HAVE RECEIVED ONLY 2 OS SYSTEMS PLEASE ADVISE RSI ASAP SO WE CAN GET THE EXTRA ONES TO YOU. WITH 4 OS THEY CAN BE ADJUSTED SO NO VEHICLES ARE MISSED.

THE BEST TEST TO BE SURE THE OS ARE INSTALLED OK IS TO LOOK AT THE VEHICLE LOG USING RADINSPECT. IF THERE ARE MANY SMALL VEHICLES THIS OFTEN MEANS THAT PASSING VEHICLES ARE BEING "CHOPPED-UP" BECAUSE THE OS ARE NOT SET CORRECTLY. EVERY VEHICLE THAT PASSES SHOULD CREATE ONLY 1 VEHICLE IN THE SYSTEM. IF THERE ARE ISSUES THEN A GOOD WAY TO CHECK OS POSITION IS TO USE A STEP-LADDER TO ENABLE YOU TO LOOK DOWN THE OS-VIEW AND VERIFY ALL PARTS OF THE VEHICLE ARE BEING SEEN BY THE OS BEAM.

2.3.3 Horizontal Mounting of OS

In RAIL applications it is necessary to mount the OS units a max of 0.5m apart to achieve correct segmentation as shown



2.3.4 Install Optical Sensors (OS)

Refer to the previous diagram and dimensions for OS positioning

Mount the Optical Sensors as follows:

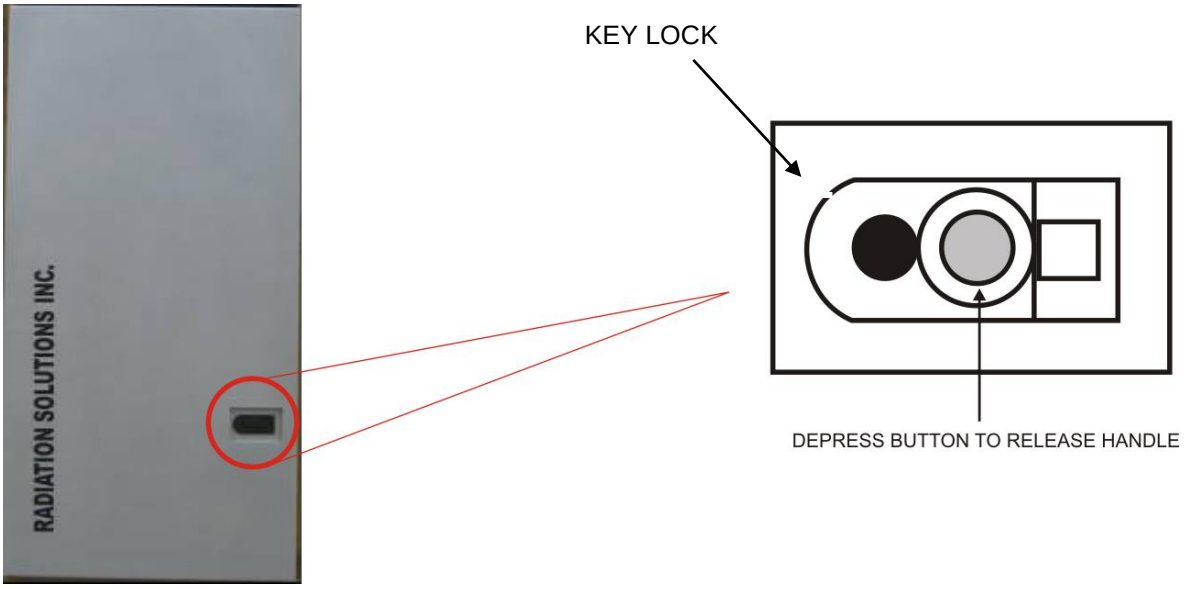
1. Mount each optical sensor (4 places) to the Unistrut using a Unistrut channel nut, 1/4” S.S. flat washer, 1/4” S.S. lock washer and a 1/4-20UNC x 7/8” LG S.S. hex bolt.
2. Torque 1/4-20UNC x 7/8” LG S.S. hex bolt to 72 in-lbs.

NOTE: ONCE THE OS ARE PROPERLY MOUNTED, LABEL ALL OS WITH THEIR DESIGNATED NUMBER (1-4) AND ALSO WHETHER THE OS IS A Rx OR A Tx AS THIS WILL BE OF GREAT HELP DURING SYSTEM TESTING AND MAINTENANCE. MANY USERS USE AN INDELIBLE BLACK MARKER, AS THIS SHOWS UP WELL ON THE YELLOW OS. BUT THE USER MAY ALSO HAVE A LABELING PROCESS THEY PREFER.

3.0 SYSTEM WIRING

3.1 Detector Connections

The RSI detector boxes are designed for easy installation and service. The lid (cover) has a special door opening lock device that is key-locked to prevent unauthorized entry (refer to Figure). Once unlocked a button is depressed to release the single handle assembly, pulling the handle forward opens the lid.



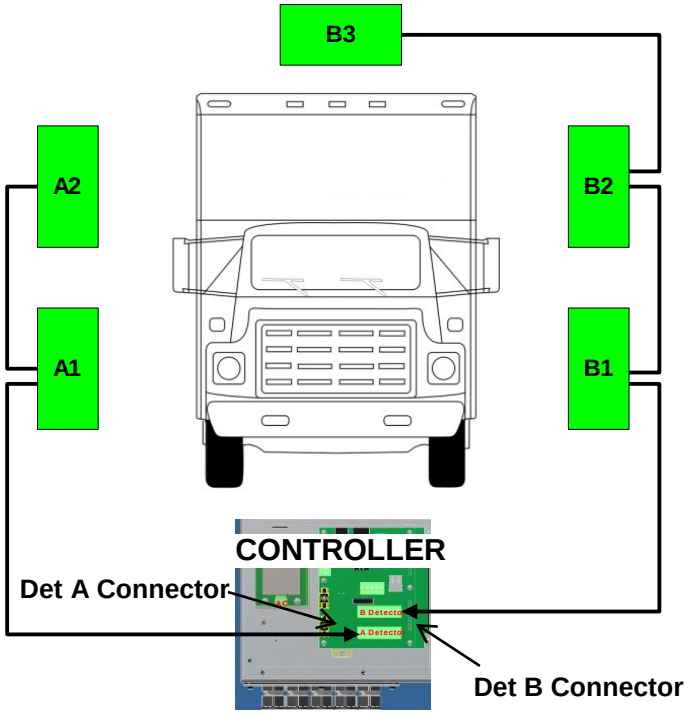
A dual locking hinge is also incorporated, so once the door is opened, pulling it forward locks the hinge preventing the door from swinging. When installation or maintenance service is complete a simple motion unlocks the hinges and allows the door to close and lock.

With the door open the 3 main Modules are now accessible. They are mounted on an easy access tray for fast, reliable trouble shooting and module replacement.

Refer to the wiring diagram for system interconnection and termination.

The detectors are wired according to the wiring diagram in Section 3.2 using the detector numbering convention defined previously (a 5 detector system is used to cover most wiring possibilities but a 2 detector system would be only A1 and B1). The wiring diagram in the manual is for a 2 detector system but RSI will supply the appropriate wiring diagram as required.

NOTE: Detectors A1 and 2 are connected to the Det A Connector on the SCT CCA in the Controller as shown, Detectors B1, B2 and B3 are connected to the Det B Connector on the SCT CCA.

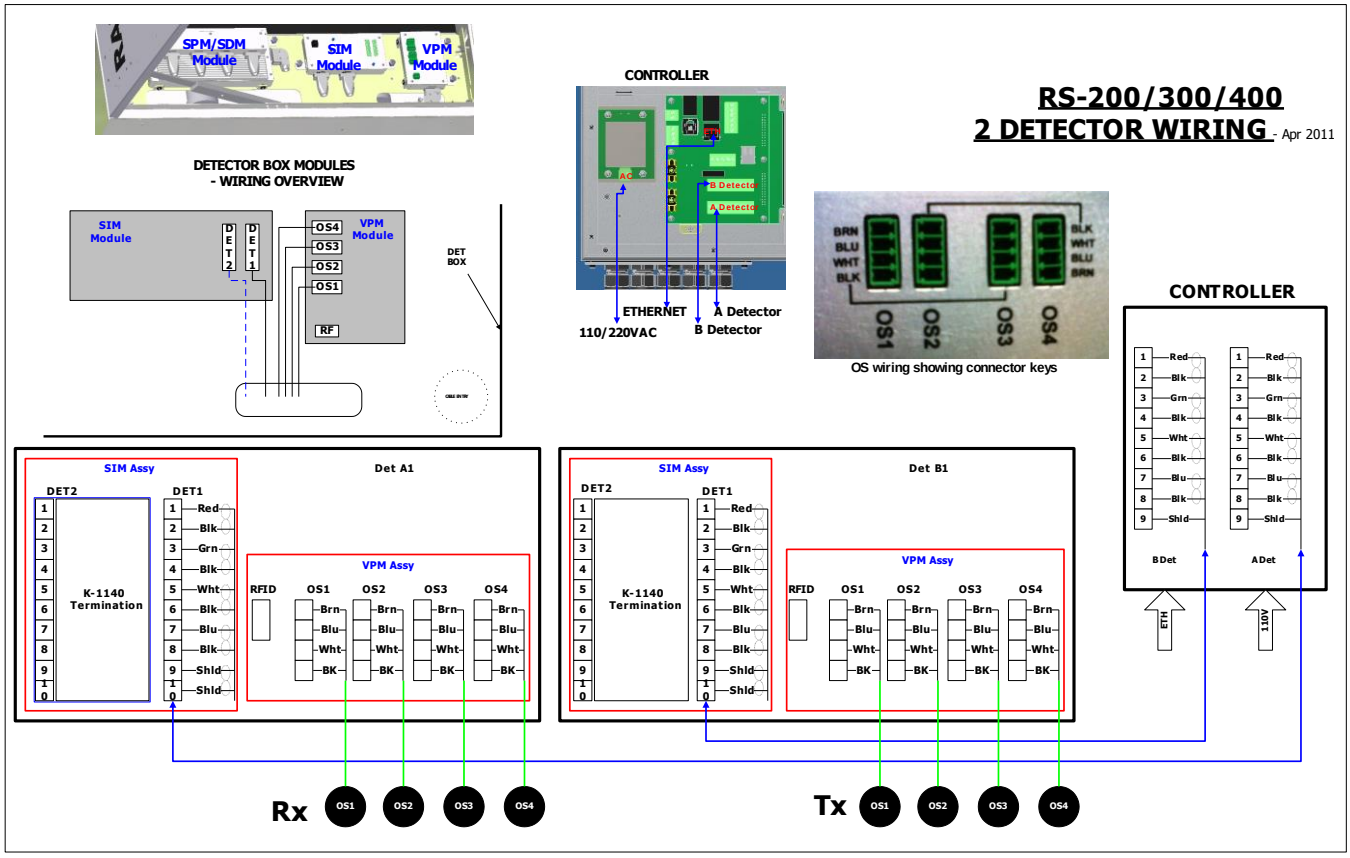


3.2 System Interconnect

3.2.1 RS-200/300/400 – 2 Detector Wiring

The figure shows the wiring details for a 2 detector system.

NOTE: Shield wires must be insulated to ensure they do not touch any metal material and cause ground loops.

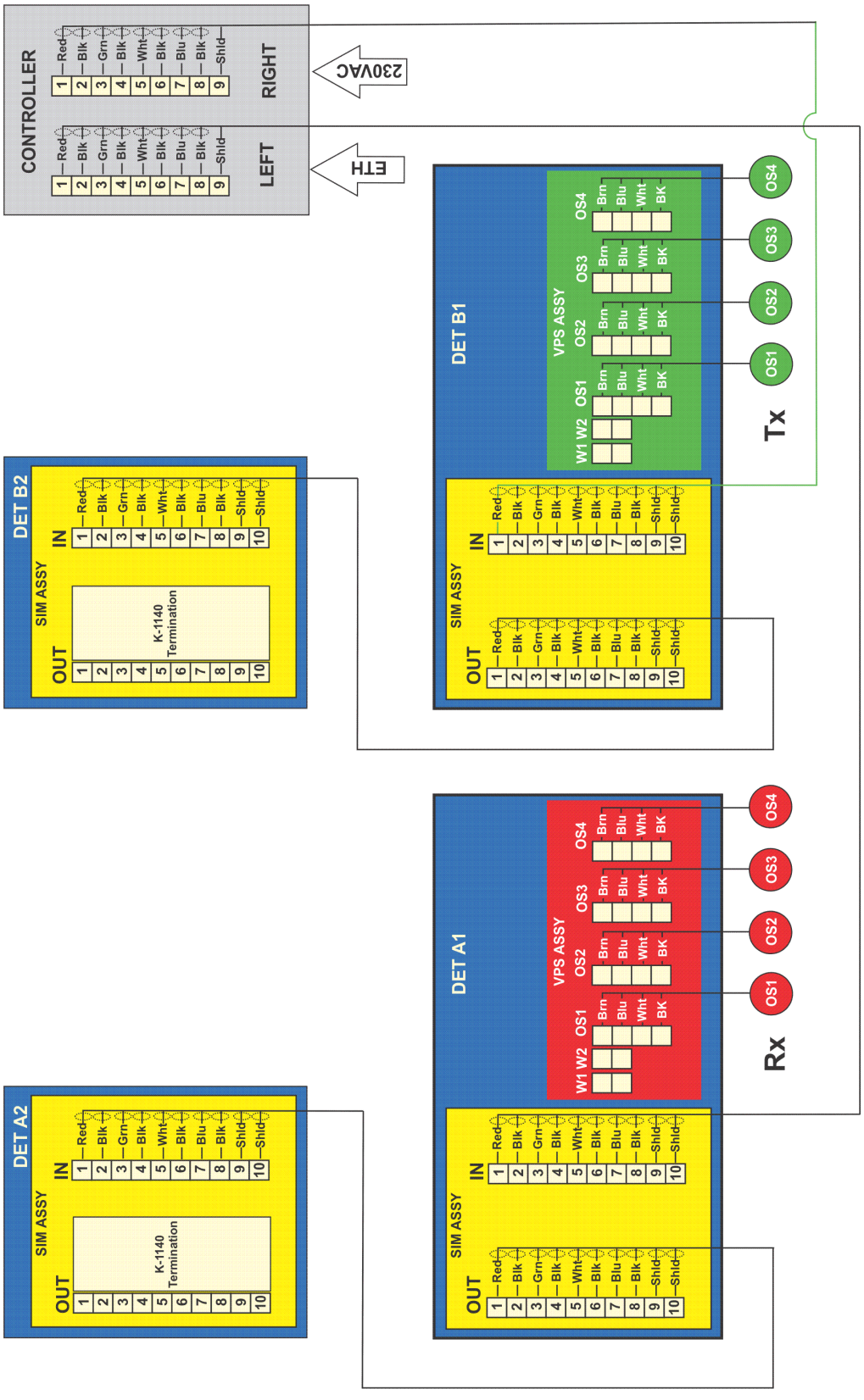


CAUTION:

WHEN WIRING IS COMPLETE, IT IS ESSENTIAL TO CHECK AND VERIFY THAT THE SHIELD OF THE DETECTOR CABLE IN THE DETECTOR AND CONTROLLER IS PROPERLY INSULATED - SO IT CANNOT CAUSE A GROUND CONNECTION. IF THERE IS A GROUND CONNECTION BETWEEN THE SHIELD OF THE CABLE AND THE DETECTOR OR CONTROLLER BOXES, A SERIOUS EM BREACH WILL OCCUR AND MAKE THE SYSTEM VERY SUSCEPTIBLE TO LIGHTNING DAMAGE.

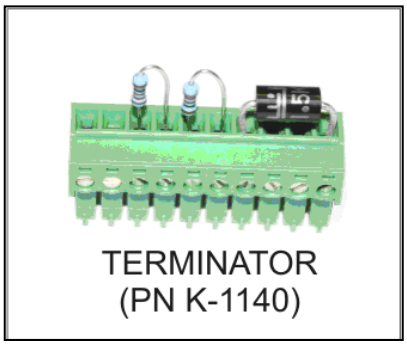
3.2.2 RS-200/300/400 – 4 Detector Wiring

The figure shows the wiring details for a 4 detector system.



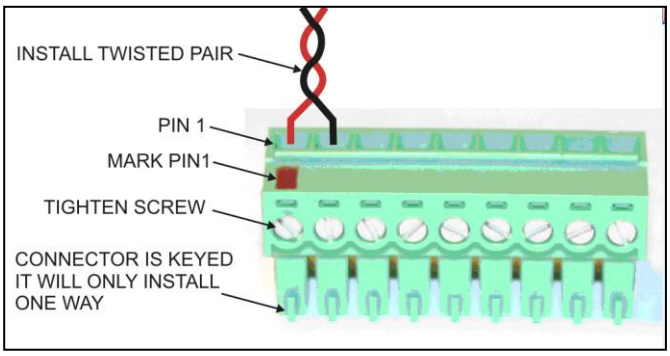
3.3 Detector Terminations

Make sure that the connections at the Detector Boxes are made in accordance with the previous drawing.



Use the K-1140 end of line termination to terminate the last Detector in the A and B series of Detectors as shown on the wiring diagram.

Connect terminal strips as per the wiring diagram. Ensure that stripped cable has no cuts and that the wire is terminated securely in the Terminal Strip ***– a gentle tug after all connections is made is recommended to ensure secure connections***.

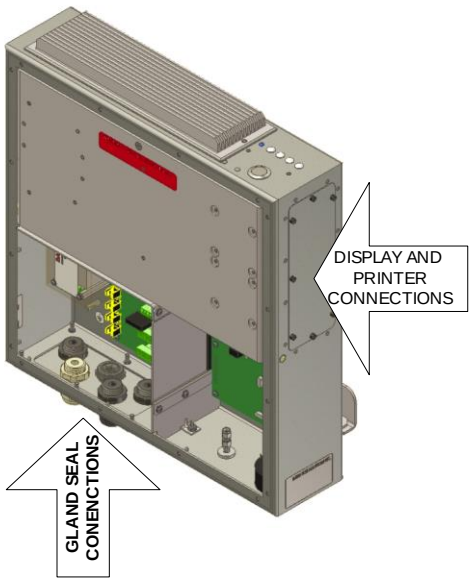


3.4 Controller Connections

The **RS-C1 Controller** acts like a "black box" which is used for all connectivity but no user interface or actions are required once the unit is powered on. The Touch Screen is used to interact with the Controller.

A removable front panel is used to access the internal Interface boards for easy wiring via terminal strips. Ten screws attach the access panel to the Controller enclosure (see figure).

Five 3/4" Seal-Tite connectors provide dust-proof cable entry to the Controller. It is important that the cables are properly inserted through these cable entry devices to ensure a dust-proof connection.



NOTE: ALL CONNECTIONS TO THE CONTROLLER LOWER EDGE MUST USE SUPPLIED SEAL-TITE CONNECTORS – INSTALLERS SHOULD ENSURE THAT DUST INTEGRITY OF THESE SEALS IS ACHIEVED WHERE POSSIBLE.

3.4.1 SCT Board Connections

To wire the Controller to the Detector and other accessories do the following: **Refer to Figure 3-1.**

1. Using a 7/64" Allen Key (supplied), remove ten socket head screws from the Access Panel, retain socket head screws for Assembly
2. Remove front cover Access Panel.
3. Thread the Detector cables '**A**' and '**B**' through separate 3/4" Seal-TITE cable grips on the bottom of the controller enclosure, leaving enough cable slack for connection and cut off excess cable. Tighten cable grips.
4. Locate the **SCT Board** and the **J1** and **J2** Connectors.
5. Wire the connectors in accordance with Detector Connector Wiring Diagram.
6. Plug connectors into sockets making sure that the Detector 'A' series is plugged into connector J1 and the Detector '**B**' series is plugged into **J2.**
7. Thread the Ethernet cable through the White Seal-TITE cable grip and attach to the **RJ-45** connection **J10.**
8. If used, thread the **TLC** cable through a Seal-TITE cable grip connect to **J7**.

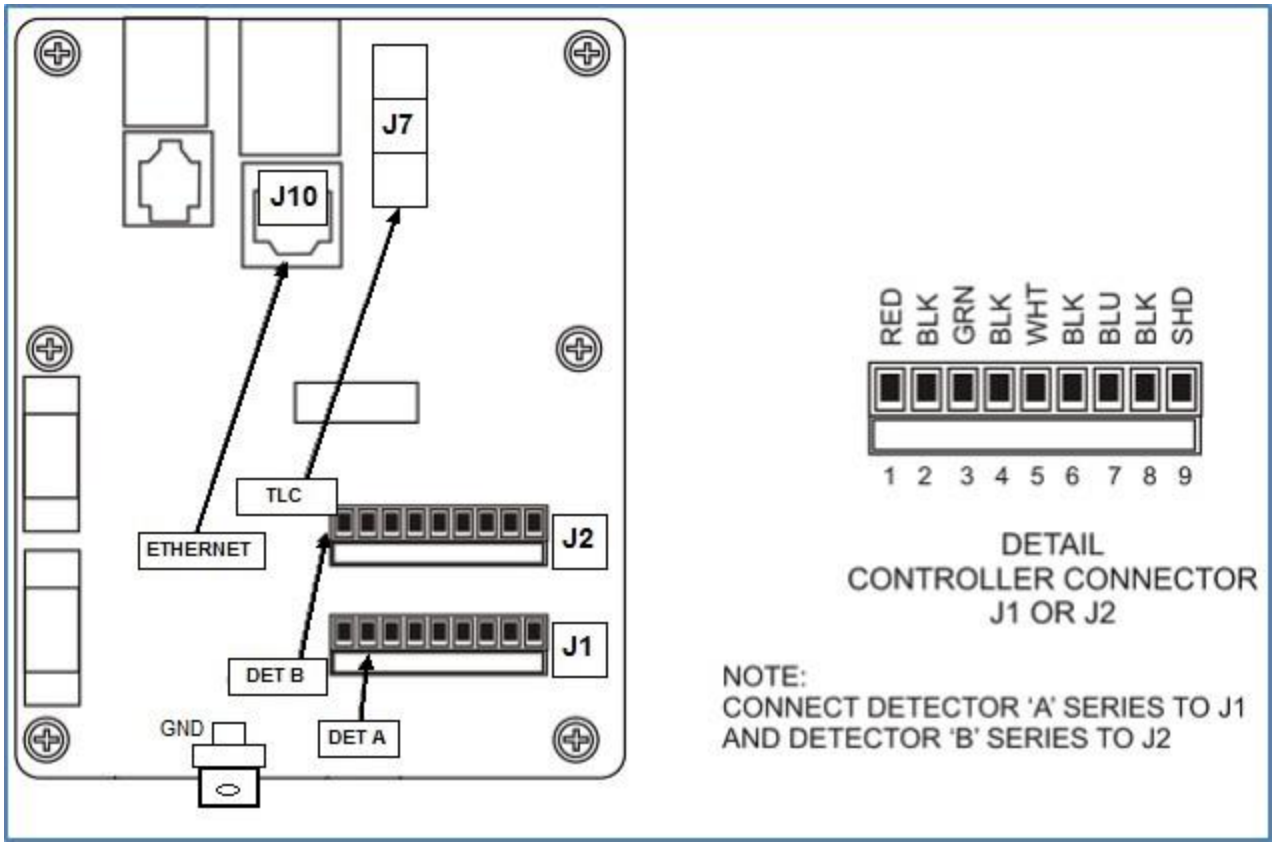


Figure 3-1 SCT Board Details

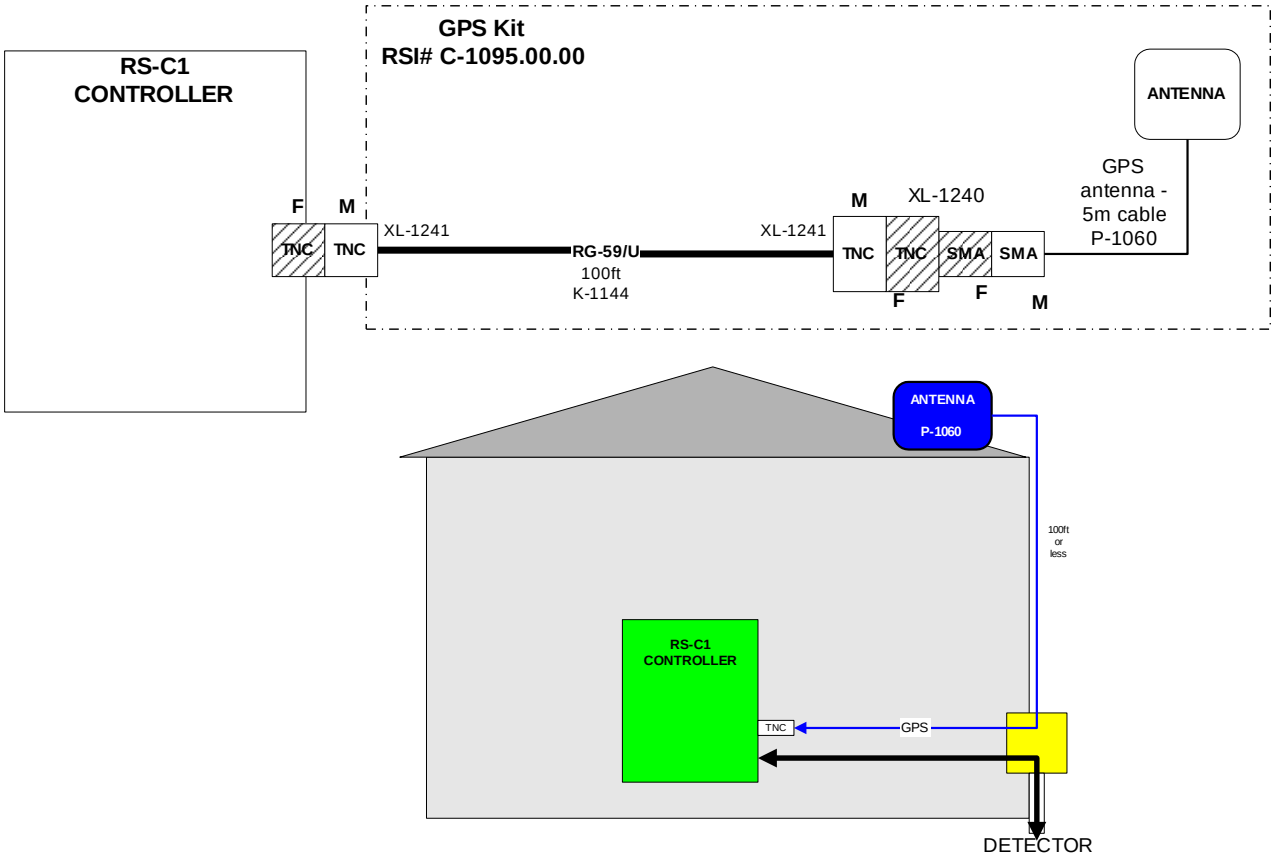
9. Leave the Access panel open until successful system start up is achieved.

3.5 GPS Connections

Connect the GPS system as noted below. This GPS connection gives real time location but its primary function is to ensure that the system CLOCK that stamps all alarms is always accurate.

NOTE: In multiple system installations ONLY 1 GPS INSTALLATION IS REQUIRED as the DataCentre will arrange Time Sync using the 1 GPS as the master clock.

C-1095 - GPS cabling for less than 100ft cable runs - Jun 2010



Experience has shown that in many cases the GPS antenna can be mounted on the inside of a window – the key issue is that the GPS must be able to "see" some satellites. Obviously a roof location is better but is sometimes impractical. Cable runs for GPS of 100-300ft need an additional in-line amplifier as signal strength gets degraded – consult RSI-Service.

RSI Service - service@radiationsolutions.ca

(Refer to **Appendix Z** for Contact Information).

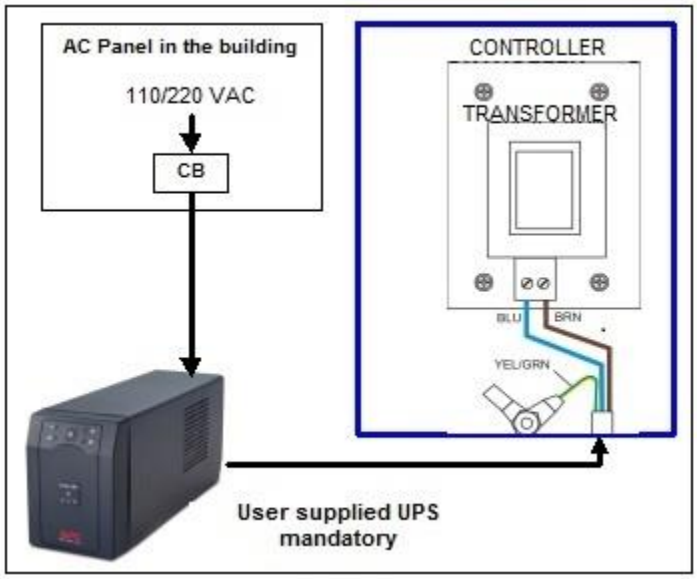
3.6 UPS Connections

The Controller unit (will handle 110V or 120VAC as needed) shipped from the factory is supplied with a pre-wired AC cable with a standard North American connector set to run off 110VAC to permit proper factory testing. For EURO installations a set of 5 EURO cables is supplied – users are advised to change cables as required.

NOTE that RSI Controllers MUST use a UPS to prevent system problems.

NOTE – some users will supply their own UPS.

NOTE: DO NOT CONNECT THE CONTROLLER TO THE UPS AT THIS TIME.



Notes:

i. UPS wiring to the AC control panel should be hard-wired IF POSSIBLE to avoid the possibility of someone unplugging it.

ii. AC wiring in the panel should connected via a Circuit-Breaker (CB) where possible which will act as system OFF for maintenance.

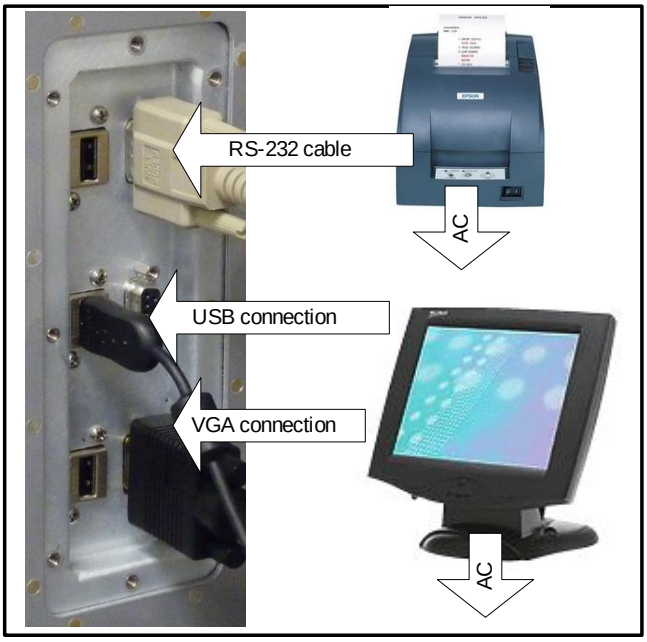
iii. AC connection to the UPS from the Controller is via an AC plug. **Once the system is fully functional**, an effort should be made to make it very difficult to accidentally unplug this connection (cable ties or silicone glue is effective).

3.7 Side Panel Connections

a) **DISPLAY (110/220VAC)**
The standard touch display – 3 cables – 1 to VGA, 1 to any USB and 1 to AC power

b) **PRINTER (110/220VAC)**
The printer is supplied with a RS-232 to RS-232 cable. Connect this cable to the printer and the other end to the lower side panel connector as shown.

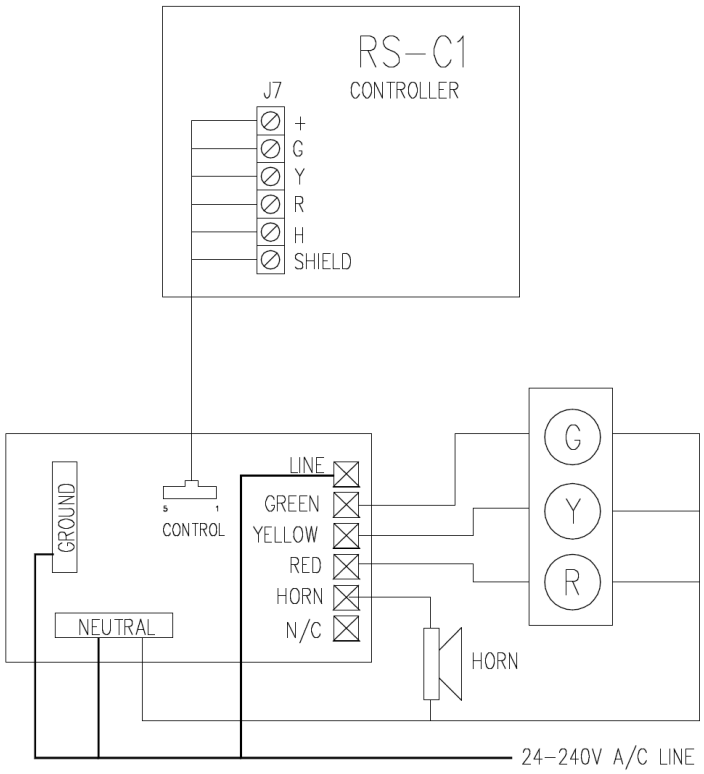
Connect the printer AC power cord to the nearest receptacle (if possible the supplied UPS).



3.8 TLC Connections

NOTE: The TLC is an optional item and is not supplied for all installations.

The following schematic shows how to connect the RSI – TLC unit.



Connect the **TLC** CONTROL to **J7** in the Controller as per the wiring diagram.

Note: The TLC is rated for 24 – 240 V AC operation with max 500W LOAD.

3.9 Ethernet

The Ethernet connection from the Controller uses the RSI supplied 5m Ethernet cable to connect to the nearest ROUTER for LAN connection via the supplied switch if necessary.

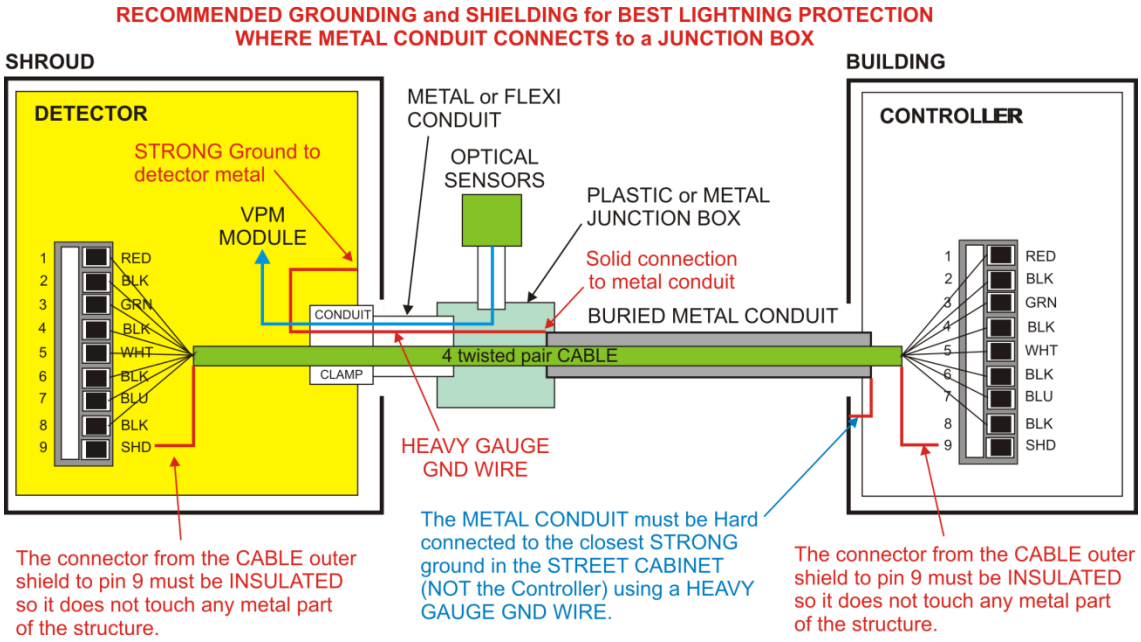
3.10 Check System Grounding

For real lightning protection as explained in the Installation manual, various things must be implemented. The following information is somewhat repeated to enable the Start-Up staff to be completely sure that everything possible has been done to protect the system.

a) **LIGHTNING RODS** - verify that the best possible Lighting protection has been implemented at the detector with grounded Copper wire/cable or rod – as fully described in the Installation manual – PN **P-1324.xx.xx Section 2.4**.

b) **CABLE CONNECTIONS** - verify that grounding and shielding of the signal cables and conduit is as shown in the Insulation manual but repeated here for clarity – cable shielding at both ends must be checked as noted and conduit ground MUST be heavily grounded.

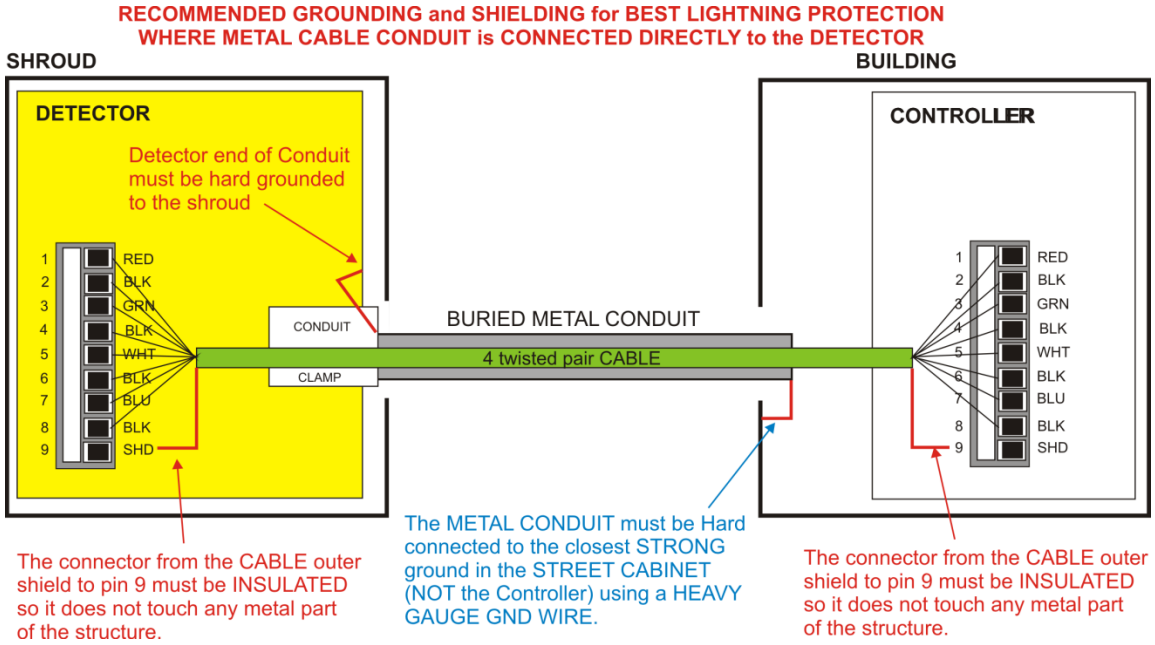
The following figure shows typical installation wiring issues. Typically 2 or more detectors are used so it is necessary to use a Junction box to route the wires properly and this situation is as shown.



NOTES:

1. METAL conduit is used from the Controller to the Detector junction box for the best lightning protection.
2. A junction box is used at the detector for ease of cabling, (prefer metal but plastic is common).
3. In case of a Plastic J-box – it is necessary the HARD GROUND the metal conduit to the detector CHASSIS GROUND - NOT the electronic ground.
4. Insulate the cable shield connections at both ends as shown in the figure.

In some applications (typically a Charge-Bucket) only a single detector is used in which case the following figure is more typical.

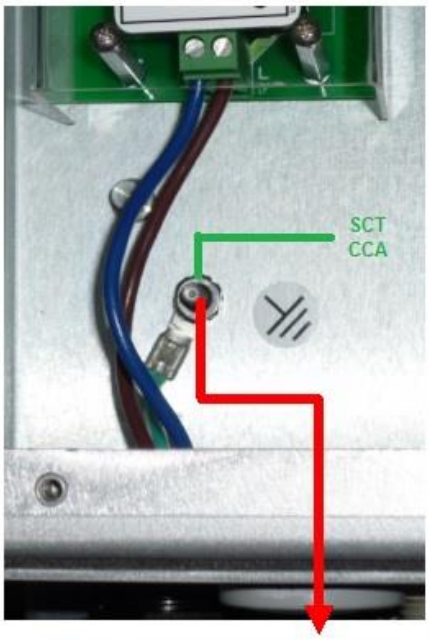


c) **CONTROLLER GROUNDING** -

It is ESSENTIAL that the system CONTROLLER is hard-wired to a STRONG ground point as shown in the figure. Without this protection the CONTROLLER has a high probability of failure due to lightning strikes because the lightning induced energy is so powerful that it MUST be drained away safely using a strong ground system or it will severely damage the Controller.

IN MOST INSTALLATIONS A STRONG GROUND IS ACHIEVED VIA THE AC LINE. TYPICALLY THE AC LINE FROM THE WALL CARRIES THE GROUND TO THE UPS WITH A 3-WIRE AC CONNECTION. THEN THIS GROUND IS CARRIED TO THE CONTROLLER BY A 3-WIRE AC CONNECTION.

IF THIS "PROPER" GROUNDING IS IMPLEMENTED DO NOT ADD AN EXTRA GROUND AS SHOWN IN THE FIGURE OR THIS WILL CAUSE GROUND LOOPS.



The Controller GROUND point

3.11 Final Hardware and Wiring Check

PERFORM A HARDWARE INSTALLATION AND WIRING CHECK TO ENSURE ALL CONNECTIONS ARE MADE AS REQUIRED BEFORE POWERING UP EQUIPMENT. USE PRE-START CHECKLIST BELOW TO VERIFY THAT ALL HARDWARE AND WIRING HAVE BEEN INSTALLED PROPERLY IN ACCORDANCE WITH THIS MANUAL BEFORE PROCEEDING.

ENSURE THAT THE UPS IS NOT CONNECTED SO NO POWER TO THE CONTROLLER YET -- OK

DISCONNECT THE CONTROLLER FROM THE USERS LAN ---------- OK

START A SYSTEM CHECK SHEET (SECTION 8) ---------- OK

For Detectors:

Check that all nuts fastening the Detector Stand to the anchor rods and foundation are tightened and the detector stand is level and plumb.	OK	
Check that Lightning rods are connected properly	OK	
Detector cable wiring secure and as per diagram	OK	
Termination Jumper installed on the final Detector in each series?	OK	
Check that EACH detector cable shield wire at the detector end is insulated from the case	OK	
Check all OS sensors mounted as per manual - Tx facing average sun - OS1/3 on INCOMING to the plant side - OS1-4 connected to the VPM module correctly	OK	
Check GPS cabling and Antenna are correct if done at the detector	OK	
Ensure that metal conduit is properly grounded to the detector stand for good grounding	OK	

Check that all enclosure conduit penetrations are properly sealing.	OK	
All wires are to be routed neatly and clamped securely in place.	OK	
Close detector doors and lock securely	OK	
All paint surfaces are free of damage?	OK	

For Controller:

Check that all bolts mounting the Controller are tightened.	OK	
Check that all cabling is secure and correct - AC Power - Detector cabling - Ethernet cabling - GPS connection - TLC cabling	OK	
Check GOOD ground to Controller ground point	OK	
All cabling secure with no excessive tension?	OK	
Note system serial numbers on Check sheet	OK	

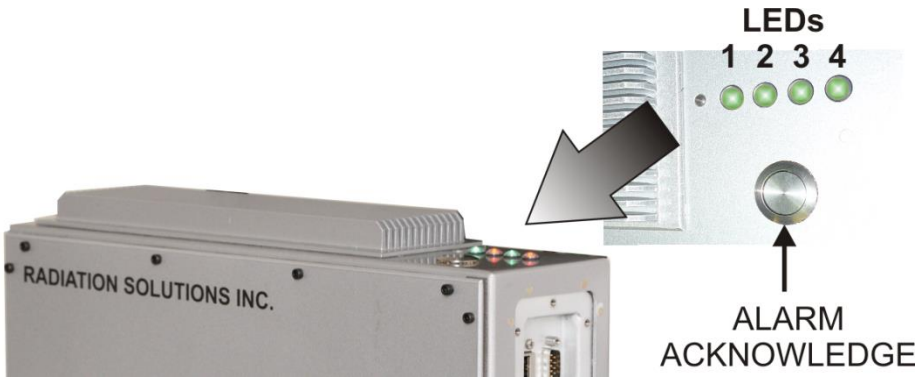
3.12 Power ON the Controller

NOTE: DURING SYSTEM START-UP (typically 5 minutes) NO VEHICLES SHOULD PASS THROUGH THE SYSTEM IF AT ALL POSSIBLE. IF THEY DO THEN SOME SCAN ERRORS WILL OCCUR, NOT A MAJOR PROBLEM BUT DATA INSPECTION IS MUCH EASIER IF THERE ARE NO UNNECESSARY DATA PRESENT ON THE SYSTEM.

Connect the Controller to the UPS TO POWER ON THE SYSTEM. After a few seconds the LED's at the top of the Controller will light up as the internal computer systems start the boot up sequence. The boot up sequence takes typically 60 seconds so wait for this time period before checking the system status

The LEDs ON TOP OF THE Controller can be used for trouble shooting and the table below explains the functions.

However most users will use the system DISPLAY for system status information



LED1	**Power Status** **GREEN = Power OK**
LED 2	**Health Status** **GREEN = No Error** **YELLOW – Warning present** **RED – Error present**
LED 3	**Alarm Status** **GREEN = No Pending Alarm** **RED = At least one alarm is pending**
LED 4	**Datacenter Communication Status** **GREEN – Connected** **RED – Not Connected**

Check that:

LED1 = should be GREEN – showing power is ON – if not, check UPS and power connections.

LED2 = should be GREEN– after power ON it could take up to 3 minutes for this to go Green. After this time assume a problem and investigate as shown below.

LED3 = should be GREEN– showing no Alarm – if not Green assume a problem and investigate as shown below.

LED4 = should be GREEN– showing the DataCentre is connected. If not green investigate as shown below.

For all further communication with the system, use the DISPLAY interactive touch screen.

3.13 Checking Controller System Status

The full system should now be checked using the main system DISPLAY.

3.13.1 Error on StartUp

When the Controller is first connected to AC power it takes approximately 30 seconds to do primary boot and another 30 seconds to start the application.

Even if all is **OK** the system needs a few minutes to compute the local background. For this reason the system will always start with an error, the system audio will sound and the top left button will show ERROR as in the figure. THE BACKGROUND CORRECTION TIME WILL BE EXTENDED EACH TIME A VEHICLE PASSES SO IF POSSIBLE **STOP VEHICLES PASSING DURING THIS SHORT START-UP TIME.**

Press the **ERROR** button to silence the alarm and the display switches to the **STATUS** screen as shown in the figure below.

WAIT 1 MINUTE AND USUALLY THE COMPUTATIONS ARE COMPLETED AND THE ERROR CONDITION IS AUTOMATICALLY CANCELLED AND THE TOP LEFT LIGHT GOES GREEN TO SHOW THE SYSTEM IS FULLY OPERATIONAL.

a) In some cases the problem is caused by incorrect configuration. If the parameter issue is judged NOT to significantly affect the system operation a **WARNING** message is shown:

Often these problems occur when the DataCentre is **NOT CONNECTED** and the system is searching for it.

b) **IGNORE ERROR or WARNING light FOR NOW** - carry out procedures detailed below.

3.13.2 Check the Main Status Data Box – (top left)

This data box shows various data about the system that are useful in troubleshooting.

Serial: This is the serial number of the installed system and is an important ID for RSI Service support.

RSS Addr: This is the System IP address on the Plant Network - this is assigned by RSI and is usually 3-x-x-x where x is determined by its position in the data tree (alternatively could be 2-x-x-x).

Sw version: the installed Controller software version.

IP Address: The systems IP address on the Internet assigned by the DHCP controller in the users LAN system - IGNORE THIS FOR NOW.

Uplink connection: an RSI set parameter to define the Controller's data level – IGNORE THIS FOR NOW.

SCI Comm: checks communication with the Spectrometer units inside each detector – should say **OK**

USB Detectors: checks communication with USB connections to the detectors - should say **OK**

No GMM active: – check that the configured detectors – if the system detects an active detector that is NOT in the configuration it generates an error - should say **OK**

No VOS active: – checks Vehicle Optical Sensor module – if the system detects an active VOS that is NOT in the configuration it generates an error - should say **OK**

Multiple VOS: if the system detects multiple VOS units the system shows an error as only 1 VOS unit is required for correct system performance - should say **OK**

Printer: checks connected printer - should say **OK (if used)**

IF THE ITEMS HIGHLIGHTED IN BLUE ABOVE ARE NOT AS DESCRIBED, CONTINUE THESE PROCEDURES AS PERHAPS PARAMETER SETTINGS DESCRIBED BELOW WILL FIX THE ISSUE.

3.13.3 Check the DETECTORS Data Box

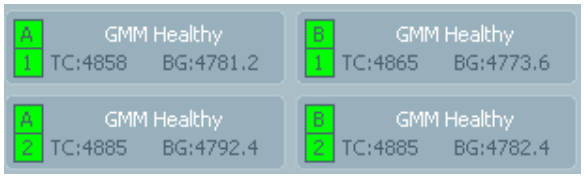
These data information show the status of various parts of the system.

If all lights are **GREEN** then all is **OK.**

Line A (B) Healthy – the detectors are connected to the Controller unit via 2 separate cables. All detectors on one side are designated **A** detectors (**A1, A2…A7**) and the other side are designated **B** detectors (**B1, B2…..B7**). Both these sets of detectors are fed into the Controller on SEPARATE cables and plugged into the Controller data inputs in the **A input** and the **B input**. A green light here means that the Controller can read these input ports **OK** so the data INPUT is functional.

CHECK THAT THE A and B LINE LIGHTS ARE GREEN.

GMM Healthy – this is the Gamma Data (GMM) for the detectors. The example given here is for a 4 detector system designated A1, A2 and B1, B2. The green label for each detector shows that the detectors are functioning **OK**.



TC:4858 - is the Total Count data from each detector.

BG:4781.2 - is the stored Background data for each detector

CHECK THAT THAT ALL THE DETECTOR LIGHTS ARE GREEN (could take up to 2 minutes if NO VEHICLES are present and much longer if vehicles interfere). IF PROBLEMS PERSIST REFER TO Chapter 6.0 below for ERROR ANALYSIS.

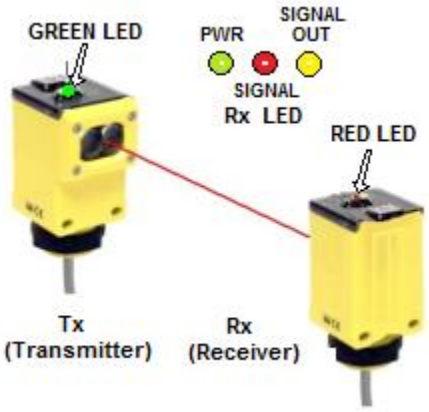
3.13.4 Check the Vehicle Optical Sensors (VOS) Health

VOS Healthy – the semi-circular icon shows that this "detector" is actually a Optical Sensor (**OS**) and is functioning **OK (GREEN)**. As a vehicle passes, the 4 lower "lights" will light up as the OS are activated. The example shows OS1 and 2 activated. As a typical scrap truck passes, action on all 4 OS should occur.

If any OS is inactive or "stuck on" then an error will occur and the appropriate OS will show a **RED** light to indicate the error. (See below for details).

OS SETUP

a) **ALIGN OS UNITS**



Alignment Procedure (after system power-up):

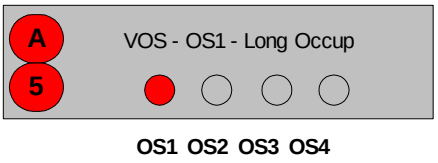
1. Rotate the Emitter (Transmitter) up or down and right or left and align receiver to transmitter sensors as indicated by VPS mounting positions figure above. As the sensors become better aligned, the Red LED strobes at a faster rate as shown in the figure to the right.
2. Continue rotating the sensor to the point where the Red LED strobes at its fastest rate (approx. 2/second). This indicates the best possible alignment.
3. When alignment is achieved, torque bolts attaching the OS bracket to 72 in-lbs.

FOR PROPER SYSTEM OPERATION IT IS VERY IMPORTANT THAT THE OS UNITS ARE SET AT THE HEIGHTS SPECIFIED.

OS ERRORS

If any OS is inactive or “stuck on” then an error will occur and the appropriate OS will show a **RED** light to indicate the error.

A typical example is if the OS unit is misaligned – system logic sees this as if it was covered for a long period of time. The system has an internal error check and no OS is expected to stay on for longer than the typical 20 secs max of vehicle transit. An internal system timeout is set at 900 seconds. After this time period the ERROR message is given and the OS STATUS shows as follows. The OS should be checked at the detector as noted in the Maintenance Manual



NOTE: If errors persist refer to Chapter 6.0 and use RadInspect to investigate, or contact RSI-Service

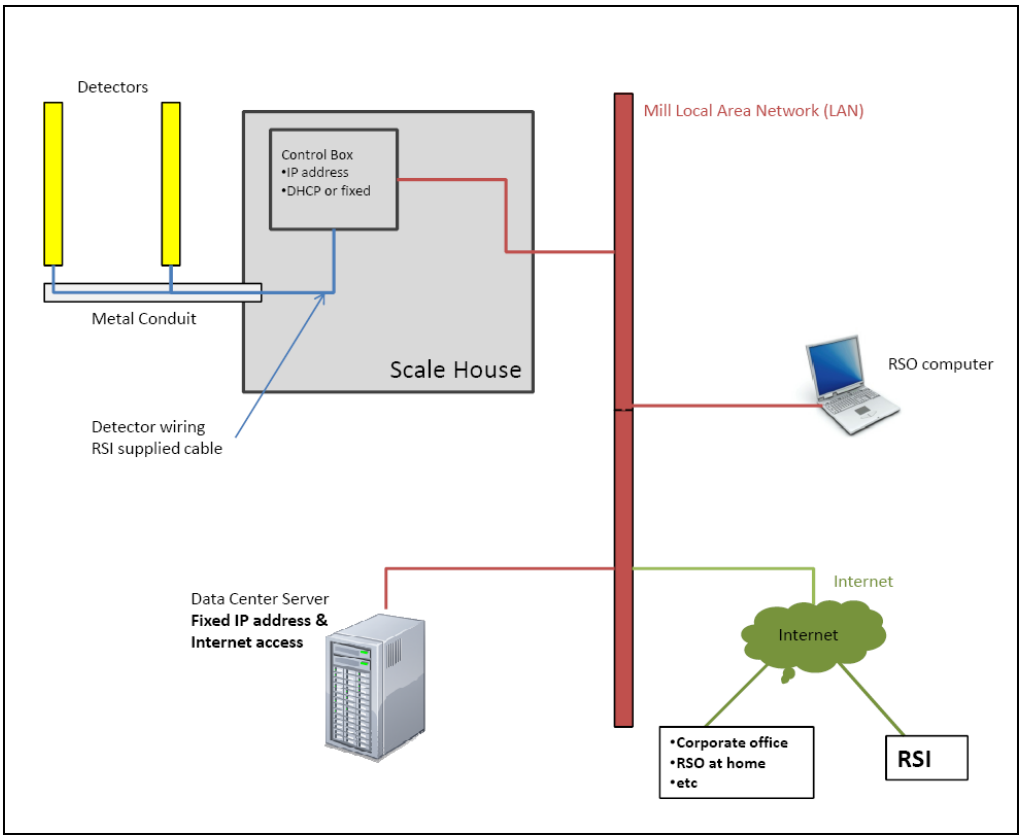
4.0 DATACENTRE CONNECTIONS

This section explains how to install, setup and use the **RSI supplied DataCentre.**

NOTE: If the users LAN connection is not available at the Controller – see Section 4.6.

4.1 Overview

All RSI systems require an Ethernet connection to the users LAN. The purpose of these LAN connections is to permit the RSO to overview all alarms on all RSI systems installed to verify alarms and oversee proper system usage. This figure shows the connection concepts.



All RSI systems are supplied with a no-charge "black box" computer called the **RSI-DataCentre**. This black-box computer will eventually be integrated into the system Controller but for now is external. The DataCentre has no-display/keyboard etc. as it is pre-configured by RSI.

ONE RSI- DataCentre is required for each plant which can support an unlimited number of RSI systems (Vehicle/Dust/Charge-Bucket etc.) in the plant. Systems acquire data and forward data to the Datacenter to be stored. A DataCentre (seen as a blue unit in the figure in each plant) has the following main functions:

a) Stores data received from portals into a database via the users LAN.

b) Allows remote users (typically the RSO) using RSI supplied PC software (RadInspect) to run queries against the database (to view scanned vehicles, error logs, etc.).

c) Send notifications to registered users in case of alarms and system errors.

d) Allows RSI to remotely service and monitor all the hardware and software components of the system via the Internet.

The last function requires a communication channel between the Steel Plant DataCentre and the RSI DataCentre. This communication channel is implemented as **an outgoing TCP connection**.

4.2 System Connectivity

Local Area Network (LAN) and Wide Area Networking (WAN) Requirements:

In the best setup the RSI DataCentre will have access to the internet, WAN access, to enable full RSI on-line support. In a LAN without Internet access, the user will not have the ability for remote trouble shooting and system check out but will be able to access the data from anywhere on the LAN, for example in the RSO office.

LAN Connection:

To set up the system for LAN connectivity to the system, the DataCentre and Radiation Detection System can operate with a fixed IP addresses or using a DHCP server. If fixed IP addresses are used for each device, the DataCentre and Detection system need to be setup for a designated IP address. This can be done at RSI prior to shipment to make the start-up trouble free **BUT IN MOST CASES THE LOCAL IT DEPARTMENT CANNOT EASILY SUPPLY IP ADDRESSES IN ADVANCE.** RSI-SERVICE should be contacted to discuss obtaining these IP addresses in advance if at all possible. will discuss with the user the need to define these assigned IP addresses. Any computer on the LAN with RadInspect installed can see and access the DataCentre if they are on the same sub net (has the 3 first block of the IP address in common for example **192.168.1.xxx**).

STATIC IP ADDRESSES ARE PREFERRED. THE SYSTEM HAS THE ABILITY TO CONNECT AUTOMATICALLY ON "NORMAL" NETWORKS VIA DHCP BUT IF CONNECTIONS PASS THROUGH A ROUTER THE AUTO-CONNECT CAPABILITY WILL FAIL.

WAN Connectivity:

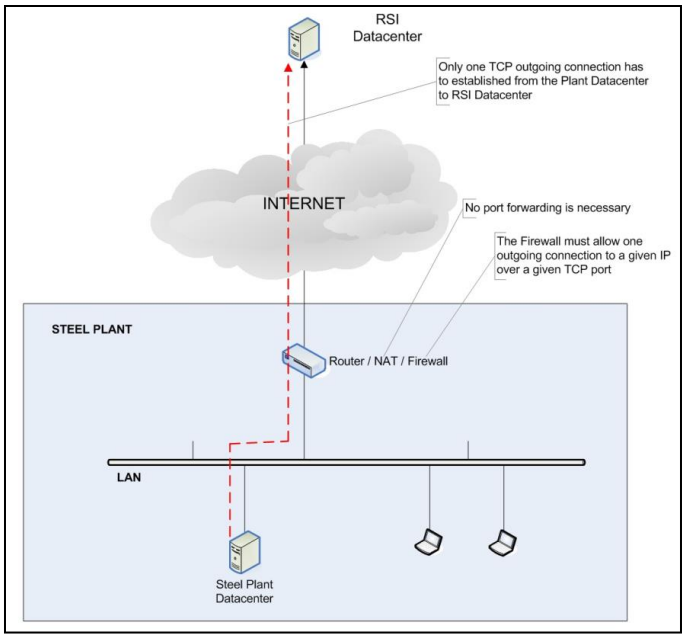
The RSI system is designed with network security in mind and the WAN networking can be performed in three different ways.

1) The Network system uses a simple router with some degree of firewall. Standard web browsing ports are allowed (port 80h) but other ports are blocked.
   In this configuration the RSI DataCentre can use port 80h for WAN access and access to RSI.

2) Same as (1) above but with dedicated outgoing ports open for the Data Center.
   In this configuration the DataCentre will be configured for using the designated ports for its outgoing connection to RSI. The network administrator will assign a port and open the firewall for outgoing connections on the specific port.

3) Proxy Server:
The RSI Data Center supports the use of a SOCKS 5 proxy server. The DataCentre needs to be configured with the correct Proxy IP and Proxy port and in some cases with a designated user logon and password. The network/proxy administrator can provide this information.

The diagram explains the interactions.



Connection via Router with Firewall

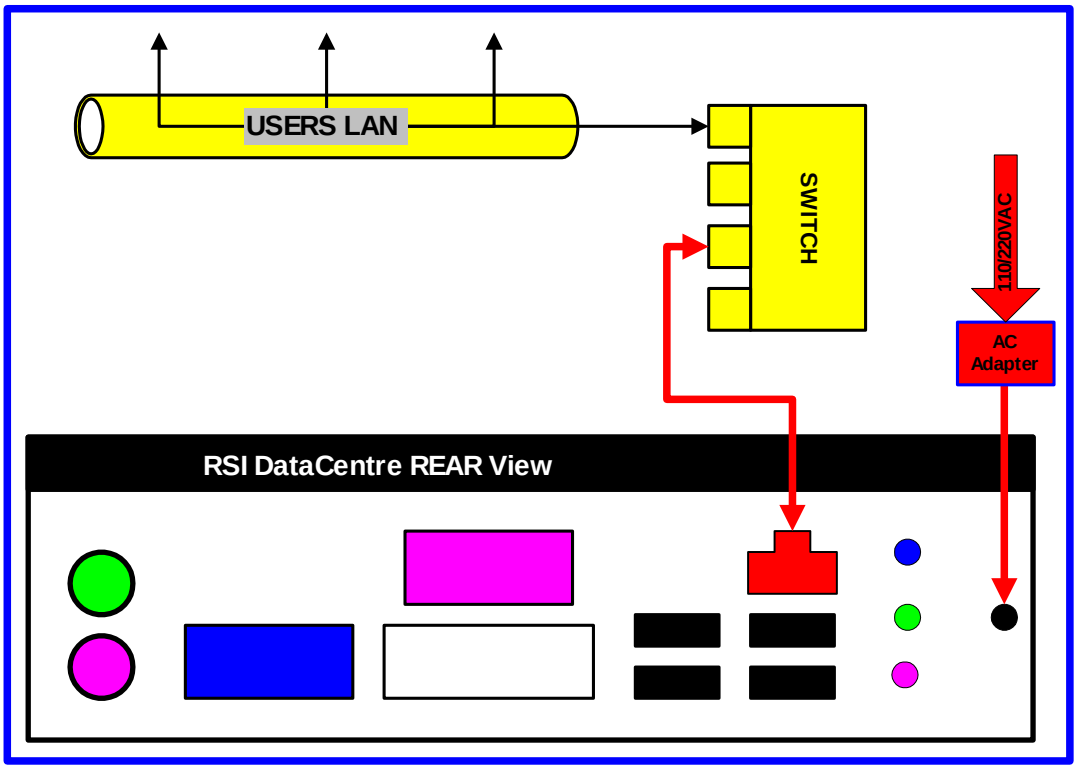
A typical situation is as shown in the sketch.

This is the typical configuration and shows a RSI supplied DataCentre acting as the hub for all data transfers from all RSI systems on site. The DataCentre also acts as a buffer to import all data from all RSI system Controllers on the LAN and export all these data to RSI-Service computer for Technical support, Data overview and System Remote Troubleshooting. The key is access to the LAN with one fixed IP address for the Data Center and one address for the System Controller either DHCP or Fixed IP.

The RSO can connect to the system from his office PC and can get email or SMS notifications of important events as long as the Data Center has Internet access.

4.3 System Connections

The sketch shows the appropriate connections required.



a) The AC connection (110/220) is connected to the Power Adapter which then plugs into the RSI DataCentre as shown (in red) – change the AC connector as required to suit local requirements.

b) The RJ45 LAN connector on the DataCentre (red in the sketch) must be connected to the users LAN. Usually there is a local LAN connector available or sometimes the user must supply a switch to make the connection. **DO NOT USE A ROUTER IF AT ALL POSSIBLE AS THIS MAKES SYSTEM SETUP MORE DIFFICULT.**

c) Power on the system when all connected.

4.4 Integration of the RSI DataCentre into the Users' LAN

As noted the DataCentre must have Defined STATIC IP address for the DataCentre to operate on the users LAN. This is supplied by the local LAN Administrator. See FAQs for more information.

4.5 FAQS

The following answers some common questions regarding the RSI DataCentre

a) **Protocol of communication between the detectors and the system control?**

The data protocol is an internal RSI protocol running on RS-485 at 10MB/s. The cable is supplied by RSI and combines detector communication and power.

b) **Is the data center server an industrial computer?**

No it is not an industrial computer but a “black box” with no Display or Mouse/Keyboard as it is preconfigured by RSI.

c) **What is the internet connection for? (some customers have Proxy filters, any problem?)**

The internet connection has multiple functions. It allows connection to the RSI Datacenter and sends real time information about the health of the systems to our Service Department. RSI can also monitor the alarms and help the RSO (Radiation Safety Officer) to interpret any alarm. This is especially important early on until the RSO learns how to interpret the alarms and is essential for proper service support as with broadband access, RSI-Service can properly analyze system problems.

The connection is outgoing so it should not be a problem for the proxy, router or NAT. If the proxy is filtering some ports it should allow a defined port [assigned by RSI in range 44550-44600] to connect to the RSI DataCentre.

d) **Is the VPN connection permanent?**

RSI does not use a VPN connection. We are using our own communication protocol running on top of TCP/IP.

e) **What is the concept of operation?**

The key is RSI does NOT connect to the user’s network, the users DataCentre connects to RSI. The DataCentre at the plant will be permanently connected to the RSI DataCentre and sends health and alarming information to the RSI-Service department. RSI also uses this communication channel to upgrade the software on the Datacenter and Portal Controllers as required. In addition the DataCentre can be setup to send email notifications to users in case of alarms or system errors.

The system can work without the Internet connection but the customer will miss the very important Support, Trouble-Shooting and Alarm Overview as well as the real-time notification aspect.
The components do not need real internet IP addresses, they are using Local Area Network IP addresses.

Component	IP Address	TCP/ Ports
Portal Controller (or Control Box)	DHCP or Static (LAN IP)	Connects to the users local DataCentre on one of the TCP Ports in the following range [44550-44600] defined by RSI.
Datacenter	Static IP (LAN IP)	Connects to the RSI Datacenter on the preset TCP port .
RadInspect (Windows application used to monitor the system, Runs on users PC)	DHCP or Static (LAN IP)	Connects to the users local DataCentre on the preset IP address and allows the users to monitor the status of the system and process alarms. It can be used by the RSO from home using VPN or by the Mill manager if he is interested in seeing what is happening with the system.

4.6 SPECIAL CASE – NO LAN Connection at the CONTROLLER

In some installations the LAN connection to the Controller will not be available EVER – OR it will be some time before this connection is available.

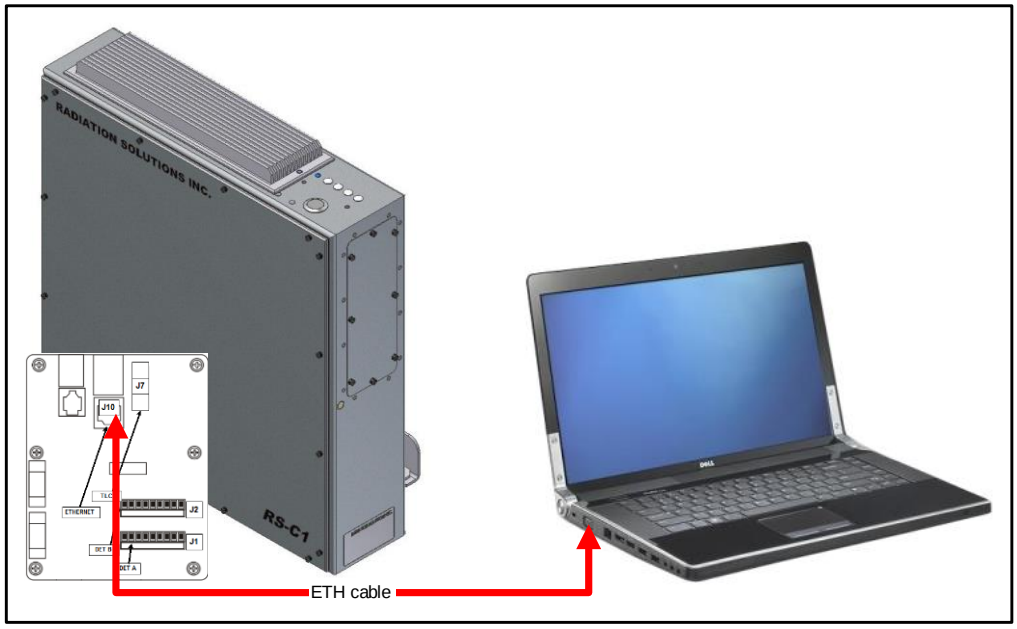
In EITHER case it is recommended to change a parameter in the system to prevent the Controller searching for the DataCentre or you will get WARNING messages on the Controller.

4.6.1 DISABLING DHCP CONNECTIVITY

The figure shows the connection method. Use one of the supplied LAN cables and ensure that the LAN connection goes via a Conduit connector to maintain dust protection.

In principle you should use a CROSS-OVER Ethernet cable but some laptops will automatically convert the Ethernet connection – however it is better to have an Ethernet inverter available if you are unsure of your laptops capabilities.

The technical problem is that the Controller is setup at the Factory to work on a Network so DHCP is enabled. However if you connect without a Network DHCP does not work so the system cannot find a good IP address so communication is impossible. We solve this by setting MANUAL IP as described below.



With the Controller and the Laptop powered **ON** – proceed as follows:

a) Ensure no Ethernet cable is connected to the Controller

b) Select the STATUS screen on the Controller by pressing **STATUS** tab

c) Verify that at the top left screen **IP ADDRESS** = **127.0.0.1**

d) Connect the Ethernet cable from the Laptop to the Controller

e) Look at the top left screen for **IP ADDRESS**. Wait approx. 1-2 minutes to make sure it changes then note this address – typically it may be something like **192.168.127.12** but any number like this is OK it depends on your laptop

f) On the Laptop – select **Control Panel**

g) Select **Network and Sharing centre**

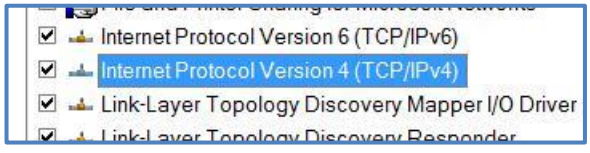
h) Select **Change Adapter Settings**

i) Choose **LOCAL AREA NETWORK**

j) Select **PROPERTIES**

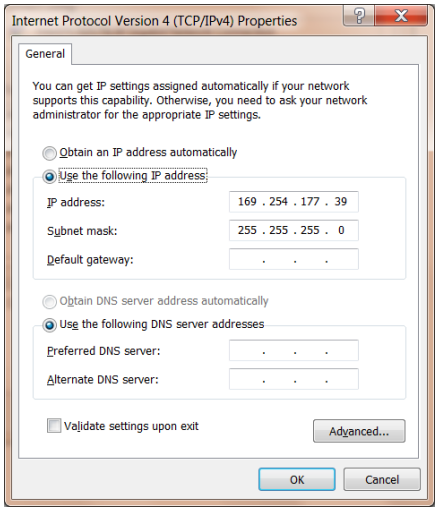
k) Choose **Internet Protocol Version 4**

l) Select **Properties**



m) As shown in the figure:

- Select **USE THE FOLLOWING IP ADDRESS**
- Set IP address to one in (c) above but increase the last number by "1" so in the example noted above enter **192.168.127.13**
- Set Subnet mask = **255.255.255.0**
- Then **OK** to accept then **CLOSE, CLOSE** as required to exit the Control Panel

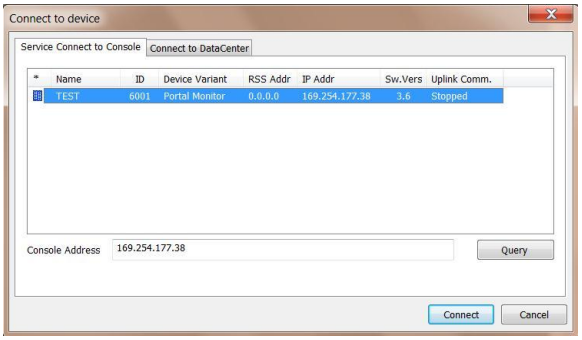


n) Start **RadInspect** and select **SERVICE CONNECT.**

o) You should now see the Controller in the data box with IP **192.168.127.12.**

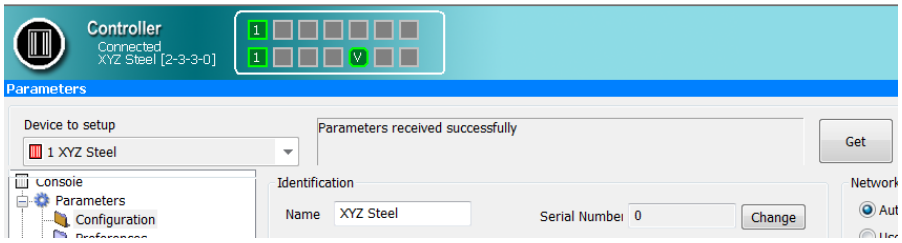
p) If nothing is visible click **QUERY.**

q) If still nothing, connect an **Ethernet inverter device** on the Ethernet cable at the Laptop and then plug into the Laptop. Now click Query again – using one of the above will let you see the IP of the Controller.



r) Click to select the Controller IP line then click **CONNECT.**

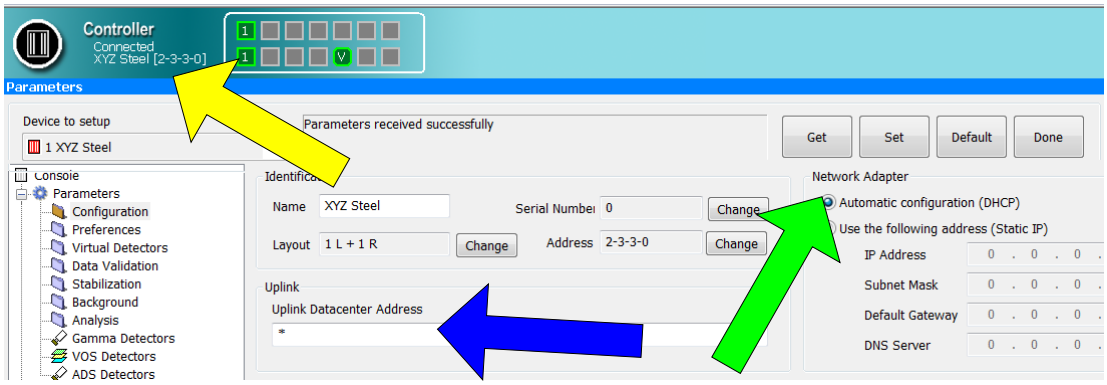
s) Display screen should be as shown – note that at the top left it shows **CONTROLLER** showing you are directly connected to only the Controller.



t) Select the lower **PARAMETERS** tab.

u) Select the **DEVICE TO SETUP** data box at the top left and click the pull down arrow. There should be a device there (**XYZ Steel** unless someone has already setup the system to another name) – select this then click **GET** (top row button).

New Display



Adjust as follows:

v) The upper display (Yellow arrow) shows that you are directly connected to the system **Controller** for **XYZ Company** (or whatever local name is defined).

w) Ensure the **NETWORK ADAPTER** (Green arrow) is set for "**Use the following Address**".

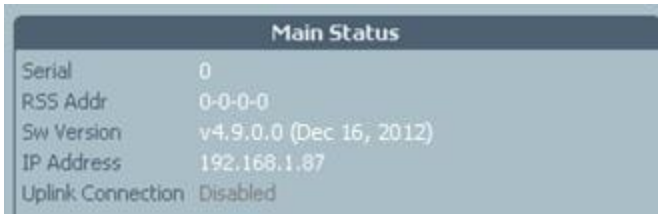
x) **REMOVE** any info on the **UPLINK DATACENTER ADDRESS** line.

y) Click the **SET** button to "load" it into the system.

z) Click the **GET** button to "read" the parameters to make sure they were loaded.

aa) Select **DONE** (top right button) to terminate this action then **FILE – DISCONNECT** to terminate the connection.

bb) Check that the "**Uplink Connection**" line on the Controller Status screen now shows **DISABLED** as in the figure.



cc) **Proceed to Section 5.2.**

The system will now operate normally with UPLINK disabled and the main system button which had said **WARNING** will now be Green and show **OK.**

4.6.2 ENABLING DHCP CONNECTIVITY

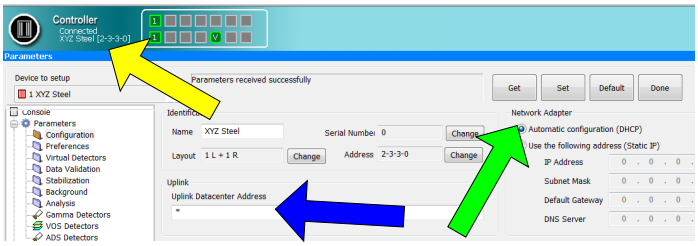
Normally the systems are shipped with DHCP enabled, however if the system had to be changed to MANUAL as described in 4.6.1 above – **then when LAN connectivity is finally available DHCP needs to be enabled** again as follows.

a) Repeat 4.6.1 steps (a) to (u) above.

b) The upper display (Yellow arrow) shows that you are directly connected to the system **Controller** for **XYZ Company** (or whatever local name is defined).

c) Ensure the **NETWORK ADAPTER** (Green arrow) is set for "**Automatic configuration - DHCP**".

d) Add an asterisk (*****)as shown in the **UPLINK DATACENTER ADDRESS** line.



e) Click the **SET** button to "load" it into the system.

f) Click the **GET** button to "read" the parameters to make sure they were loaded.

g) Select **DONE** (top right button) to terminate this action then **FILE – DISCONNECT** to terminate the connection.

h) Check that the "**Uplink Connection**" line on the Controller Status screen now does NOT show **DISABLED but shows CONNECTING or CONNECTED** as in the figure (RED arrow).

i) **Go to Chapter 5.0.**

5.0 SYSTEM SETUP USING RadInspect

5.1 General

Install the supplied software program **RadInspect** on a user's computer (auto install via supplied CD). Usually this is the RSO's computer but can also be the MAINTENANCE staff computer if they need service access.

To simplify the manual the following is assumed to be the instrument ownership/location – users of course can change to what they require but this info is used for demonstration:

– the **COMPANY** = **XYZ Steel**
– at **PLANT** = **SMITHVILLE**
– in **LOCATION** = **TRUCK SCALE A**

5.2 User SetUp

a) First step is to define PASSWORD access for the local user.

For the following description we will use:

USER PASSWORD = **RSO**
NAME = **user**

However, the local RSO information should be used.

NOTE: RSI deliberately disables the local USERS ability to change Parameters as this is a very sophisticated system and incorrect Parameter changes could seriously affect proper system operation.

However it IS necessary for the Service Tech to access parameters. There is a backdoor password used for first entry (**superuser/1** as shown below) but we don't want the local user to know about this access capability as they may mess with the system. It is easy for the user to see you enter "1" as the password so we need to change that.

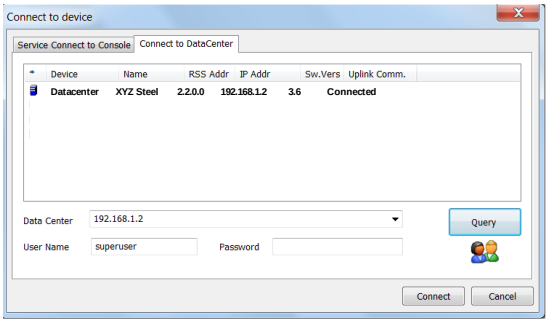
For this reason we recommend adding a second user (startup person) and they should choose their own password access and use the same one for all systems to avoid confusion.

For this manual description we will use:

SERVICE PASSWORD = **service**
NAME = **service007**

b) Ensure the pre-programmed DataCentre supplied by RSI is connected to the users LAN.

c) Start RadInspect – choose **FILE/SERVICE CONNECT.**



d) Choose the **CONNECT TO DATACENTER** tab.

e) The data box should show the RSI DataCentres connected to the users LAN , there should only be 1 DataCentre connected as only 1/plant required.

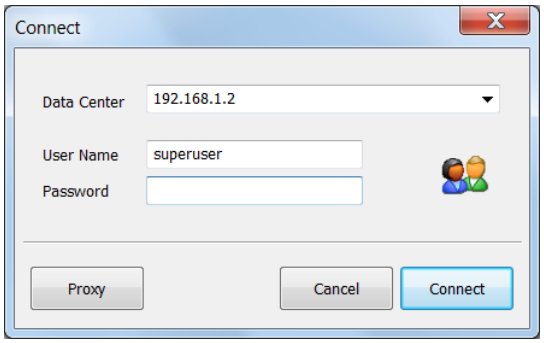
f) **If a DataCentre is seen go to (g) below** - if no data is shown select QUERY – if no data repeat QUERY 3 times, if still no data proceed as follows:

- Check that the DataCentre is physically connected to the LAN via the supplied Ethernet cable and powered ON – if not then connect it and power ON.

- If it **IS** connected it is slightly possible that the Ethernet cable is defective so plug/unplug a couple of times to see if QUERY will now find it.
- If **NOT** then it is probable that the local LAN is using multiple modes such as virtual LANs etc. In this case ask the local IT specialist to tell you what the actual IP address on the LAN is for the RSI DataCentre.

g) Note the IP ADDRESS using QUERY or from the local IT person advice – let us assume it is **198.168.1.2** as shown in the figure above and use it below (NOTE: obviously use the actual IP address but this is used as an example).

h) Now in RadInspect select **FILE/CONNECT** and this dialog box appears.



i) Enter:

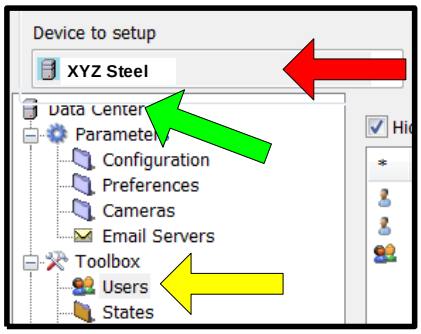
- DataCentre = **192.168.1.2**
- User Name = **superuser**
- Password = **1**
- Then click **CONNECT**

As commented above, try very hard to avoid the USER seeing this entry information.

j) On the startup screen for RadInspect – use the drop down box to select **XYZ Steel** (or whatever name was used) – since there is only 1 DataCentre – only 1 name should be seen here) RED arrow in the figure.

k) Ensure you select the DataCentre – should say Data Center as shown with GREEN arrow in the figure.

l) Select **USERS** YELLOW arrow in the figure.

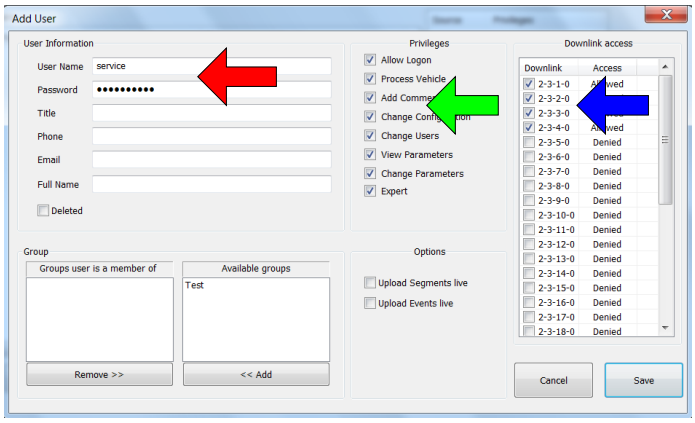


m) Select **ADD USER.**

n) Setup this for SERVICE access (not for local plant users but service for startup)

SERVICE PASSWORD = **service**
NAME = **service007**

- Enter this user name and password (or whatever you choose) RED arrow in the figure.
- Click ALL or the PRIVILEGES boxes – GREEN arrow in the figure.
- Click top 4 boxes – BLUE arrow in the figure.
- Select SAVE to enter these data.

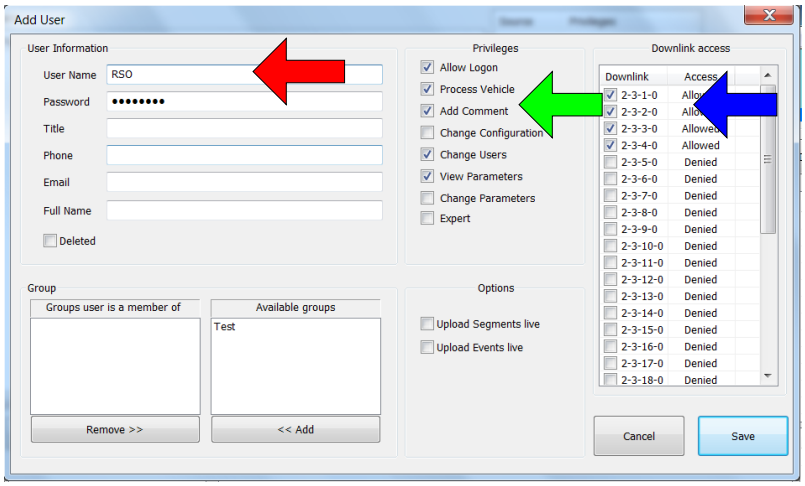


NOTE: These settings give the service user the ability to change many things.

o) Select **ADD USER** and set this up for the RSO access

USER PASSWORD = **RSO**
NAME = **user**

- Enter this user name and password (or whatever you choose) RED arrow in figure.
- Click ONLY the boxes shown of the PRIVILEGES boxes – GREEN arrow in figure.
- Click top 4 boxes – BLUE arrow in the figure.
- Select SAVE to enter these data.

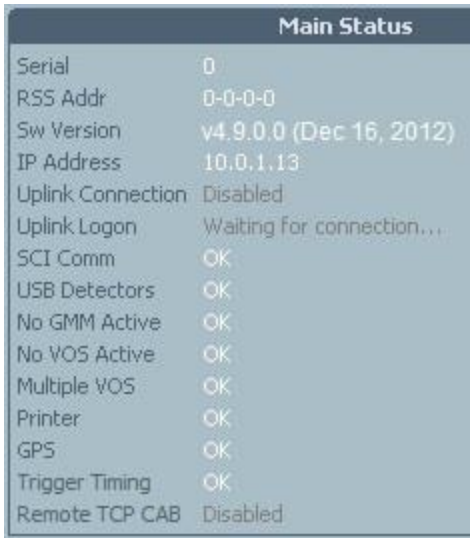


NOTE: These settings give the RSO user enough access for their required information but NO ability to change parameters or Configuration as incorrect changes here could seriously affect system performance.

Connect the RS-1C Controller to the company LAN (with DHCP and Internet support capability) using the supplied Ethernet.

p) Connect the RS-1C Controller to the company LAN (with DHCP and Internet support capability) using the supplied Ethernet cable and the supplied Ethernet switch as required. As shown in **Sections 4.2** and **4.6** above.

q) Inspect the Controller **STATUS** display Main Status data box and check the system IP ADDRESS which is automatically assigned by the users LAN via DHCP (shown in the example as **192.168.1.86**) Note this address and check with the LAN staff to ensure this is a valid IP address assigned by the LAN DHCP system**. If it is VALID then continue**. If not then discuss with LAN staff regarding the problem. Typical issues are problems in the local Router, bad Ethernet cable etc. Change as required then if necessary cycle power to the Controller with a 10 second wait and after reboot, check if all is **OK** – if problem persists – contact RSI-Service at **service@radiationsolutions.ca.**



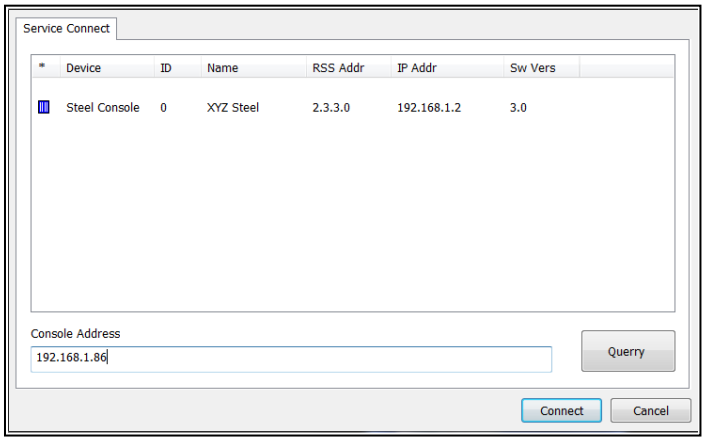
r) If Users name and Password have not been setup use:

USER NAME = **USER**

PASSWORD = **PASSWORD**

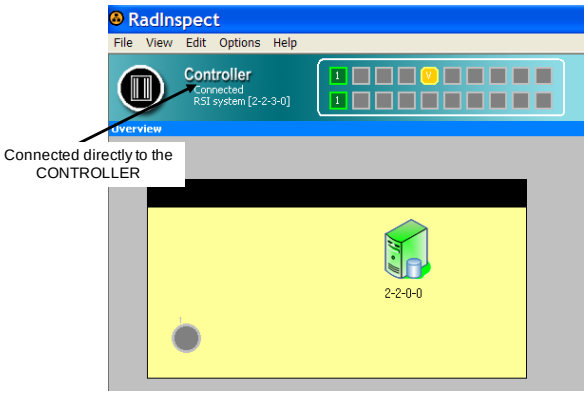
s) Start the installed **RadInspect** program, select **FILE – SERVICE CONNECT** then on the pop-up data box enter the IP ADDRESS of the CONTROLLER (**192.168.1.86** in the above example) then click **CONNECT.**

If any errors occur say **YES** to keep going.

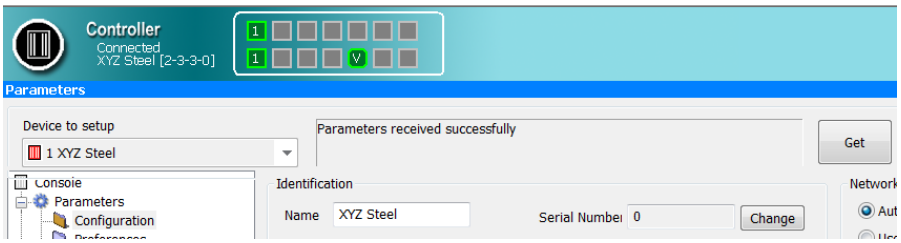


t) Display screen should be as shown – note that at the top left it shows **CONTROLLER** showing you are directly connected to only the Controller.

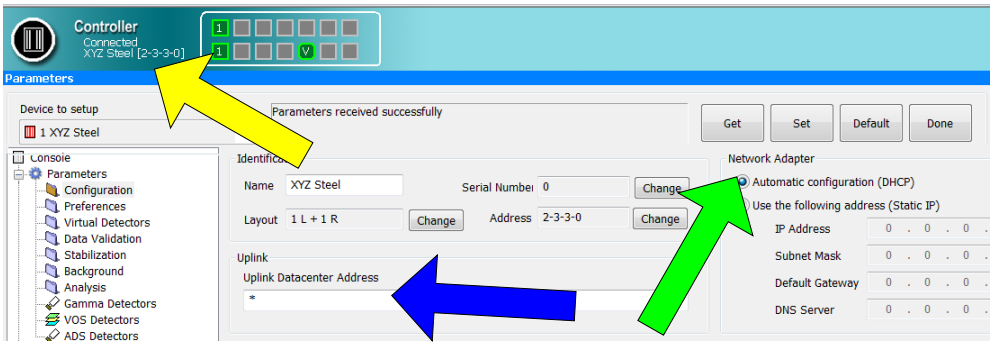
u) Select the lower **PARAMETERS** tab.



v) Select the **DEVICE TO SETUP** data box at the top left and click the pull down arrow. There should be a device there (**XYZ Steel** unless someone has already setup the system to another name) – select this then click **GET** (top row button).



New Display:



Adjust as follows:

w) The upper display (Yellow arrow) shows that you are directly connected to the system **Controller** for **XYZ Company** (or whatever local name is defined).

x) Ensure the **NETWORK ADAPTER** (Green arrow) is set for "**Automatic ….**" as shown.

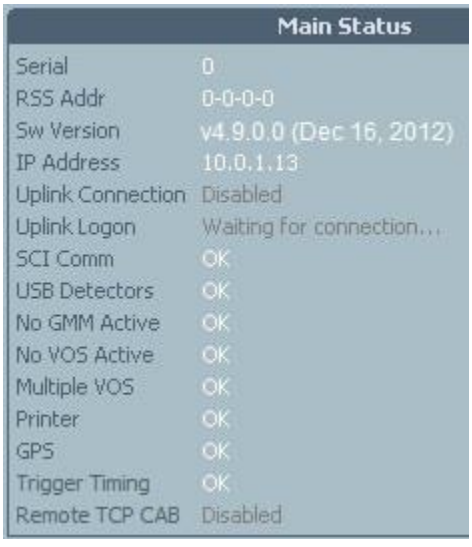
y) Enter an asterisk (*****) for Uplink address (Blue arrow) which sets the system on auto search.

(NOTE: if no LAN connections See Section 4.6, remove the asterisk).

z) Click the **SET** button to "load" it into the system.

aa) Click the **GET** button to "read" the parameters to make sure they were loaded.

bb) Select **DONE** (top right button) to terminate this action then **FILE – DISCONNECT** to terminate the connection.



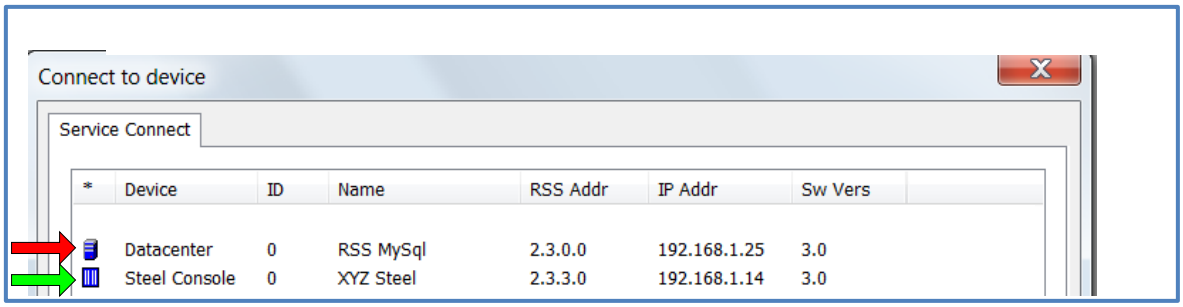
cc) Check that the "**Uplink Connection**" line on the Controller Status screen now shows **CONNECTED.**

5.3 Verify Connections

Now that all is setup, the Start-Up team should access the system using **RadInspect** to check parameters and verify all is **OK.**

a) Start **RadInspect**, select **File – Service Connect**

b) Inspect the screen and look for a Datacenter (highlighted below with the red arrow)

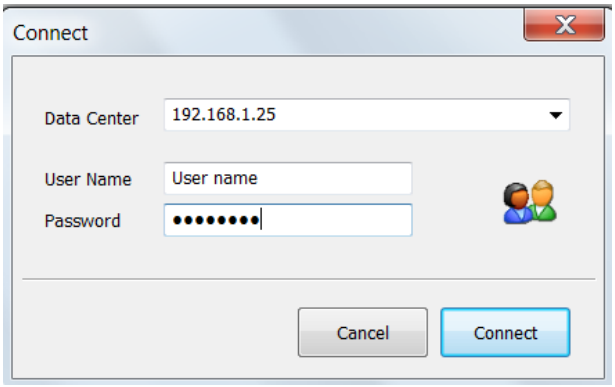


c) Note the IP address of the system – in this case **192.168.1.25** – this is the address that the user will always use to access this DataCentre.

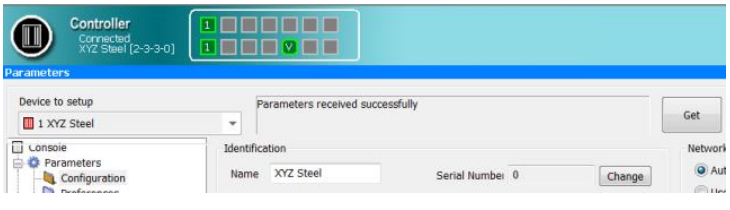
NOTE: IN FUTURE NEVER USE THE SERVICE-CONNECT CONNECTION AGAIN AS INCORRECT ACTION HERE CAN HAVE A SERIOUS EFFECT ON THE PERFORMANCE OF THE SYSTEM – USERS MUST NOW USE CONNECT INSTEAD.

d) Select **File-Connect** – enter **DataCentre address** (in this example 192.168.1.25) then the **User name** and **Password** assigned to the user.

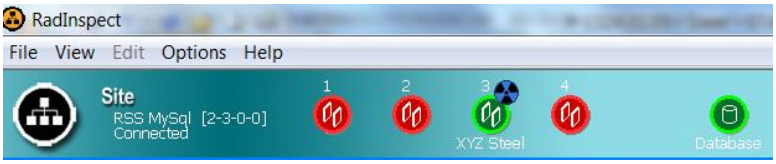
e) Click the **CONNECT** button.



f) Select the **PARAMETER** tab, then In the **Device to Setup** data box, use the pull down arrow to find the Controller (in this example would show up as **XYZ Steel**).



g) The top screen should show a Green icon labeled "**XYZ Steel"** showing you are connected OK and another Green icon labeled "**Database**" showing you are connected to the DataCentre as well.



IF PROBLEMS – THEN RSI-SERVICE WILL WORK WITH THE INSTALLER AND THE LOCAL LAN STAFF TO RESOLVE ISSUES AND SOLVE THE PROBLEM. See Appendix Z for Contact info.

6.0 STATUS PAGE and SYSTEM ERRORS

This page shows the current Status of important parameters.

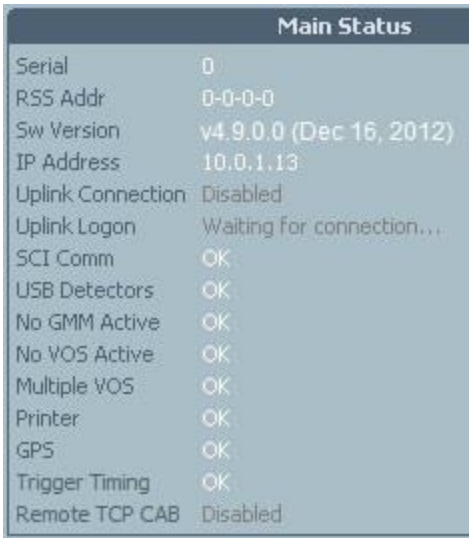
In the event of an error, the audio sounds and the top left red button shows:

User should silence the audio by pressing the button and the display automatically changes to this Error display to permit the user to assess the problem.

This screen can also be used to check the status of various functions as described below.

6.1 Main Status Data box

This data box shows various data about the system that is useful in troubleshooting.



Serial: this is the serial number of the installed system and is an import ID for RSI Service support.

RSS Addr: this is the System IP address on the Plant Network.

Sw version: the installed Controller software version.

IP address: the systems IP address on the Internet.

Uplink connection: an RSI set parameter to define the Controller's data level – normally this **should say ENABLED**

SCI Comm – shows communication with the Spectrometer units inside each detector is all **OK** – **should say OK**

USB Detectors – shows communication with USB connections to the detectors is **OK** - **should say OK**

No GMM active – shows that the configured detectors test **OK** – if the system detects an active detector that is NOT in the configuration it generates an error - **should say OK**

No VOS active – shows VOS unit test **OK** – if the system detects an active VOS that is NOT in the configuration it generates an error - **should say OK**

Multiple VOS – if the system detects multiple VOS units the system shows an error as only 1 VOS unit is required for correct system performance - **should say OK**

Printer – shows Printer is connected and test **OK** - **should say OK**

GPS – shows GPS is connected and test **OK** - **should say OK**

Trigger Timing – shows Trigger is connected and tests **OK** - **should say OK**

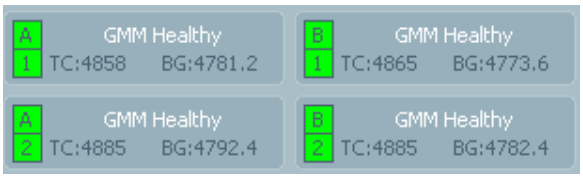
Remote TCP CAB – shows TCP CAB is DISABLED - normally this **should say DISABLED**

6.2 Detectors' Display

These data information show the status of various parts of the system. The rule-of-thumb is if all lights are **GREEN** then all is OK

Line A (B) Healthy – the detectors are connected to the Controller unit via 2 separate cables. The detectors are setup on opposite sides so the vehicle must pass between them. All detectors on one side are designated **A** detectors (A1, A2…A7) and the other side are designated **B** detectors (B1, B2…..B7). Both these sets of detectors are fed into the Controller on SEPARATE cables and plugged into the Controller data inputs in the A input and the B input. A green light here means that the Controller can read these input ports **OK** so the data INPUT is functional.

GMM Healthy – this is the Gamma Data (GMM) for the detectors. The example given here is for a 4 detector system designated A1, A2 and B1, B2. The green label for each detector shows that the detectors are functioning **OK**.



TC:4858 - is the Total Count data from each detector.

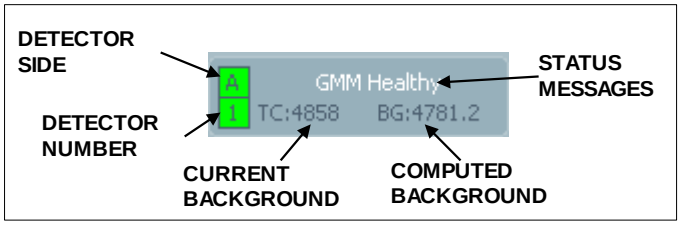
BG:4781.2 - is the stored Background data for each detector.

VOS Healthy – the semi-circular icon shows that this "detector" is actually a Vehicle Occupancy Sensor (VPS) and is functioning **OK (GREEN)**. As a vehicle passes, the 4 lower "lights" will light up as the OS are activated. The example shows OS1 and 2 activated. As a typical scrap truck passes action on all 4 OS should occur. If any OS is inactive or "stuck on" then an error will occur and the appropriate OS will show a **RED** light to indicate the error (see Maintenance Manual for details).

STATUS ERRORS

When the system first starts it must compute the local background levels as a reference. During this time the "**COMPUTED BACKGROUND**" is shown as:

- **Init. BG 4728 [43]**



Where:

Init. BG = the label showing that the local Background is being computed.

4728 = this is the count rate of the detector in counts/second and this number varies depending on detector location but is typically 3000 to 5000cps.

[43] = this is the preset time countdown – and progresses usually from 60 seconds (parameter preset value) down to 0. When the detector BG countdown gets to 0 the computed value is displayed, the countdown disappears and the data changes from red to white to show that all is now **OK.**

At the same time the **ERROR** button (top left) automatically changes to Green OK when all detectors backgrounds are computed **OK**.

NOTE: VEHICLES SHOULD NOT PASS THROUGH THE SYSTEM WHEN IN ERROR MODE OR A SCAN ERROR WILL OCCUR.

Problems that can occur are displayed in the "**STATUS MESSAGE**" box shown in the figure. Messages, meaning and recommended actions are show in the table below.

Appendix Z – WARRANTY

RSI RADIATION SOLUTIONS INC

Radiation Solutions Inc. Warranty

RSI products are provided with a two (2) year return to factory limited warranty against defects in materials and workmanship from the date the Products are placed at the disposal of the Buyer at the named place of delivery. The warranty does not cover damage caused by improper use or unauthorized repairs.

Repairs of defects will be performed by RSI at no charge to the Buyer, subject to the limitations when the unit is returned to the factory. To request warranty service, the Buyer must call RSI's service coordinator for a return material authorization (RMA) number.

The Buyer is responsible for all the shipping, customs clearance costs and risk of loss of returning the repaired or replaced Products to the Buyer. RSI will own all parts removed from repaired Products or all Products replaced.

RSI's warranty does not include mechanical damage to the detector from handling or abuse. RSI does warrant the detectors to be complete and fully operational to their published specifications at the time of delivery and to maintain the minimum resolution and performance for a period of two years under normal operating condition.

The radiation monitoring system is warranted by RSI to perform correctly if it is installed and operated according to RSO directions. However system operation is limited by basic physics so RSI does NOT warrant 100% detection capability but does warrant that if the system is installed and operated correctly then these systems are technically more advanced than any other similar system on the market and has the highest probability of alarming.

Complete details of the "***Standard Terms and Conditions***" may be obtained by contacting RSI.

For more information or to make a warranty claim contact RSI.

Contact Information

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