

TECOM Discovery Control Panel Installation and Quick Programming Manual

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Manufacturer	Manufactured in Australia by: SRX Global Electronics Manufacturing Services Australia & Malaysia 8 -10 Kitchen Road Dandenong Victoria 3175 Melbourne, Australia
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ACMA compliance	 When installed as directed, this product conforms to the standards set by Standards Australia on behalf of the Australian Communications and Media Authority (ACMA) Notice: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.
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Important information

Limitation of liability

To the maximum extent permitted by applicable law, in no event will KGS Fire and Security Australia Pty. Ltd. be liable for any lost profits or business opportunities, loss of use, business interruption, loss of data, or any other indirect, special, incidental, or consequential damages under any theory of liability, whether based in contract, tort, negligence, product liability, or otherwise. Because some jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages the preceding limitation may not apply to you. In any event the total liability of KGS Fire and Security Australia Pty. Ltd. shall not exceed the purchase price of the product. The foregoing limitation will apply to the maximum extent permitted by applicable law, regardless of whether KGS Fire and Security Australia Pty. Ltd. has been advised of the possibility of such damages and regardless of whether any remedy fails of its essential purpose.

Installation in accordance with this manual, applicable codes and the instructions of the authority having jurisdiction is mandatory.

The customer is responsible for testing and determining the suitability of this product for specific applications. The customer is responsible for testing the product at least once every three months.

While every precaution has been taken during the preparation of this manual to ensure the accuracy of its contents, KGS Fire and Security Australia Pty. Ltd. assumes no responsibility for errors or omissions.

Agency compliance

The TECOM Discovery product range displays the Regulatory Compliance Mark (RCM) as evidence of conformance with requirements set by the Australian Communications and Media Authority (ACMA).

Notice: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Compliance with the RCM labelling requirements has been demonstrated by testing the product in representative installation configurations to various Australian and New Zealand Standards as listed in [Appendix A](#).

In addition to the necessary regulatory requirements, the TECOM Discovery product range has also been evaluated in representative installation configurations and proven to be compliant with various EMC Immunity requirements as listed in [Appendix A](#).

Contact information

For contact information, see <https://aritech.com.au>

Preface

This manual covers the installation of the Discovery product range and power supplies in new and existing environments. Please review the sections related to the products being installed and the specific installation environment to ensure that items related to system performance and safety are addressed.

The product name “Discovery” will often be used in this manual.

The *TECOM Discovery Installation and Quick Programming Manual* is for installation technicians to install, program and commission a Discovery panel.

Refer also to other Discovery manuals in the suite:

- The *TECOM Discovery Administrators Manual* is for user’s and system administrators who need to manage the Discovery system via its text-based user interface (via the User menu).
- The *TECOM Discovery User’s Manual* is suitable for most users of the Discovery system to perform everyday tasks.

Latest versions of the manuals are all available online at: <https://bit.ly/tecommanuals>

Product contents

The package contents for the products covered in this manual are given in the tables below.

Inspect the package and contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately.

Table 1: TSX10000, TECOM Discovery DIN module shipping list

Qty	Item
1	TSX10000 TECOM Discovery Control Panel
7	Black 2-way plug-on screw terminal connectors
4	Black 3-way plug-on screw terminal connectors
1	Red 5-way plug-on screw terminal connectors
3	Black 5-way plug-on screw terminal connectors
5	Black 6-way plug-on screw terminal connectors
2	Black 8-way plug-on screw terminal connectors
1	Resistor, 1k 5% 250mW 0.4" axial
32	Resistor, 10k 5% 250mW 0.4" axial
1	Battery Lead Fused, 8A T, 800mm
1	Label for enclosure

Table 2: TSX10000-UPGKIT, TECOM Discovery Upgrade Kit shipping list

Qty	Item
1	TSX-DINRAIL (DIN rail for existing TS0307 enclosures)
1	TSX10000-PSU1 (24VDC 120W Standalone Power Supply)

Product overview



Figure 1: TECOM Discovery Control Panel

The TECOM Discovery Control Panel is a scalable intrusion detection and access control system.

Key TECOM Discovery Control Panel features and benefits include:

- Supports TECOM Challenger system components and peripherals
- DIN rail mounting (DIN adaptor kit for existing enclosures)
- 12 / 24 VDC primary power supply
- 8 individually fused power outputs supporting 3A of peripheral load
- 2 siren and 1 strobe outputs
- 16 on-board alarm inputs
- 4 general purpose relays (e.g., doors)
- Expansion port for additional relays
- 3* Comm (LAN) (RS485) busses supporting existing and new TECOM high speed protocols
- 2 reader terminals supporting Wiegand and OSDP* protocols
- All Comm and OSDP ports have on-board protected, SW controlled termination
- Ethernet NIC
- 2 USB host ports for additional communications (4G / 5G / Wi-Fi / 2nd NIC)*
- STU interface
- I/O status indication LEDs
- Web browser for configuration options

* Certain functionality will be available in the future by firmware updates.

Before you begin

This section contains items that govern the installation of the TECOM Discovery Control panel.

When installing a Discovery control panel, or any other parts of the system, you need to be aware of requirements for installation location, cabling and earthing, and plan accordingly.

NOTICE! A trained service person must perform all required hardware installation in compliance with all applicable codes.

Disclaimer: This manual contains requirements based on Australia and New Zealand codes. It is not an authoritative reference regarding codes and has not been reviewed by the responsible authorities. Codes applicable to your specific installation district or installation environment may not have been considered or included. The codes may change and may not be reflected in this document.

Safety Warnings



The enclosure protective earthing supplementary safeguard is not effective until the equipment is connected to the building earth via the mains plug or a direct wired connection.



Field wiring errors or damage may present hazardous voltages inside the enclosure. Treat all wires and boards in the enclosure as hazardous until checked and validated as safe.



KGS Fire & Security Australia Pty. Ltd. recommends the use of personal protection equipment, such as gloves, glasses, voltage detectors and meters for all installation and maintenance operations.



Take appropriate precautions if working on an active or recently de-powered device.

The circuit board and the heatsink on older TECOM bare circuit board products may be hot.

Do not touch.

Discovery compatibility with past power supplies

Operation with TECOM Challenger AC power supplies is not supported. Discovery is compatible with a nominal 12 VDC or 24 VDC source. Refer to [Appendix B2](#): Power Supply Specifications, page 68

ChallengerPlus interfaces not used on Discovery

The following hardware interfaces available on ChallengerPlus are not present on Discovery:

- The on-board plug-in expansion ports
- The analogue phone interface
- The SD card socket for backup and restore

Discovery Compatibility with prior TECOM hardware

Whilst Discovery is compatible with most peripherals developed for legacy Tecom systems, customers are advised that support for V8 Door and Lift Controllers (TS0866, TS0867, and TS0869) is not available in the Discovery platform. Please refer to the 2022 article available here <https://support.firesecurityproducts.com.au/hc/en-us/articles/14327548808207-Transitioning-into-the-Tecom-NAC> for information on transitioning to supported peripherals.

<https://support.firesecurityproducts.com.au/hc/en-us>

Equipment location



The Discovery control panel location must comply with the Environmental and Mechanical Specifications detailed in [Appendix B1](#) and [Appendix C, table 6a](#). The Discovery control panel must be installed in a location with restricted access. Access to the installation area should be monitored by the Discovery system and history events generated in the system.



The unit must not be installed in areas where children are likely to be present. The Discovery system is designed to be fixed in place. When the system is wall mounted, the enclosed unit final weight and access restrictions must be considered when selecting the mounting surface and the fasteners. Additional guidance is given in Minimum Enclosure table on page 67 for wall and rack installations given in [Appendix B1 tables X1](#) and [8](#).

Enclosure Access Restrictions

According to the requirements of AS/NZS 62368-1, the interior of the enclosure presents hazards to general users and thus physical access restrictions must be instituted to ensure safety. To comply with the requirements related to safety:

- Access to the interior of the Enclosure must be limited to suitably trained and qualified installation and maintenance technicians.

- Access to the interior of the enclosure must require the use of a tool.

These restrictions can be met by implementing one or more of the following options:

- Fit a lock to the enclosure. Ensure that it is always locked when not under the immediate control of suitably qualified technicians.
- Seal the enclosure door using standard head (non-knurled) screws, firmly tightened.
- When using finger operable screws (knurled head, etc) to seal the enclosure door, tighten to 2Nm (typically >1/4 turn beyond the finger tight point).

Installing the TECOM Discovery Control Panel

Installation guidelines



Installers must adhere to any country dependent requirements and local applicable standards. The installation environment must comply with environmental specifications of all modules fitted inside the enclosure.

Installation location requirements are provided in the [Equipment location](#) section on page 9. Some of these are new and as a result retrofit installation locations may no longer be compliant with current safety standards.

The following sections provide guidance regarding standard and bespoke installation of the Discovery module, enclosures, batteries, power supplies and wiring. The Discovery module port connections are covered in the section starting on [page 17](#). Detailed specifications and limits for each of these items is provided in [Appendices B](#) and [C](#).

The specific installation configuration must comply with all applicable entries in the specifications table and the detailed notes below.



All wiring internal to the enclosure, and all mains wiring, must be brought into compliance with the latest applicable wiring standards at the time of installation.

Newer electrical codes generally require that a power disconnect device be present close to the enclosure; for mains powered installations this is typically the GPO.

Installation procedure

Enclosures - general

The TECOM Discovery Control Panel must be installed in an approved, compatible enclosure, as detailed in the [Minimum Enclosure Requirements table](#) on page 67.

Install equipment in a clean environment and where environmental conditions are within the range specified for each module in the enclosure.

Installation in the open (without a surrounding enclosure) is unlikely to be compliant and has not been considered in the certification process.

Custom enclosures must comply with the minimal requirements. When mounting on equipment rack shelves or drawers, additional concerns are raised for wiring and ventilation, especially when other equipment shares a sealed rack enclosure. Forced air cooling may need to be provided. The installer is responsible for determining their suitability for the installation scenario at hand according to local codes, customer demands, ambient environmental conditions, and system requirements.

Enclosure location and mounting – New installations.

In a new installation, the empty enclosure is located and mounted on to the supporting surface following the procedure in the specific enclosure installation manual.



The enclosure as mounted is not earthed, so field wiring should not yet be pulled into the unit.

Enclosure location and mounting – Retrofit installations.

Retrofit kit is designed to suit the TS0307 enclosure. Retrofit installations should be reviewed prior to proceeding to ensure that the environment is still suitable for use and that the integrity of the existing enclosure and wall mounting arrangement is sound and suitable. Since the introduction of the Tecom systems, and the installation of the unit being updated, safety standards have improved, room usage may have changed, the thermal load in the room may have significantly increased or the enclosure mounting may have been damaged. Refer to the [Equipment location](#) section on page 9 for specific requirements.



Prior to working on the unit:

Validate the integrity of the enclosure earth. Be aware that during the upgrade process, the metal enclosure will be unearthed until the works are completed. The additional safety precaution of providing temporary earthing to the enclosure during the wiring transition may be taken if deemed necessary by the qualified installer.

Ensure that cables entering the enclosure are not carrying dangerous voltages.

Identify any potential hazards and make them safe; The front door should be removed from the enclosure prior to working on the unit. The system should be de-powered, and the battery removed and safely stored when moving or modifying the enclosure, mounting new hardware or re-wiring the system.

Before drilling into a wall or fitting self-drilling screws, consider cables, voids, studs, and other hazards that may be behind the wall face.

Ensure that all necessary access codes are known and that the procedures for taking the system off-line are followed. Take adequate notes and photos to ensure that the transfer of wiring between the old and new system can be successfully completed.

Enclosure preparation

Adequately record and mark all cables connected to the existing Tecom panel in preparation for reconnection to the new module.

The existing blue Terminal Block plugs are not compatible with the Discovery system and will need to be changed over.

Once connections are annotated, the existing Tecom panel should be disconnected and removed from the enclosure, along with its mounting hardware.

Proceed as follows:

- a) TECOM and custom power supplies must meet all of the environmental and mounting constraints detailed in the relevant sections of [Appendix B2](#). If permitted by the local wiring codes, the low voltage DC lead of external power sources may enter the enclosure by the same means as the existing low voltage ChPlus power lead.
- b) Locate the GPO powering the system. Prior to de-commissioning the existing system, confirm that the power supply can be connected to the GPO and the Discovery module, taking into account the mounting requirements and planned mounting point.
- c) Power down the system and remove the door and battery from the enclosure.
- d) Unplug the AC plug pack powering the existing Tecom system. Disconnect and remove its low voltage cable from the system.
- e) Disconnect all remaining cables from the ChPlus system.
- f) Unscrew the ChPlus from its mounting points and remove it from the enclosure. Use pliers to compress and remove its mounting standoffs from the enclosure.
- g) Wires under the existing ChPlus board or entering the enclosure through the covered openings must be moved to allow installation of the DIN rail and Discovery.

Maintain control of the plug end; do not allow it to be connected to the mains prior to the completion of all power supply wiring.

NOTICE! In case of a worn, pinched or otherwise damaged mains lead, the power supply module must be replaced in order to avoid hazard.

DIN rail mounting

Locate the supplied DIN rail as shown and locate the inner tabs of the DIN rail, slot DIN rail into the cable tie loops in the base of the enclosure. Secure the rail with the supplied self-drilling screw.

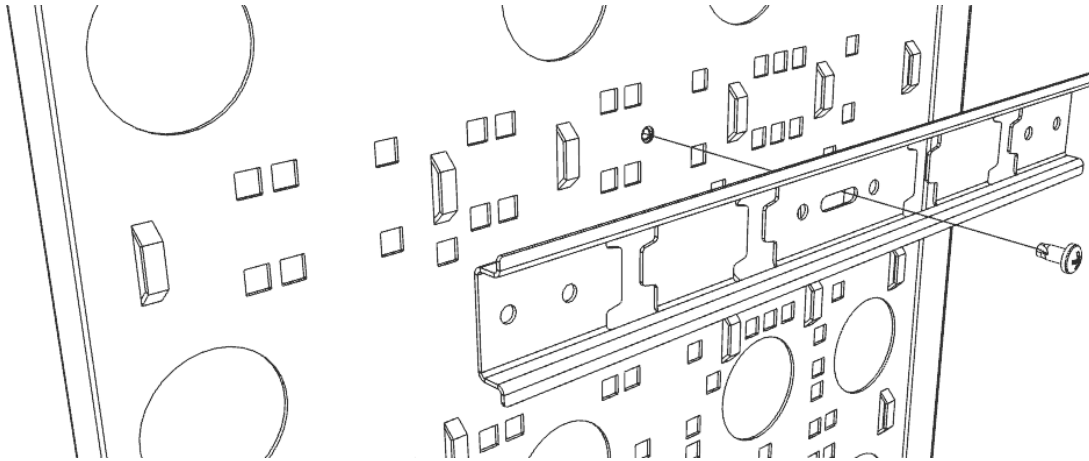


Figure 2: DIN Rail mounting

Discovery module mounting

Locate the Discovery module approximately in the centre of the DIN rail, hooking the upper section over the rail, and securing in place using the latching clip; removal follows these steps in reverse. Please refer to [Appendix C, table 6a](#) for guidance in custom installations



The Discovery module should not be mounted until the earth; power supply and system wiring has been routed into the enclosure.

Figure 3: Discovery module mounting.

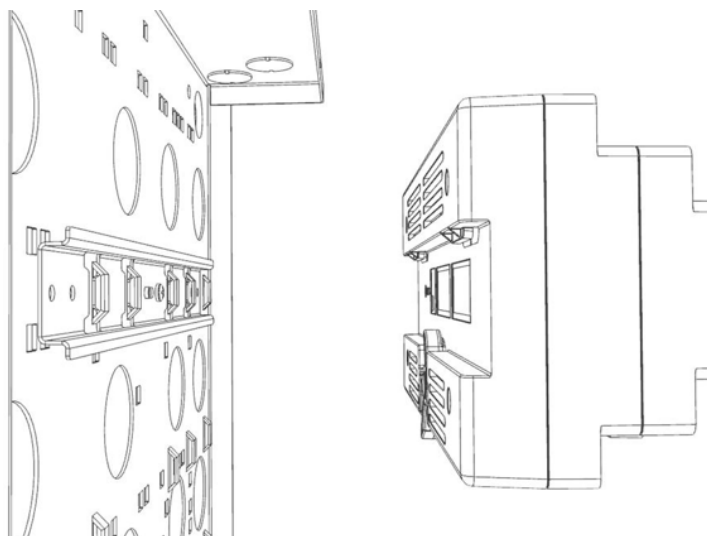


Figure 3A: Discovery module mounting

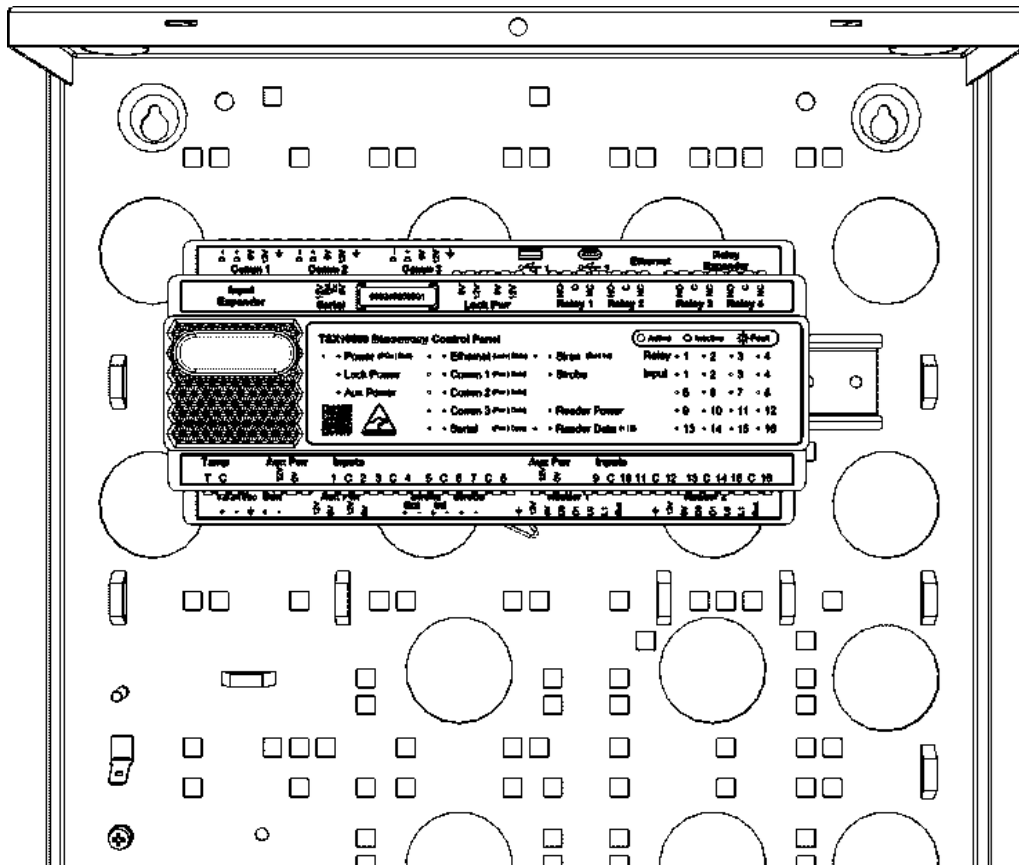


Figure 3B: Discovery module mounting

Discovery System Cabling requirements

General

- Enclosure cut-outs are provided in the rear face to allow cable entry through the mounting wall. Some enclosures also have cut-outs in the top and/or bottom faces provided for situations where it is not practical to trunk cables via wall cavities.
- Circuit separation, conduit materials, and workmanship must comply with all applicable codes. All wires entering the enclosure should be tied near the point of entry. Avoid loops of wire.
- Route cables so that they do not lie on top of any device. Do not route wires underneath any bare PCB modules. Use cable ties to improve neatness of wiring.
- All enclosure wiring must comply with the requirements in [Appendix C table X1](#).
- Minimum conductor requirements for the Discovery ports are detailed in [Appendix C, tables 6a, 6b and 6c](#).
- Terminal wiring should be performed with all power disconnected from the system and covered battery terminals to avoid accidental shorts or more serious hazards.
- If terminating wires with modules fitted, be aware that stripped wire ends can easily contact each other, nearby terminals or conductors in modules.
- Connectors used on the Discovery module are not compatible with earlier products. Wires must be re-terminated to the new connectors supplied with the module.

- Discovery and legacy TECOM module connector torque data and wire preparation notes are provided in [Appendix C, Table 6a](#).
- Poor connections lead to intermittent faults, excessive voltage loss and can affect system performance.
- When terminating conductors, do not re-use stressed portions of the wire; cut it off and strip a fresh section to terminate, ensuring a clean insulator cut and no cut or nicked strands. Dress the wire, fully insert into the terminal housing and tighten the retaining screw to the specified torque. On completion, the cage clamp must only have engaged the conductor, less than 2mm of bare conductor should be visible between the clamp and wire insulation, no broken or free strands should be present and the conductor must be firmly held by the terminal.
- In general, the activities related to pulling wires into the enclosure, securing the bundles, cutting and stripping the ends, etc., are easier when the enclosure is empty. Perform as much of the installation as possible and clean up the enclosure and surrounds prior to mounting modules. Be aware of loose wire strands resulting from cutting and stripping the cables – they can readily cause intermittent shorts and other damage if they find their way into the module circuitry.

Safety earth bond



In configurations where circuits rated ES2 or higher per AS/NZS 62368-1¹ enter an enclosure, metal enclosures and all separate externally accessible metallic parts (doors, access panels) require a safety earth bond.

Security and access control systems may be subject to misuse or attack, making this condition more likely to occur than faults in other low voltage control systems. TECOM recommends that the enclosure is earthed in all installation scenarios.

The enclosure safety earth bond must be in compliance with applicable codes, as confirmed during the enclosure installation.

The Discovery module and peripherals are not rated to carry earth fault currents and must not be used as junction points or the primary bonding point for safety earth.

Installations using external 12 VDC or 24 VDC sources will require enclosure safety earth and bonding points to be provisioned by the installer; minimum requirements are in [Appendix B1, table 8](#).

The safety earth bond will typically be made to the enclosure or on the metal frame of a TECOM mains power supply designed to fit inside the enclosure. All remaining safety earth connections should be made from this earthed structure in a compliant manner; in general, safety earth connections should be direct and not part of a daisy chain.

Functional earth connections

Discovery series controllers and legacy peripherals require a functional earth connection for correct operation; it assists with the handling of ESD and surge currents as well as maintaining correct voltage levels across

large installations.



The functional earth is not a substitute for safety earth connections. Discovery system connectors, LAN and power cabling are not rated for and must not be used to carry fault currents.

Terminal location. On the Discovery module, the functional earth terminal is between the power and battery terminals, similar to the location on legacy controllers such as the ChPlus, DGP and TS1066 and TS1067 door controllers. The Discovery module also provides a functional earth terminal at each communications port to connect to LAN and Wiegand cable shields. On some TECOM peripherals the functional earth is also provided as an M3 screw connection, tab terminals or it is available at the circuit board mounting holes.

Ground or Earth links. Legacy TECOM peripheral devices have an earth lug (or stud) on the PCB and are fitted with a link labelled “GND” or “EARTH.” In such cases, the device’s GND or EARTH link must be removed. When configured correctly, there will be a resistance value greater than 100 k Ω between the device’s earth lug (or stud), or power earth terminal, and any “C” or “0V” terminal on the device (measure in isolation, before connecting cables to the peripheral).

Shielded cables. Discovery modules distribute functional earth with the shield on communications cables (LAN, Wiegand). When a LAN is connected to a module with a local connection to earth, the LAN cable shield is not connected to the module at this point, but it also is not broken – it continues to the next destination. Refer to [Figure 6](#) RS-485 LAN and earth system block diagram on page 25.

Earthing of one cabinet containing several devices. The device functional earths must be connected to a safety earth bonding point inside the enclosure in a daisy chain or star configuration.



There must only be ONE link between the functional earth cabling and an enclosure safety earth in the whole network; if there are two or more, the functional and safety earth have been wired in parallel: fault currents will flow in the functional earth circuit, leading to damage.

Earthing of panels in a single building. In a single building several cabinets or devices are locally bonded to the building earth. A licensed electrician should check the integrity of the building earth system. The functional earth of modules in each cabinet is connected to the cabinet safety earth, as discussed above.

As each cabinet is individually earthed, cabling between cabinets must not link the functional earths together (typically via communications cable shields). Refer to [Figure 6](#) RS-485 LAN and earth system block diagram on page 25.

Earthing of panels in more than one building. If the wiring extends to separate buildings, use more than one common earth system. Install LAN isolation devices, such as TS0893, TS0894 or TS0896 isolation Interface modules to isolate the system LAN between buildings to protect the system against differences in earth potential and/or to extend distance. See [Figure 5](#) page 24.

TSX10000 TECOM Discovery Control Panel details

The available connections on Discovery Panels are summarised in the diagrams below and detailed in subsequent sections.



To ensure system reliability and gain the maximum benefit from Discovery modules, review the detailed notes applicable to the interfaces in use at an installation; They cover normal usage scenarios, capability, limitations and interactions with the other Discovery ports.

Some ports are designed to interface to specific TECOM modules; for a complete overview of the function, refer to the peripheral's documentation in addition to the notes below.

Conventions:

All circuits are polarised and must be correctly connected to the target devices to function and avoid damage.

- Only connect 24V power to the primary power terminals.
- The positive side of power circuits is indicated by '+', '12V' or '12VDC'
- The negative side of connections is indicated by '-', '0V' or 'C'
- Functional earth is indicated by **G**. It is not the same as and will not function as a negative terminal. Do not connect to power circuits, only use it as described for shield terminations and connection to earth.
- Confirm all wiring interconnections prior to applying power.

Figure 4: Model TSX10000 Control Panel details

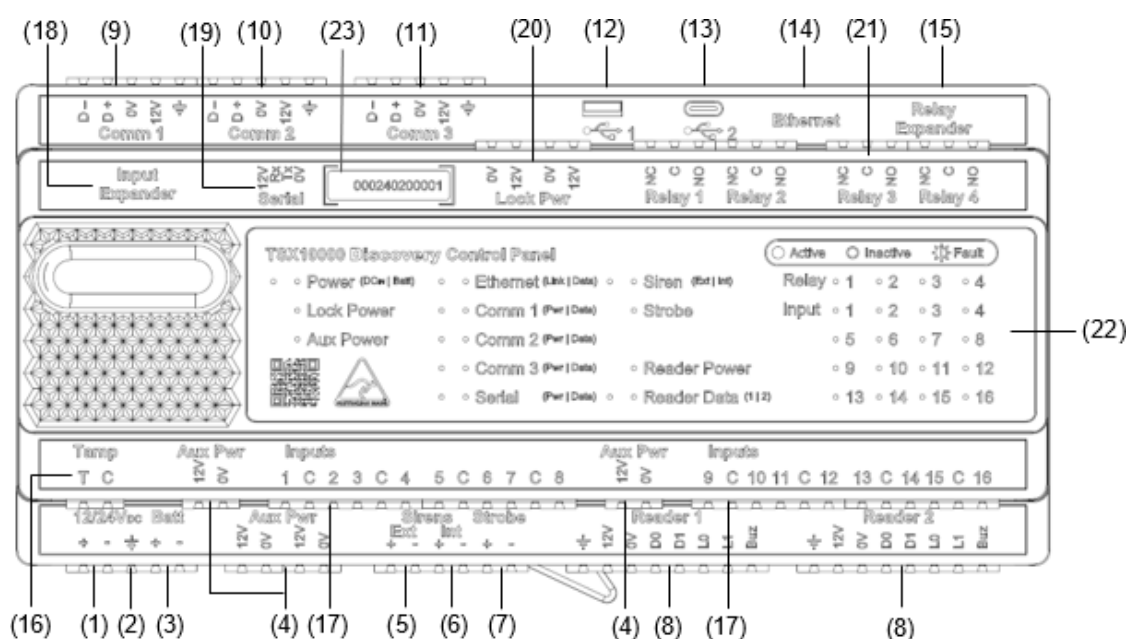


Figure 4: Legend

Item	Terminal description	Applicable sections
1.	Primary power, 12 or 24 VDC.	Primary power
2.	Functional Earth.	Functional earth
3.	Battery, 12 VDC sealed lead acid.	Battery
4.	Auxiliary power, 4 sets.	Power outputs
5.	External Siren.	Siren, Power outputs,
6.	Internal Siren.	Siren, Power outputs,
7.	Strobe.	Strobe, Power outputs,
8.	Reader input, 2 sets. (<i>Reserved*</i>).	Reader, LAN, Power outputs
9.	Comm 1.	LAN, Power outputs
10.	Comm 2.	LAN, Power outputs
11.	Comm 3. (<i>Reserved*</i>)	LAN, Power outputs
12.	USB port 1. Type A. (<i>Reserved*</i>)	USB
13.	USB port 2. Type C. (<i>Reserved*</i>)	USB
14.	Ethernet port, 100bT.	Ethernet
15.	Relay expander.	Relay expander, Power outputs
16.	Tamper	Tamper, LEDs
17.	Inputs, 16 sets.	Inputs
18.	Input Expander. (<i>Reserved*</i>)	Input Expander
19.	STU	STU, Power outputs
20.	Lock power, 2 sets	Power outputs
21.	Lock relay contacts, 4 sets	Lock relays
22.	Onboard status LEDs.	LEDs
23.	Serial numbers	Serial numbers

* Marked items have been reserved for future use.

Primary power

The Discovery module can be powered from a nominal 12 VDC or 24 VDC source. Power source voltage limits, output power, fusing and wire selection are provided in [Appendix C, Table 6a](#): TSX10000, Discovery Control Panel – Input Power.



Operation with TECOM Challenger AC power supplies is not supported.

Details of suitable TECOM power supplies and the basic requirements for installer supplied units are provided in [Appendix B2](#): Power Supply Specifications

The Discovery module automatically detects the applied voltage and configures its operating mode accordingly. It always operates from the primary power terminals regardless of operating voltage, in contrast to 12V operation with legacy products: *do not bridge the primary and battery terminals*.

Installations requiring backup battery support controlled by the Discovery module must provide 24 V to the primary power terminals. Full capability is available with 24 V primary power and a backup battery. 24 V operation without a functional backup battery limits load capability: sirens are not supported.

In scenarios where externally managed, battery-backed 12 VDC power is available, this can be used as the sole power source for the Discovery module. When operating from 12 V, the Discovery cannot charge the backup battery, attached load support is extended to 4A and sirens will operate.

Power should not be applied until:

- The enclosure is earthed.
- Connections terminated at the Discovery module.
- The wiring has been checked for short circuits and mis-connections.

To ensure reliable operation of the system, observe the warnings provided in [Appendix B2](#): Power Supply Specifications. Modern DC power supplies have electronically limited power outputs and will not be damaged by brief short circuits; they also have thermal fuses and will be permanently disabled if they are subject to excessive thermal overload; confirm the capabilities and observe the limitations of the power modules used in the specific installation.

Complex systems involving more than one module connection to the primary power source should follow the source wiring and fusing requirements in [Appendix C Table 6a](#): TSX10000, Discovery Control Panel – Input Power if detailed connection data is not specified by the power source vendor.

Installers should consult the Power De-rating section of [Appendix C Table 6b](#): TSX10000, Discovery Control Panel – Output Power Specifications when configuring heavily loaded systems. As detailed, maximum temperature, maximum 12 V and 5 V system loads and maximum charging load cannot simultaneously be met. One of the usage requirements must be relaxed; the table indicates available trade-offs in 5 V output or charging current to maintain maximum 12 V load current at maximum temperature.

Functional earth



The functional earth is used by the system to discharge surge and ESD impulses on the module and on the shielded communications lines (items 8, 9, 10 and 11 in figure 12).

The functional earth connection point for the module must be connected to earth and other modules inside the enclosure as detailed in the sections: [Safety earth bond](#) and [Functional earth connections](#) on page 15.

Battery

A TSX10000 Discovery Control panel operating from a 24 VDC supply should be connected to a 12 V battery for maximum load capability and to provide a backup power source during primary power outages.

In [Appendix C Table 10](#): Battery requirements details compliant battery chemistry, characteristics and necessary regulatory compliance requirements.



The selected battery must meet the compliance requirements in [Appendix C Table 10](#).



CAUTION

**RISK OF EXPLOSION IF Battery IS REPLACED by INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.**



The installer is responsible for identifying and specifying a compliant battery that meets the Discovery's terminal voltage and charging current requirements. The battery's operating temperature range must be commensurate with the specific installation environment; a minimum range of 0°C to +40°C is recommended.

[Appendix C Table 10](#) also documents the battery terminals that match the supplied battery lead and terminal adaptors. When batteries requiring the use of terminal adaptors are employed, attach the adaptors to the leads and use the supplied white heat-shrink tubing to cover the exposed metal. Connections to battery terminals other than those accommodated by the supplied leads must be made in a safe and compliant manner by the installer.



A fuse is required in the positive lead of each battery, as fitted in the supplied battery leads; a spare is not provided. Replacement fuse specifications are provided on the label on the battery cable as well as the battery section of [Table 6a](#): TSX10000, Discovery Control Panel – Input Power in [Appendix C](#): Discovery Module and Interconnect Specifications.



Batteries can supply very high currents. This can happen when terminals are bridged by metalwork, wires, tools, jewellery, etc. The bridging metal can get very hot, melt, or vaporize, leading to damage and serious injuries.



Take all necessary precautions to ensure safety, including covering bare terminals, when transporting or replacing batteries.



Batteries can be large, heavy and have slippery cases. These factors contribute to mishandling incidents such as slipping and dropping. Impact damage can rupture the battery case, releasing hazardous chemicals. Slips and drops can allow terminals to contact metal, or cause injuries to the installer or others nearby. Take all necessary precautions to ensure safety, including not working overhead or blind in cramped areas, covering bare terminals, and using appropriate means to safely handle the awkward and heavy units.



Worn, pinched or otherwise damaged battery leads must be replaced in order to avoid hazard.

The required battery capacity is installation dependent, largely determined by the system operational time on battery power; considerations involve specific site requirements, security or access role, the availability of remote monitoring, etc.

The system load can be estimated based on the sum of the permanently powered connect loads in addition to the Discovery standalone current for the operating configuration, as detailed in the section “Minimum

Operating Current” of [Table 6a](#): TSX10000, Discovery Control Panel – Input Power in [Appendix C](#): Discovery Module and Interconnect Specifications.

The Discovery offers a range of charging currents, supporting batteries rated up to 18 Ahr (24 hr recharge to >80%) and up to 36 Ahr (48 hr recharge to >80%); details are provided in [Appendix C Table 6a](#): TSX10000, Discovery Control Panel – Input Power. Note that the TS0307 enclosure only supports 7Ahr batteries due to its limited depth. To set Battery charging current rates refer to the *Discovery Programming Manual*.



The installer is responsible for ensuring that the specified battery in conjunction with the configured system load and Discovery charger settings provide the required system backup and recharge times.



The installer (or user) is responsible for scheduling on-going battery system checks as required by the applicable standards and codes to ensure user safety, battery integrity and system performance; a 3 monthly interval is suggested. To configure an automatic Battery test via the Discovery web interface, refer to the *Discovery Programming Manual*.

Battery fitment and replacement

When connecting the battery, the installer must ensure that:

- The positive lead (red) is the first wire connected and the last wire disconnected.
- The battery terminal polarity and open terminal voltage is validated prior to a connection being made.
- The battery tab and receptacle mate firmly and completely. It should not be possible to remove the terminal with gentle force.
- New batteries must be clearly marked with the date of installation in order to facilitate future maintenance activities.

When batteries are replaced, the board should be queried using the CTPlus control software diagnostics section to validate the newly installed units.

When making voltage measurements at the battery terminals to establish battery state, healthy batteries that have not been discharged in the preceding 48hrs should measure >13.5V

Depleted or damaged batteries must be prepared for disposal by fitting suitable caps or covers to the exposed terminals to prevent inadvertent shorts during transport. Batteries must be disposed of in a manner compliant with the laws and ordinances in effect at the installation site.

Power outputs

There are 8 individually fused 12 VDC (nominal) circuits available on the Discovery distributed amongst the connectors.

[Appendix C Table 6b](#): TSX10000, Discovery Control Panel – Output Power Specifications covers the specifics.

On the Discovery connector labels, the power circuit is identified by “12V” for the positive terminal and “0V” for the negative.

Overall system load current is defined in the subsection “Supply Current Limit” according to the installation specific input power configuration.

The “Power Circuits” section gives details regarding:

- The mapping between the connectors described in figure 12 and the available circuits.
- Circuit current limits for the 3 classes of power output in the subsequent sections of the table, headed Class:). Supported load characteristics and minimum conductor sizes are provided. Heavy capacitive loads are supported by the DC output classes, but they do not activate instantly as we do not have infinite power to make it so.
- Guidelines for designing reliable installations.

All power outputs are energised when the Discovery first powers up unless faults are detected. Circuits in fault are re-tried every minute to facilitate troubleshooting.

Faults affect all connectors powered by a circuit; they cannot be isolated to a shared connector. Critical loads should be partitioned to prevent power loss due to unrelated faults.

The terminal output voltage is dependent on the active power source and circuit load. Specifications are provided in the section “Output Voltage.” In addition to the terminal voltage, cable losses should be considered in the system design when any one or more of the following criteria applies: long wiring runs, heavy loads or constrained voltage requirements at the load. As a guide, expect a 30 mV loss per meter of a 1.5mm² conductor pair serving a 1A load (scaled from the wiring data in [Appendix C Table 6a](#): TSX10000, Discovery Control Panel – Input Power). Alternate wire paths, larger conductors or load-side power sources may be necessary to support some loads.

Typical usage

Auxiliary power terminals are commonly used to power the detector loops; large numbers of connections can be required. A TS1044 board can be used to increase the number of terminals (see “TS1044 Power Distribution Board on [page 24](#)).

Lock power terminals supply magnetic locks and strikes via the relay terminals.

The other power outputs are described in their related sections. Assignment of loads to other power terminals is at the installer’s discretion.

Siren

The two siren outputs, internal and external, are a special class of power output. Details in the prior section, Power outputs are applicable and define the allowed load.

The external and internal siren modes outputs can be independently configured for DC (on/off) or AC (modulated waveform) operation. By default the Siren mode is set to Standard sirens which is AC.

Horn- or speaker-based sirens driven with a modulated waveform can present very heavy loads and are more liable to malicious attacks. The system only attempts to drive them when adequate power is available to handle these events. Activation details are provided in the System Current limit and Class: Siren sections of [Appendix C Table 6b](#): TSX10000, Discovery Control Panel – Output Power Specifications.

The external siren circuit should be sealed using a 1K ¼ watt resistor (supplied) at the load end of the terminal pair. It is not necessary in the case of an 8 or 4 ohm load. It is recommended when using DC loads: some sounders can present as an intermittent open circuit.

The internal siren circuit is not monitored; it does not require a 1K resistor.

The External and Internal siren outputs follow relay 16 and are mapped to event flag 1.

Warning: The siren type must be configured correctly in the Discovery web interface. Specifying a siren type of DC Volts when there is an 8 Ω siren connected to the Discovery may damage the siren.

Strobe

The strobe output is a controlled DC power output. Details in the prior section, Power outputs are applicable and define the allowed load.

The strobe circuit is not monitored; it does not require a 1K resistor.

Similarly to the external siren, strobe circuits can be exposed to malicious attacks. As such, the system only attempts to drive the strobe when adequate power is available to handle these events. Activation details are provided in the System Current limit and Class: Siren sections of [Appendix C Table 6b](#): TSX10000, Discovery Control Panel – Output Power Specifications.

The strobe output follows relay 15 and is mapped to event flag 2 by default.

RS-485 Comms

The Discovery provides up to five RS-485 interfaces for peripherals: Three COMM ports and two Reader ports (see the Reader section below).

Each terminal set has a 12 V power output; details in the prior section, Power outputs are applicable.

[Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications provides the data interface specification in the section COMM and OSDP; on-board programmable terminations and wire types are also covered.

Discovery RS-485 LAN cabling and connections

- Use 2-pair twisted shielded data cable such as Belden 8723.
- The screen of the RS-485 cable is connected to the COMM functional earth terminal (not the 0V terminal). The requirements for functional earth interconnections between system components given in Functional earth connections are applicable. These are shown diagrammatically below in [Figure 6](#) on page 25.
- An RS-485 connection requires a 0V reference. This wire is run inside the screened cable. It is connected to the black wire of the red-black pair.
- Traditionally, the green-white pair is used for data: D+ on white and D- on green.
- The copper resistance of the data pair will limit maximum bus length; expect a maximum of 1 km with 0.325mm² (AWG22). Conductors with larger cross-sectional area are recommended for long buses.
- The length of copper LAN cable should not exceed 1.5km. LAN isolation devices can be used to extend the distance and are typically cheaper than long copper runs.

RS-485 LAN configurations

RS485 LANs may be configured in a variety of ways:

- Multi-building, where the LAN extends to more than one building.

Straight LAN

In a straight configuration ([Figure 6](#) on page 25), the LAN wiring runs directly, point to point between connected modules. Straight configurations may require additional wire and installation time compared to other wiring options but support higher data rates for the effort.

Stubs, if present, are kept short, preferably comprising < 10% of the overall main-line length.

The Discovery or TECOM modules at the start and end points of the LAN are terminated, all others are not.

This is the only configuration compatible with Discovery's high speed operating mode*.

Star LAN

Star LAN configurations trade off communications speed for simpler or shorter overall cable length.

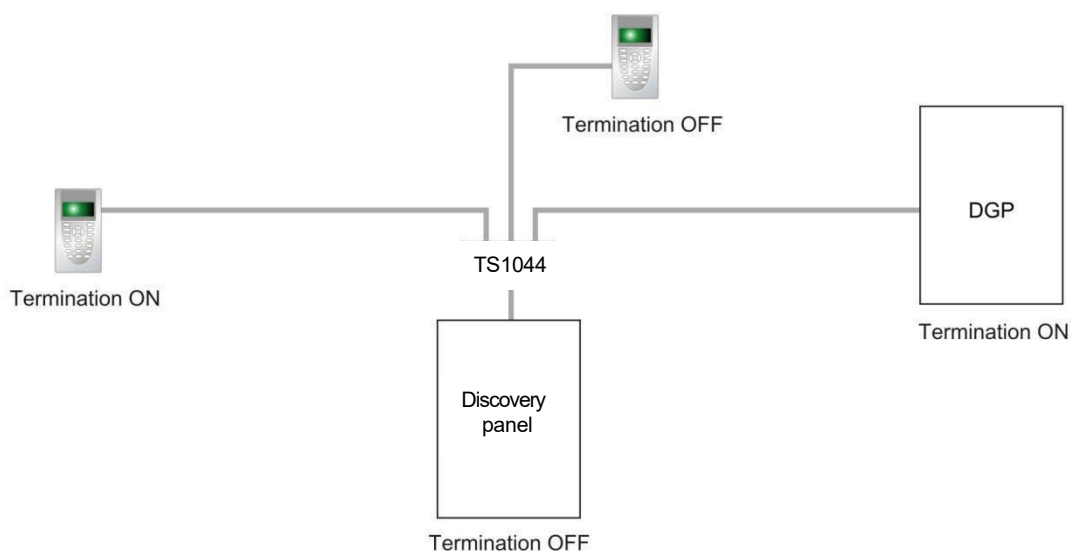
In a star configuration, the LAN has at least two branches (Figure 5 below) optionally connected via a TS1044 Power Distribution Board (see “TS1044 Power Distribution Board below).

The termination would be ON for the two devices at the ends of the two longest cable runs. In some cases, additional terminations at additional long ends of junctions may be of benefit.

Star configurations are not compatible with high-speed operation*.

* High speed LAN will be available in the future with firmware updates

Figure 5: Star LAN configuration



Multi-building or long-distance LAN cabling

If the RS-485 LAN extends to more than one building, each building must have its own earth system. LAN isolation devices, such as TS0893 LAN Isolation Interface modules, are used to isolate the system LAN between buildings to protect the system against differences in earth potential.

This is not strictly a LAN wire configuration. LAN isolators can be used with both star and straight LANs. The available TECOM isolators are only compatible with Challenger RS-485 networks.

The LAN isolator is treated as is any other device on the local LAN; the isolated remote LAN does not impact local LAN operations.

Figure 6 below shows the use of two TS0893 modules to extend the RS-485 LAN across two electrical installations. Each TS0893 module has a pair of termination links, used to terminate (if applicable) the LAN segment on each side of the module's isolation barrier.

Figure 6: RS-485 LAN cabling between two buildings

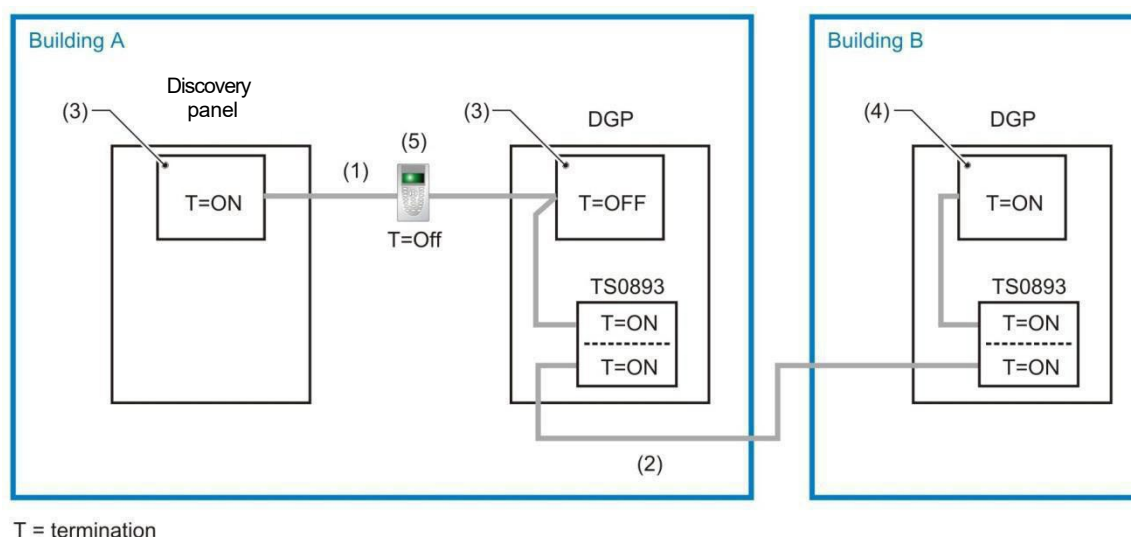


Figure 6: Legend

Item	Description
1.	LAN segment 1 extends from the Discovery panel to one side of the TS0893 LAN Isolation Interface. Termination is ON at the panel and the panel's side of the TS0893. Maximum cabling distance for segment 1 is 1500 metres.
2.	LAN segment 2 extends from the TS0893 in building A to the TS0893 in building B. Termination is ON at both TS0893 modules. Maximum cabling distance for segment 2 is 1500 metres.
3.	Earth point on remote device connected to building earth via plug pack earth wire (green), or earth wire from local power supply.
4.	Plastic-body LAN device. Join data cable shields where cable extends past a device that does not have a LAN earth connection.

RS-485 LAN termination

Each Discovery LAN port has an on-board software configurable 120 Ω termination that is protected from overload and preserves its setting independently of module power.

TECOM Challenger devices and LANs use 470 Ω LAN termination resistors, setting the impedance of the LAN to around 220 Ω when correctly terminated. The termination resistor may be external or onboard (devices with an onboard resistor use a link or a DIP switch to set the LAN termination to ON).

A Discovery LAN should have only two devices with the LAN termination set to ON (or the LAN termination resistor fitted).

The Discovery 120 Ω termination is compatible with Challenger RS-485 LANs.

In a completely connected (but powered down) system, you can check for correct LAN termination by measuring the resistance across the Discovery panel's D+ and D- terminals. The values below are for AWG24 cable runs < 50m where up to 10 Ω of cable resistance is present; longer runs require cable resistance to be considered more carefully.

- 60 Ω indicates a correctly terminated high speed or Tecom RS-485 LAN with 2 x 120 Ω resistors.
- 90 Ω indicates a correctly terminated Tecom RS-485 LAN using a 470 Ω and a 120 Ω resistor.
- 220 Ω is a correctly terminated, 2 x 470 Ω Tecom RS-485 LAN.

If the above values are not met, the following can assist in determining the problem:

- 0 Ω indicates a short circuit in the cabling.
- Values below ~ 53 Ω indicate excessive termination – 470 Ω and 2 x 120 Ω , 3 x 120 Ω , etc.
- Values between ~65 Ω ...87 Ω indicates excessive termination, e.g.: 2 x 470 and 1 x 120 Ω resistors, etc.
- Values between ~95 Ω ...210 Ω indicates excessive Tecom RS-485 LAN termination, e.g.: 3 x 470 Ω , etc.
- 470 Ω or more indicates that less than two devices are terminated

Diagnosis of suspected faults in long cable runs with simple tools may be facilitated by disconnecting modules and segments at easily accessible points.

Checking LAN performance

If the rate of poll errors seems excessive, check the LAN cabling and termination.

Discovery RS-485 LAN options

The Discovery module has 3 primary LAN ports, COMM1, COMM2 and COMM3 and 2 further configurable ports available for reader connections.

Note: Some ports may not currently be available and will become available through future firmware updates.

COMM1 is required for system operation and the remainder are optional.

Each LAN must be independently terminated, either through the use of resistors, onboard jumpers/dip switches, or using the new electronic termination on Discovery.

Power supply to RS-485 LAN devices

Devices on the LAN may be supplied from the Discovery module's 12V and 0V LAN power terminals. Use an external 12 V power supply (such as TS0073 2A Power Supply) when:

- The device is more than 100 m (data cable length) from the panel
- Electrical isolation is required
- The power requirement exceeds the port capability.

When powering a LAN device from an external 12 V power supply:

- Connect the external power supply's '+' terminal to the device's '+' terminal. Do not connect the power supply + to the LAN +.

Connect the external power supply's '-' terminal to the device '-' terminal.

Connect the LAN cable black wire '-' to the device '-' terminal.

On the Discovery web interface, make sure the correct Comm Bus has the "Terminate" check box ticked.

The location for setting the "Electronic LAN termination" on the Discovery Web Interface is:

Install menu > Advanced settings > Comm BUS > Select a Comm BUS
> Tick or Un-tick the "Terminate" button.

Figure 7: RS-485 LAN and earth system block diagram

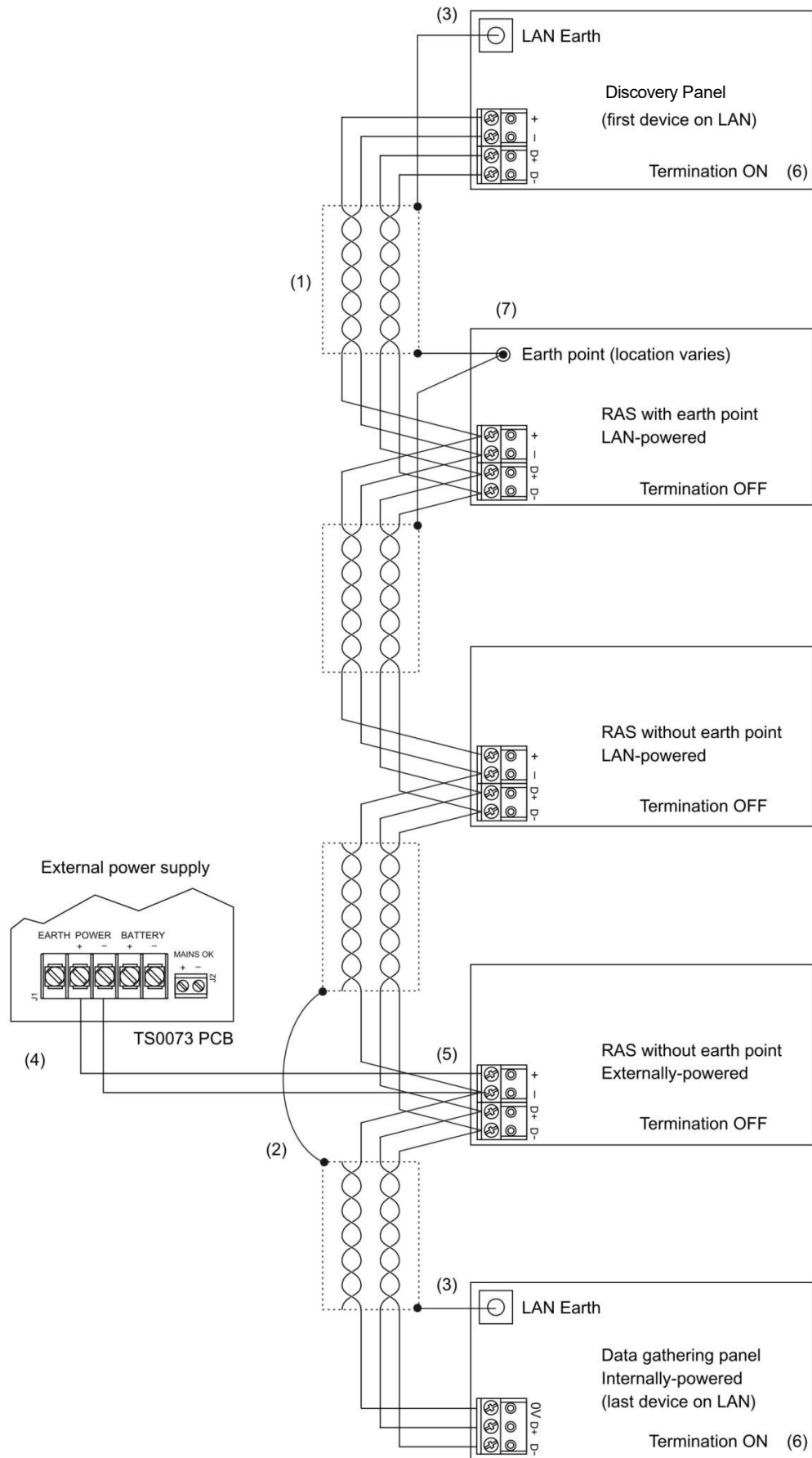


Figure 7: Legend

Item	Description
1.	RS-485 LAN cable. We recommend the use of 2-pair twisted shielded data cable such as Belden 8723 for optimal performance.
2.	Join data cable shields where cable extends past a device that does not have a LAN earth connection.
3.	In each segment of LAN cabling, connect one end only of the data cable shield to a device's LAN earth terminal.
4.	External 12 VDC power supply (if needed).
5.	Do not connect the + from the external 12 VDC power supply to the + of the LAN.
6.	Terminate the control panel and the most distant device, or the devices at the ends of the two longest LAN cable runs, as applicable.
7.	The RAS earth point should typically be connected to the data cable shield. Alternatively, it may be connected to building electrical earth (for example, if mounting to an earthed metal fixture).

Using LAN devices to facilitate cabling

Various LAN devices may be used to provide electrical isolation and to reduce cabling costs. LAN isolation devices can also be used to extend the distance of LAN cabling beyond what can be achieved by a single cable run of 1.5 km. LAN devices include the following:

- **TS1044 Power Distribution Board.** The TS1044 module provides a STAR distribution point that can be used in either data or power mode, depending on the terminals being used. The TS1044 module expands the number of physical connections that can be made to the panel's power or data output terminals.
 - In data mode, each TS1044 module provides five sets of LAN out connections and five sets of + and – auxiliary power output terminals.
 - In power mode, each TS1044 module provides 10 sets of + and – auxiliary power output terminals.

A TS1044 module is shown in [Figure 5](#) on page 24.

- **TS0893 LAN Isolation Interface.** Provides an optical isolation barrier between components on a Discovery (or Intelligent Access Controller) LAN. The TS0893 can be also used as a LAN repeater; with up to three stages cascaded together to increase the maximum LAN cabling run from 1.5 km to 6 km. TS0893 modules are shown in [Figure 6](#) on page 25.
- **TS0896 RS-485 to Fibre Optic Interface.** A pair of TS0896 modules, with suitable optical fibre cable, may be used to extend the LAN to remote buildings or locations within a building (for example where unused optical fibre cable already exists).

- **TS0098 Challenger IP LAN Adaptor:** Multiple IP LAN Adaptor modules enable Discovery LAN data to be carried over an IP network and to be converted back to RS-485 communications for connection to LAN devices.

Visit the Aritech website at <https://aritech.com.au/> for details and images of LAN devices.

Reader

Two reader terminals are provided for direct connection to Wiegand readers.

Figure 8: Reader Terminals

Pin name	Wiegand Usage
	Cable shield termination
12V	+12V power, positive
0V	0V reference for power and data
D0	1 st data line
D1	2 nd data line
L0	1 st LED
L1	2 nd LED
Buz	Buzzer

Each terminal set has a 12 V power output; details in the prior section, Power outputs are applicable. Do not connect to 5 V readers.

When set to Wiegand mode, the port supports 12 V Wiegand readers and provides three active low control lines for LED 1, LED 2, and Buzzer. [Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications provides the data interface specifications and the control line capabilities in the Wiegand section, along with cable data and recommendations. Wiegand control line current is carried in the common cable ground; it can affect the data signals. Ensure that the ground conductor voltage drop caused by the idle load is within the specified limit for reliable operation.

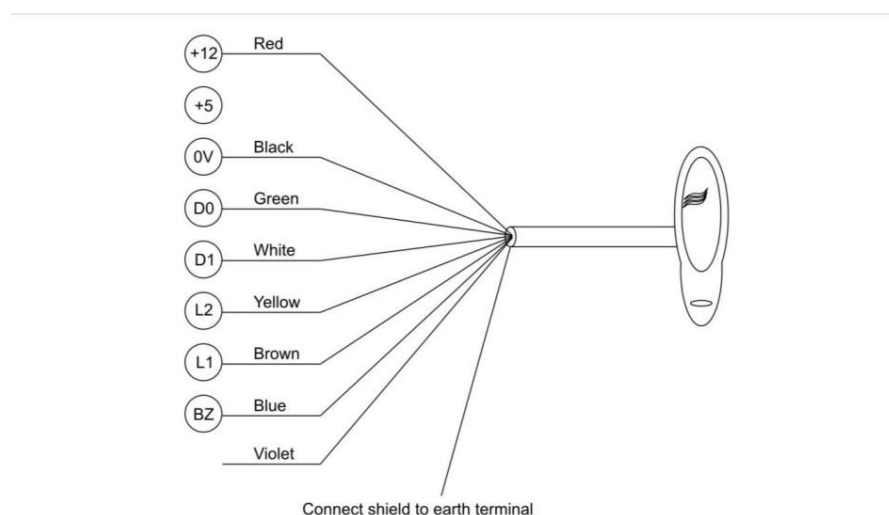


Figure 9: Connecting a Smart Card Reader as a Wiegand device

In Figure 9 above, the violet wire (open collector output) can be connected to an input via a 10K resistor to operate as a tamper input (refer to the reader's installation guide for details).

Note: [Figure 9](#) shows the cable provided with TS0870 Smart Card Readers. Other Wiegand readers may be connected using 6-core shielded data cable (Belden 9536 or equivalent).

USB

The Discovery provides two USB host ports, USB 1 is a USB-A, and USB 2 is a USB-C.

[Appendix C Table 6b](#): TSX10000, Discovery Control Panel – Output Power Specifications section “USB Power ” details the USB voltage and load capability.

Ethernet

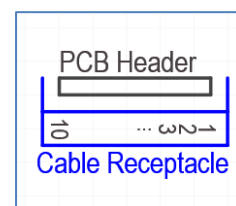
10/100 Base-T Ethernet port. Connect an RJ-45 ethernet cable to a network device for connectivity to supported software systems and/or to access to the onboard web browser.

Relay expander

Relay expansion cards can be used to increase the number of relays controlled by the system.

Figure 10: Relay Expander Pins

Pin	Pin function	
	TS0840	TS0841, TS0842, TS1041
1	12 V	12 V
2	Relay 1	Data
3	Relay 2	
4	Relay 3	Latch
5	Relay 4	Clock
6	Relay 5	
7	Relay 6	
8	Relay 7	
9	Relay 8	
10	0 V	0 V



The port provides a 12 V power output and control signals to the expansion module.

Details in the prior section, Power outputs are applicable to the 12V connection.



Note: When connecting an expander that will be powered from an auxiliary power supply (i.e., not powered by the Discovery control panel), the +12 V wire, pin 1 (right-most pin looking into the port), must not be connected to this port.

The Relay Expander section in [Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications details the control line specifications and load capability.

The Discovery Controller has four onboard relays that are assigned the first four relay numbers.

If relay expansion cards are used, additional relays are numbered according to their physical address, starting at 5. The Discovery Controller allows for relay mapping to be programmed such that a physical relay number (e.g. 5) can be mapped to a relay number in the Discovery system (e.g. 21).

One TS0840 Four-Way Relay Card may be connected to the Relay Expander to add four relays. Another one can be connected in Series to make 8 Relays.

Inputs

Inputs are also known as alarm inputs or zone inputs.

Section Inputs and Tamper in [Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications provides further details for these inputs.

A Discovery system can receive alarm signals from:

- The Discovery panel's onboard inputs
- Inputs connected to Data Gathering Panels (DGPs)

Note: Input numbers in the range 1000 to 1008 will not report CID alarms.

Each pair of input terminals may be connected to an alarm system device, such as a detector or reed switch.

By default, the Discovery system monitors inputs for four states (sealed, unsealed, open circuit, and short circuit) when used with two end-of-line (EOL) resistors in each input circuit, as shown in [Figure 11](#) on page 33. The default EOL resistor value is 10 k Ω but can be changed for the panel's onboard inputs via System Options.

Install EOL resistors in input circuits at the end of the circuit. If an alarm device is connected, place the EOL resistors at the device's connections. If an input is not used, you do not need to connect an EOL resistor if you program the corresponding input number as type 10 (spare).

Tip: Use sleeves on the resistor leads to prevent accidental shorting.

Depending on the setting of Input Tamper Monitoring in System Options, the Discovery system reports open- and short-circuit conditions in two ways:

- If Input Tamper Monitoring is set to Yes (default), then open- and short-circuit conditions are reported as input tamperers. This is known as four-state monitoring.
- If Input Tamper Monitoring is set to No, then open- and short-circuit conditions are reported as unsealed. This is known as two-state monitoring.

The panel uses the circuit's resistance to determine the state of the input. Table 3 below lists the expected resistance values for sealed (normal) and unsealed (active) states for each EOL resistor option.

Table 3: Resistance values for various EOL resistor options

EOL Resistor Option	Sealed (normal)	Unsealed (active)
10 k Ω (default)	10 k Ω	5 k Ω or 20 k Ω
4.7 k Ω	4.7 k Ω	2.4 k Ω or 9.4 k Ω
2.2 k Ω	2.2 k Ω	1.1 k Ω or 4.4 k Ω
6.8 k Ω	6.8 k Ω	3.4 k Ω or 13.6 k Ω
5.6 k Ω	5.6 k Ω	2.8 k Ω or 11.2 k Ω
3.7 k Ω	3.7 k Ω	1.9 k Ω or 7.4 k Ω
3.3 k Ω	3.3 k Ω	1.7 k Ω or 6.6 k Ω
2.0 k Ω	2.0 k Ω	1.0 k Ω or 4.0 k Ω
1.5 k Ω	1.5 k Ω	0.8 k Ω or 3.0 k Ω
1.0 k Ω	1.0 k Ω	0.5 k Ω or 2.0 k Ω

EOL Resistor Option	Sealed (normal)	Unsealed (active)
2.2 k Ω / 6.8 k Ω (see note below)	2.2 k Ω	9.0 k Ω

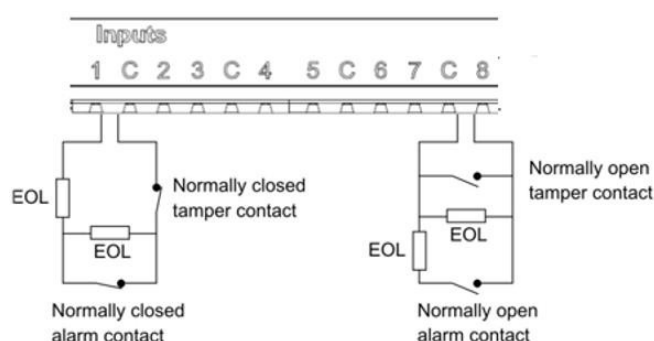
Notes

- Resistance values for open and short conditions are infinity and zero, respectively. If four-state monitoring is used, open and short conditions indicate input tamper. If two-state monitoring is used, open and short conditions indicate unsealed.
- The 2.2 k Ω / 6.8 k Ω option is not compatible with alarm devices using normally open (NO) alarm contacts and will result in the input indicating unsealed when it is sealed.

The following diagrams indicate the placement of EOL resistors in typical Discovery input circuits.

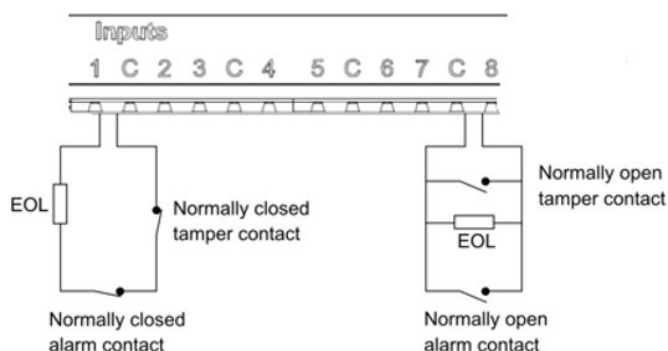
If connecting the Discovery panel to other configurations of input circuits, the placement, and values of EOL resistors may differ. In any case, you must test the installation to avoid unexpected results.

Figure 11: Four-state monitored input circuits



Alternatively, the Discovery system can be configured to monitor inputs for two states (sealed and unsealed). This is accomplished by using one EOL resistor in each circuit, as shown in [Figure 12](#) on page 34.

Figure 12: Two-state monitored input circuits



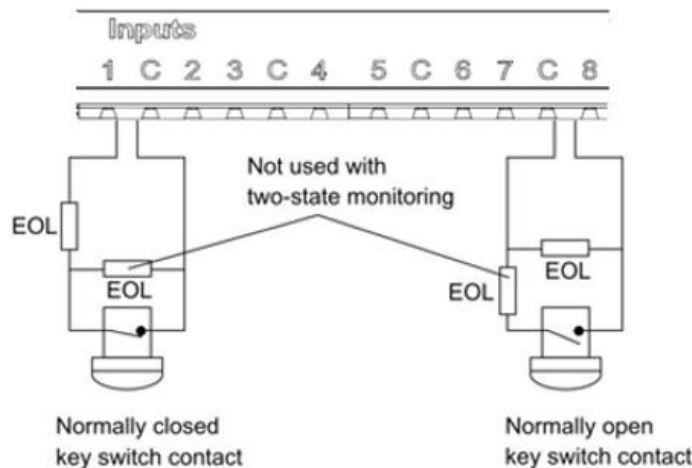
Note: When the system is used in two-state configuration, inputs can only report sealed and unsealed states. This prohibits the use of input types that need to detect short or open states. See the *Basic programming sequence* on [page 47](#) for

details.

Special input types

Inputs programmed as area control type inputs can also be used to turn areas on and off (as opposed to entering a PIN on a keypad). These inputs do not have areas assigned to them: their functions are determined by assigning an alarm group to them.

Figure 13: Wiring of key switches for input types 6 and 31



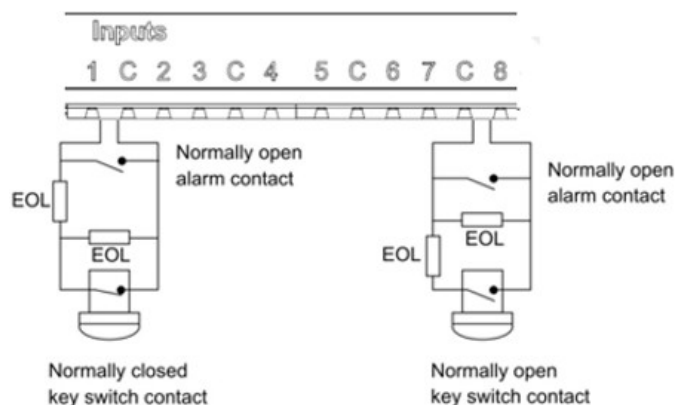
Input type 6 is used for momentary area control.

- The normal state of the key switch is sealed
- When unsealed the programmed alarm group functions are performed

Input type 31 is used for toggling area control. When the input switches to unsealed, the areas secure. When the input seals, the areas are in access.

- The normal state of the key switch is sealed to turn areas off
- When the key switch is unsealed, it turns areas on

Figure 14: Wiring of key switch and alarm contact for input type 33



Input type 33 (24-hour alarm & isolate input) is used to wire a key switch and an alarm

contact to the same input. For example, a key switch used to isolate a shop's input in a shopping centre where only one input is available for each shop. Alarm is generated when input changes from sealed to open or short.

- The normal state of the key switch is sealed
- When unsealed the input is isolated, no alarm generated
- Open circuit generates a tamper alarm
- Short circuit generates an alarm

Tamper

Connect the input and common terminals for the panel tamper switch (supplied with TECOM enclosures). Short circuit for sealed, open circuit for unsealed.

Must be sealed if not used.

Section Inputs and Tamper in [Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications provides further details for this input.

This input can only be used with normally closed contacts such as the panel tamper switches.



Note: When tamper is sealed, only the DCIN and Batt Power LEDs will operate. For full operation of onboard LEDs, tamper must be unsealed.

Input Expander

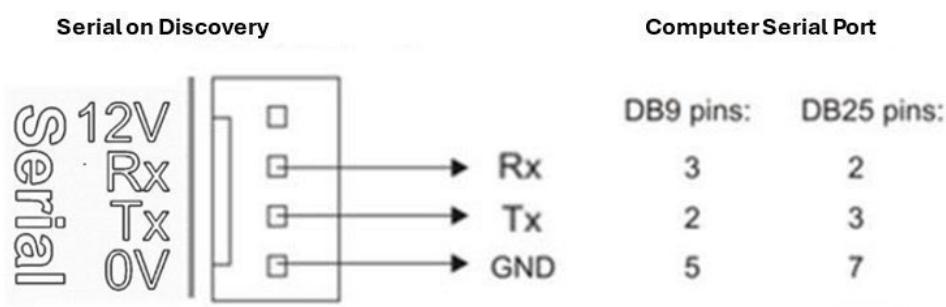
Reserved.

Serial / STU

See [Figure 4](#), page 17, item 19. The Serial port may be used for connection to a communicator, management software computer, or to a printer. The Serial port may also be known as a STU port.

[Figure 15](#) on page 36 details the required connections from the serial port (previously known as a J15 terminal) to either a DB9 or a DB25 serial connector.

Figure 15: Wiring details for computer connection



The section Power outputs above is applicable to the +12V terminal.

Section Serial Port (STU) in [Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications provides interface voltage, pullup and cable details.

Lock relays

Discovery provides four independent sets of power relay terminals.

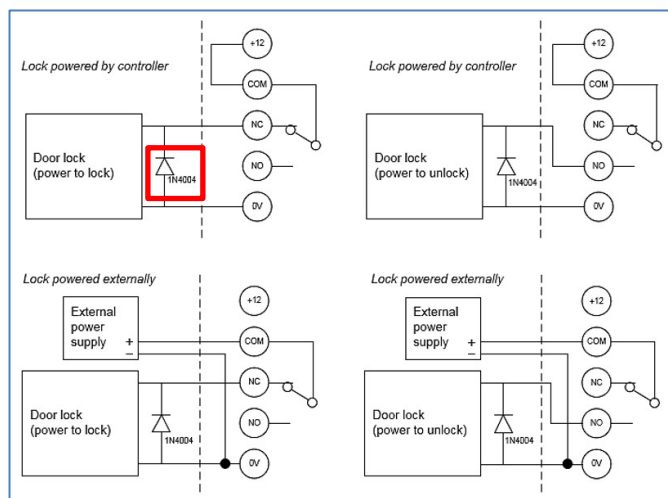
Section Relay terminals in [Appendix C Table 6c](#): TSX10000, Discovery Control Panel – Interface specifications provides interface voltage, pullup and cable details.

The Discovery power outputs comply with the relay circuit ratings.

Ensure external power sources are compliant in normal and fault scenarios: fusing may be necessary to protect the load wiring and Discovery in case of faults.

Common lock circuit connections are shown below. Ensure inductive load suppression diodes are fitted on the selected locks. Seen in the diagram below the red square around the diode for reference.

Figure 16: Door lock relays and suppression diode.



Note: A suppression diode such as 1N4004 must be used in door lock circuits. The diode must be co-located with the lock.

Serial numbers

Serial numbers / SID's are in two locations. First location is on the front of the unit in between the Serial and Lock Pwr Labelling. The second location is on the rear of the unit on the label in the centre of the unit.

Onboard status LEDs

The LED panel indicates the live status of power, inputs and outputs, communications, and various connected devices. As per Figure 16 below.

Note: When tamper is sealed, only the DCIN and Batt Power LEDs will operate. For full operation of onboard LEDs, tamper must be unsealed.

Figure 17: Onboard status LEDs for item 22

LEDs are set out as per the diagram and table below:

Note: Physical LEDs are to the left of the explanation text.
For example: The red square below around 2 LEDs represent the following:
1st LED = Power DC input, 2nd LED = Power Battery

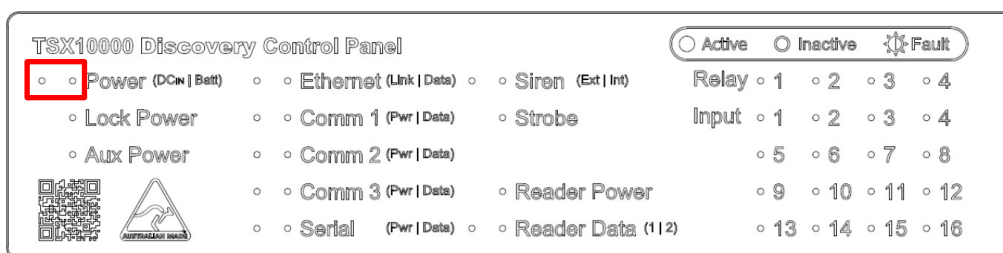


Figure 17 Legend

	Description	Colour	Comment
1	Power (DC IN)	Dual colour: Red + Blue	Power OK (12 or 24V) = Blue (solid) Mains Fail / Fault = Red (Fast Flash)
2	Power (Batt)	Dual colour: Red + Blue	Battery Fitted = Blue (solid) Battery Missing = Blue (Fast Flash) Battery Fault (Test Fail / Low battery) = Red (Fast Flash)
3	Lock Power Aux Power	Dual colour: Red + Blue	Power OK (12 or 24V) = Blue (solid) Mains Fail / Fault = Red (Fast Flash)
4	<i>PowerLEDs</i> Comms 1, Comms 2, Comms 3 And Serial	Dual colour: Red + Blue	No Fault = Blue (solid) In fault (Fuse fail) = Red (Fast Flash)
5	<i>DataLEDs</i> Ethernet, Comms 1, Comms 2, Comms 3, Serial, & Reader	Dual colour Blue + Green	Inactive = OFF TX (Transmit) = Blue (solid) RX (Receive) = Green (solid) Note: Each colour will flash with activity
6	Ethernet link	Blue	Active / connected = Blue,
7	<i>PowerLEDs</i> Ext Siren, Int Siren, & Strobe	Dual colour: Red + Blue	No Fault = Blue (solid) In fault (Fuse or Siren fail) = Red (Fast Flash)
8	Reader Data	Dual colour Blue + Green	Inactive = OFF TX = Blue (solid) RX = Green (solid) Note: Each colour should flash with activity
9	Relays	Blue	Relay Coil Active = Blue (solid) Relay Coil Inactive = Off Note: Relays can be wired to be active in the NC (Normally Closed) or NO (Normally Open) paths.
10	Input 1 - 16	Dual colour Blue + Green	Sealed = Off Alarm State (Unsealed Low or High) = Blue (solid) Fault state (Open / Short) = Red (Fast Flash)

Initial programming

This section describes basic initial programming via the Discovery Web interface and/or

a RAS connected to a Discovery Comm port.

Advanced programming is typically performed via software such as CTPlus, so basic programming also includes the items required to connect with a management software computer. Refer to the Help file documentation provided with the management software for additional details.

Configuring a Discovery control panel can be done using the **Discovery Web User Interface** (preferred) or **CTPlus**, whereas configuration of Tecom panels should only be performed via the **CTPlus** software. CTPlus must be version 3.0 or newer before proceeding, the download link can be found here: <https://aritech.com.au/document-category/software/>

With a RAS connected to Comm 1, find the IP address of your Discovery panel. By using the menu structure to navigate the following pathway:

To access the User menu:

Use the following steps to access the Discovery User menu when the Code prompt is displayed on the bottom line of the RAS.

1. Press [MENU*].

To Access Menu Enter Code
Code:

2. Enter 4346 (default Installer code), and then press [ENTER].

"0"-Exit "ENTER"-Down "*"-"Up
0-Exit, Menu:

3. You can now select the programming option you need from the User menu. To access the Install menu, enter 19 (Install menu option number), and then press [ENTER].

Install Menu
0-Exit, Menu:

4. Enter 1 (Communications menu option number), and then press [ENTER]

Communications
0-Exit, Menu:

5. Enter 2 (Status menu option number), and then press [ENTER]

Status
0-Exit, Menu:

6. Enter 1 (Ethernet Status menu), and then press [ENTER]

Ethernet
0-Exit, Menu:

7. Press [ENTER] again to reveal: Eth: IP address. Take note of its IP address.

123.456.789.012 (example only)
0-Exit, Menu:

8. In your Internet browser type the Discovery's IP address in the top address bar and press [ENTER] on your computer / device keyboard. From here you will see the Discovery Web Interface log in page appear.

Discovery Default Login details

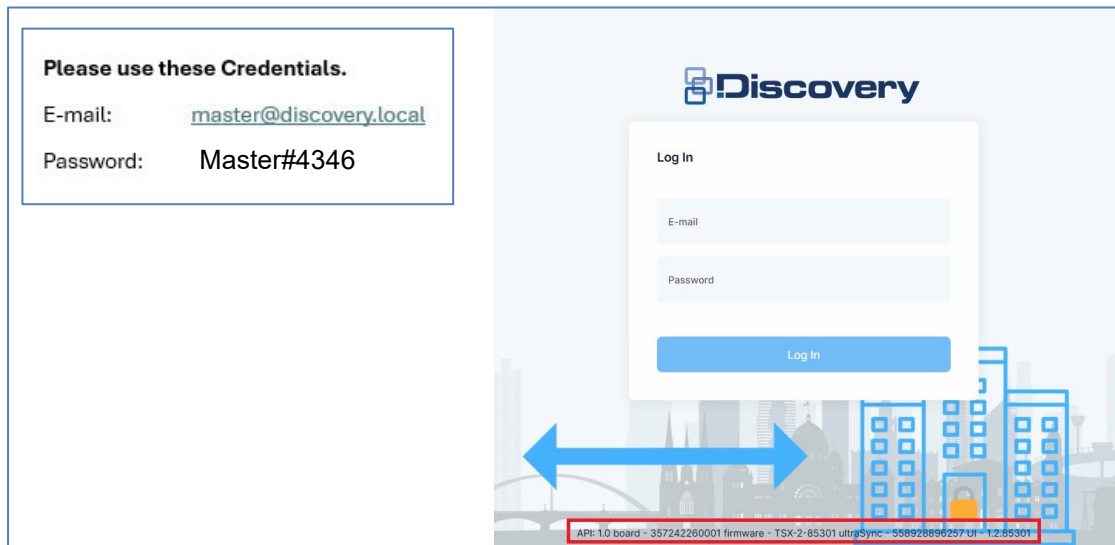


Figure 18 Discovery web interface Log in page

From here you will then need to Log in to the Discovery web interface with an email address and password. *Default log in details are:*

Email: master@discovery.local **Password:** Master#4346

Note: Case sensitive

Note: The web client version number can be found at the bottom of the page.
(Highlighted in Red)

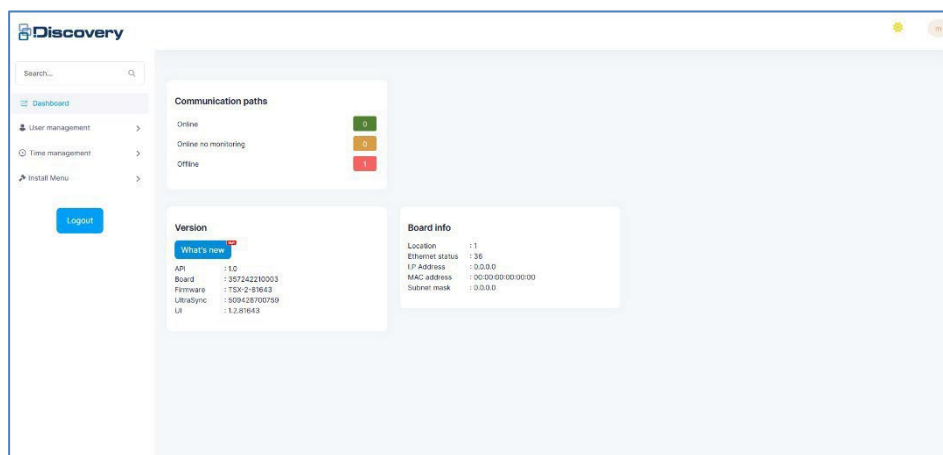


Figure 19 Dashboard

Once logged in, the Dashboard page's layout consists of a series of widgets. The First widget is the menu tree on the left hand side to navigate around the website to program the Discovery panel.

In the middle area is a widget that lists the Communication paths that will show the number of: Online, Online no monitoring and Offline panels that are reporting to this web page. These will link to their sections when clicked on.

Under the Communication path is where the widgets for the Version and Board Information is.

The Board information is to the right showing the Discovery control panel's IP address information.

On the top right hand side of the page is where the logged in profile is displayed and the log out toggle is. Just to the left of this is the page's is where the toggle to display the page in Light mode or Dark mode is.

Note: The page below will be in Light mode by default

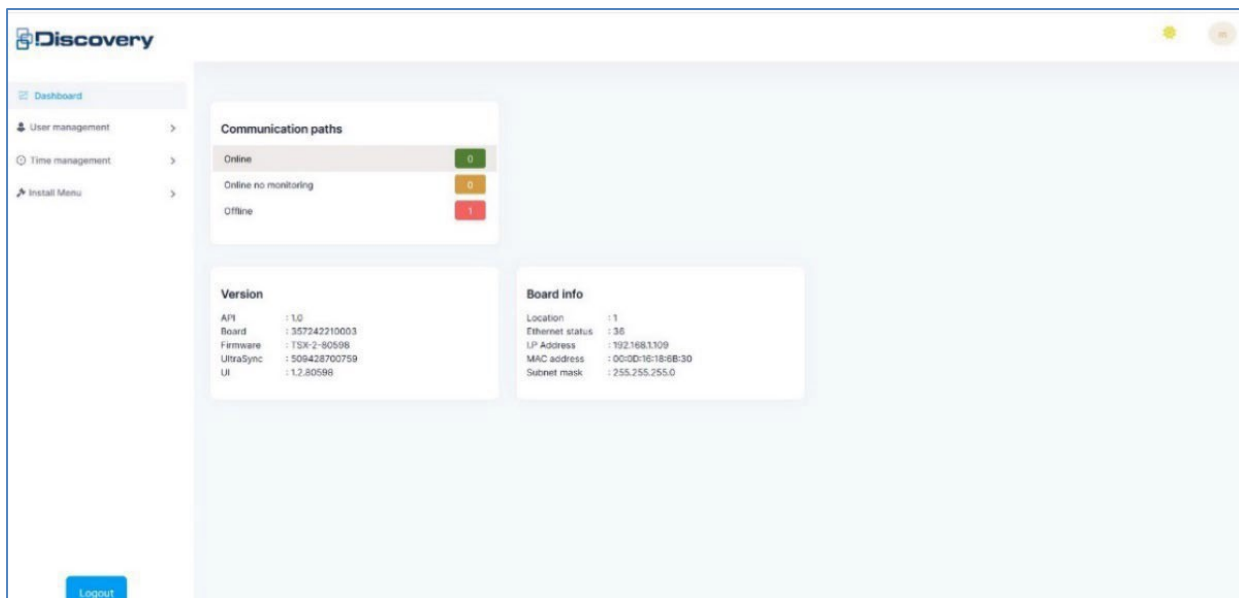


Figure 20 Light mode

To configure a panel in **CTPlus**, ensure it's either on the same network via Ethernet, or online via UltraSync.

To modify configuration of Comm devices, refer to the below based on your preferred method:

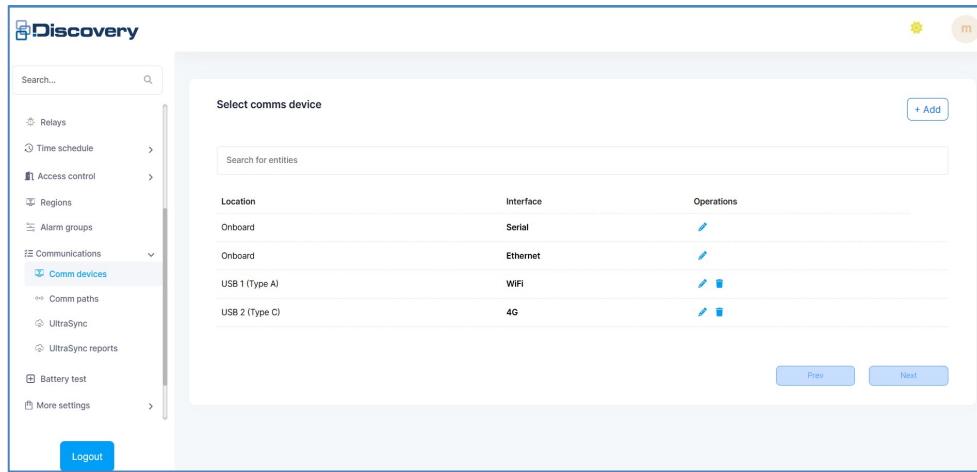


Figure 21 Comms devices

Login and navigate to **Install Menu > Communications > Comms devices**, then select **Onboard - Ethernet**.

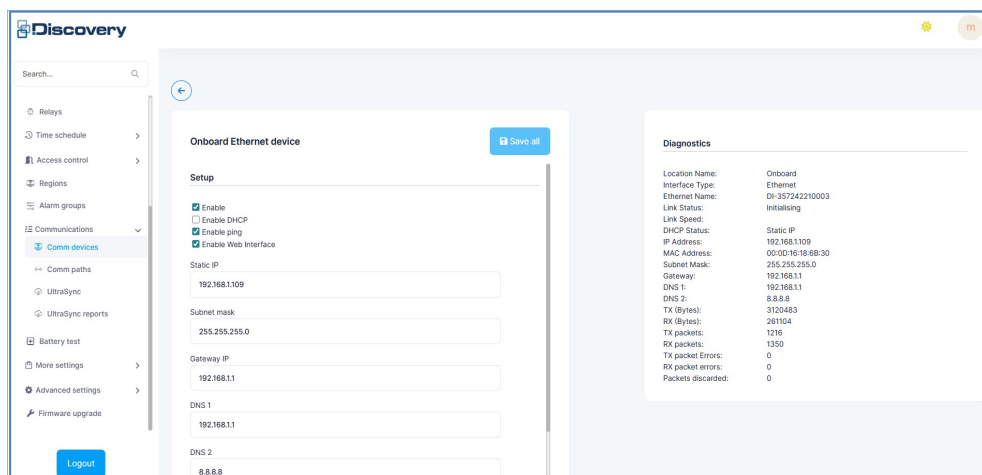


Figure 22 Ethernet device

To configure onboard Ethernet options, ensure the following are ticked or unticked as required:

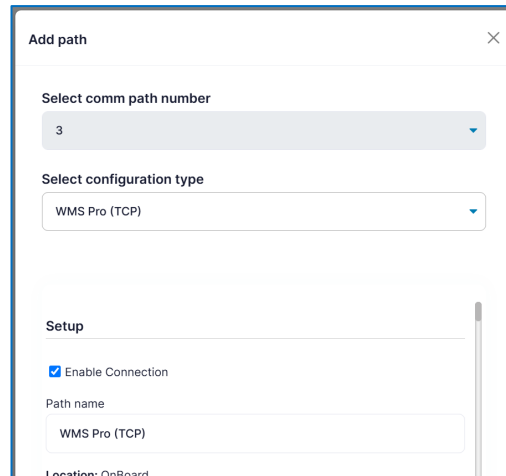
- **Enable ethernet** – when ticked, the onboard ethernet connection will be active.
- **Enable DHCP** – when ticked, the onboard ethernet connection will accept an IP address and other related network options from a DHCP server. Untick to set these options manually.
- **Enable Ping** – when ticked, the Discovery control panel will respond to ping requests on the onboard ethernet connection.

IP address info may be configured manually by ensuring that “Enable DHCP” is unticked, then filling in the required information. Please note that IP address and other network settings are not displayed here whilst DHCP is enabled.

Once your panel has been configured with the appropriate network settings, it’s time to set-up a comm path for connecting to WMS Pro. Refer to the below based on your preferred method:

Discovery Web Interface

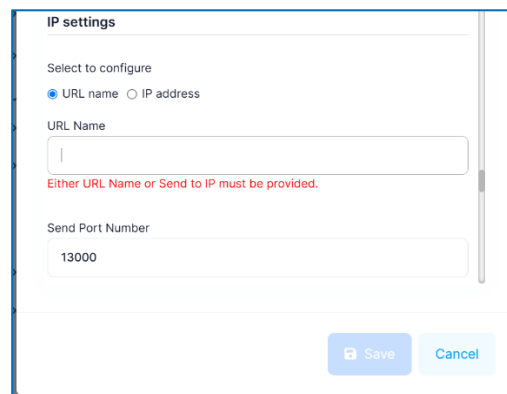
Navigate to **Install Menu > Communications > Comm paths**, then click the **+ Add** button in the top-right. Select an available comm path number, and select the configuration type called “WMS Pro (TCP)”.



The 'Add path' dialog box is shown. It has a title bar with a close button. Inside, there are two dropdown menus: 'Select comm path number' with '3' selected, and 'Select configuration type' with 'WMS Pro (TCP)' selected. Below these is a 'Setup' section with a checked 'Enable Connection' checkbox and a 'Path name' field containing 'WMS Pro (TCP)'. At the bottom, it says 'Location: OnBoard'.

Figure 23 Add path

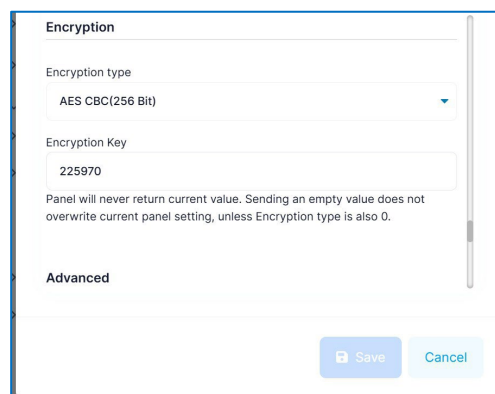
Scroll down until you reach ‘IP settings’, select either ‘URL name’ or ‘IP address’, and enter the IP address or domain name of the WMS Pro server, as entered during setup (https prefix not required).



The 'IP settings' dialog box is shown. It has a title bar. Inside, there are two radio buttons: 'URL name' (selected) and 'IP address'. Below them is a 'URL Name' text field. A red error message says 'Either URL Name or Send to IP must be provided.' Below that is a 'Send Port Number' text field with '13000' entered. At the bottom right are 'Save' and 'Cancel' buttons.

Figure 24 URL name

Scroll down again until you reach ‘Encryption’, and copy the 6-digit Encryption Key. ***You’ll need this later.***



The 'Encryption' dialog box is shown. It has a title bar. Inside, there are two dropdown menus: 'Encryption type' with 'AES CBC(256 Bit)' selected, and 'Encryption Key' with '225970' entered. Below the key field is a note: 'Panel will never return current value. Sending an empty value does not overwrite current panel setting, unless Encryption type is also 0.' At the bottom right are 'Save' and 'Cancel' buttons.

Figure 25 Encryption

All other settings should be left at default values unless otherwise advised. Click the Save  icon to finalise changes and activate the comm path. Once activated the comms path will start the handshake process with WMS Pro.

This section describes the following programming steps that are part of the installation process:

- “Disarming the system” below
- “Accessing the Discovery menu” below
- “Clearing the memory” on [page 47](#).
- “Working with multi-area systems” on [page 48](#).
- “Changing the default installer PIN” on [page 49](#).
- “Enabling communications” on [page 50](#).

An LCD RAS configured as RAS 1 must be connected to Comm 1.

Notes:

- The permissions assigned to you may not allow you to do everything described in this manual. You may not be able to see all menu items described in this manual.

Disarming the system

The system must be completely disarmed before you can access the Install menu on a system keypad (LCD RAS).

To disarm the system:

1. The default message displays on the top line of the RAS. This line may display “There Are No Alarms In This Area,” the time and date, a custom message.

There Are No Alarms In This Area
Code:

2. Press 4346 (the default Installer code), press [OFF] [0] (to select all areas), and then press [ENTER].

Tip: When using the system keypad, numbers are entered in sequence. For example, “press 4346” means press the 4 button, the 3 button, the 4 button, and then the 6 button.

Accessing the Discovery menu

The Discovery menu system, as displayed on an LCD RAS, has a first-level User menu and a second level Install menu (the Install menu is option 19 of the User menu).

Access to the Install menu is typically limited to installers or administrators.

This manual describes the Discovery programming that you may need for basic

system setup. Refer also to:

- *TECOM Discovery Programming Manual* for details of Discovery system programming via the Web interface and install menu.
- *TECOM Discovery Administrators Manual* for details of Discovery programming and operation via the User menu.

User menu options

As part of the basic system setup, you may need to use the following User menu options:

- Option 7, Service Menu
- Option 12, Test Input
- Option 14, Program Users
- Option 15, Program Time & Date
- Option 21, Holidays
- Option 25, Change user PIN

To access the User menu:

Use the following steps to access the Discovery User menu when the Code prompt is displayed on the bottom line of the RAS.

1. Press [MENU*].

To Access Menu Enter Code
Code:

2. Enter 4346 (default Installer code), and then press [ENTER].

"0"-Exit "ENTER"-Down "*"-"Up
0-Exit, Menu:

3. You can now select the programming option you need from the User menu. To access the Install menu, enter 19 (Install menu option number), and then press [ENTER].

Install Menu
0-Exit, Menu:

You can now select the programming option you need from the Install menu (see Table 4 on page 41).

Install menu options

The Install menu options and the default settings of particular importance to installers are listed in [Table 4](#) on page 46.

Note: The install menu options have changed in the current Discovery firmware compared to Challenger install menu options.

Table 4: Install menu options and selected default values

Install menu option	Description
1. Communications	Program the communications devices and paths for reporting to a remote monitoring company, connecting to management software computers, and so on.
2. Remote controllers	Use this option to access additional programming menus for remote devices such as a RAS, a DGP, or a TS0862 Smart Door Controller (which is addressed and polled as a RAS).
3. Version	Display the system's device types and firmware version numbers.
4. Defaults	Reset the panel to default settings.

Clearing the memory

When installing a new panel, or upgrading the firmware on an existing panel, we recommend that you default the panel before programming it.

Note: All custom programming will be erased. Back up any data you need before using these procedures.

The panel can be defaulted in two ways, see:

- “Clearing the memory via RAS” below, or
- “Clearing the memory via the Discovery panel Reset button” below

Clearing the memory via RAS

Users with access to Installer menu option 4 Defaults can clear the memory via RAS.

To clear the panel's memory via RAS:

1. From the Install menu option 4 Defaults, press 99 [ENTER] to reset all custom programming.

Clearing the memory via the Discovery panel reset button

You may want to perform a “panel default” to reset the panel to its factory default state and erase all programming.

To clear the panel's memory without Install menu access:

1. Unseal the tamper switch (Figure 4 on page 17, item 16).
2. Press and hold the reset button on the back of the module. Holding the reset button for 10-20 seconds will make all the LEDs on the front of the panel blink, release the reset button during this period to do a full factory default on the panel.

Note: Releasing the button just before the blinking starts or after the blinking stops will cause nothing to change in the panel.

If another user in the system has a PIN of 4346 or 4347, the installer PIN will not be reset.

Basic programming sequence

This section provides an overview of how to use an LCD RAS to set up a basic alarm system that uses PINs for access control.

Note:

* Some actions require the use of the Discovery web interface. Please refer to the *Discovery Programming manual* for detailed information on these tasks.

To initially program a Discovery system:

1. Plan the system and fill out the programming sheets.
2. Disarm the system. See “Disarming the system” on [page 44](#).
3. Access the Install menu. See “Accessing the Discovery menu” on [page 44](#).
4. Default the system. See “Clearing the memory” on [page 47](#).
5. Disarm the system and access the Install menu again, as described above.
6. Program the date and time. *
7. Change the default installer PIN. See “Changing the default installer PIN” on [page 49](#).
8. If the system will contain fewer than 99 areas, then modify Area Group 1 using Discovery web interface - Area Groups. See “Working with multi-area systems” on [page 48](#) for details.
9. Program the required system options. *
10. If a 12 Volt DC device is connected to the external siren terminals ([Figure 4](#) on page 17 item 5), set the External siren mode system option to “DC Volts”. If a 12 Volt DC device is connected to the internal siren terminals ([Figure 4](#) on page 17 item 6), set the Internal siren mode system option to “DC Volts”. *
11. Program holidays in User menu option 21 Holidays.
12. Holidays must also be assigned one or more holiday types (1 to 8). Decide what each holiday type will be used for and record the purpose in the Holidays and Holiday Types worksheets (see the Discovery Administrators Manual).
13. Program time zones. *
14. Program areas. *
15. Program area groups. *
See also “Working with multi-area systems” on [page 48](#).
16. Program alarm groups. *
17. If your system requires more than 16 inputs, or requires advanced access control functionality, then you will need to program DGPs (data gathering panels) into the system.
*
18. Program inputs. *
19. If your system requires more than 1 arming station, then you will need to program RASs. *

20. Program the system's timers. *
21. Program the communication options to enable the Discovery system to report alarms to the remote monitoring station. *
22. Program the behaviour of relays. *
23. Program (at least) the first user. See "Programming users" on [page 62](#).

Working with multi-area systems

New or defaulted Discovery panels can arm and disarm areas 1 to 99. This functionality is accomplished via Area Group 1, which contains all areas. Area Group 1 is used in the following Alarm Groups:

- Alarm Group 2—Master RAS or Door
- Alarm Group 3—Master Code (Installer)
- Alarm Group 11—High Level User Master
- Alarm Group 12—Low Level User Master
- Alarm Group 13—All Area User Code

The default installer user 50 (PIN 4346) is assigned Alarm Group 3, which controls the areas contained in Area Group 1. Alarm Group 3 cannot be edited, but Area Group 1 can have areas removed.

Note: If the Discovery panel does not need all areas, we recommend removing unneeded areas from Area Group 1.

Default installer PIN

Changing the default installer PIN

The default panel programming includes PIN 4346 for user 50. The default PIN must be changed to keep unauthorised persons from modifying your programming or using the system without authorisation.

To change the default installer PIN:

1. From the User menu prompt, press [2] [5] [ENTER] to change PIN for the master user.
2. Enter the old code.
3. Enter the new code.
4. Re-Enter the new code.
5. Press Enter

Note: Unlike previous versions of Tecom panels, you can't actually delete user 50 from the panel (however, user 50 can be deleted from management software). When you 'delete' user 50 from the panel, the user record is voided and not deleted. Doing so can create a user tally that differs between the panel and management software.

Restoring the default installer PIN

If the installer PIN for user 50 has been changed and lost, you may need to reset the PIN to default (4346). This is easily accomplished via management software. However, if necessary, it can be done from the Discovery panel reset button.

Note: This also defaults area group 1 back to areas 1 to 99, and defaults RAS 1 on LAN 1.

To restore the default installer PIN:

1. Unseal the tamper switch ([Figure 4](#) on page 17, item 16).
2. Press and hold the reset button on the back of the module. Holding the reset button momentarily (0.5 – 2 seconds) will perform a default on the installer PIN and user.

Note: If another user in the system has a PIN of 4346 or 4347, the installer PIN may not be reset.

Enabling communications

Although basic programming and administration of the Discovery system can be done via the Discovery web interface, a LCD RAS on the RS-485 LAN, most systems use software such as CTPlus for configuration.

The Discovery panel provides a web interface to manage configuration of communications and the system, and the panel may be configured to communicate with CTPlus, management software, reporting of alarms to control rooms, etc.

This section describes the programming required to prepare for communications between the Discovery panel and a CTPlus management software computer. Refer to the documentation provided with the management software for additional details, if required.

A new or defaulted Discovery panel is configured by default to communicate via DHCP to a management software computer.

WARNING: Configuring IP communications requires consultation with the client's Network Administrator. Failure to gain the essential information from the client may result in the Discovery panel not communicating with the IP Receiver, management software, or introducing data collisions with parts of the client's existing IP network and possibly a total network shutdown.

Discovery programming

Discovery panels have a range of communications options, configured via the Install menu.

The two options required to configure Communications are:

- 1. Comm devices. Used to configure Comm device hardware, can be configured using the RAS or the Discovery web interface.

- 2. Comm Paths. Used to configure the connection to CTPlus. Can only be configured using the Discovery web interface.

- Configuration paths = CTPlus and Management software = WMS Pro

Ten communication paths are available for simultaneous management software connections, reporting via IP, printing events, and so on. The status of each path can be quickly viewed via the Discovery web interface's dashboard.

A communication path can be assigned a priority number in the range 1 to 10 (the highest priority being 1), or 0 for no priority assignment. A communication path can also be designated as a backup for another communication path.

A Discovery panel has default values programmed for the following communications paths:

- Path 3. Management Software – for IP connection to a computer running management software such as CTPlus.
- Path 8 Mobile Device – for use with the TecomPlus Mobile App, enabling you to view history, alarms, users and control devices such as doors and areas over a TCP/IP connection. Please note that Discovery support in the app is currently limited and will be expanded over time.

Each of the 10 communications paths can be edited. The default paths are provided as a shortcut to setting up the panel.

The following default values are typically sufficient to establish communications with the management software computer:

- Security password 0000000000
- Security attempts 255

Note: It is advisable to change the settings for the password and security attempts once the management software is communicating with the Discovery panel.

Example 1: Programming an event-driven IP connection to CTPlus

To establish an event-driven IP connection:

1. On an LCD RAS, access the Install menu. See “Accessing the Discovery menu” on [page 44](#). Press 1 [ENTER] to access the Communications menu, and then select option 1–Setup, to configure the onboard comm device.
2. Press [ENTER] to step through the options. Change the default settings as required (in particular, ensure Ethernet is set to Yes).

Note: By default, DHCP is enabled.

To view the IP address, connect an Ethernet cable to Discovery from a connected IP network source, and refer to [page 38](#) for the instruction.

If you want to configure the Ethernet settings manually, disable DHCP and use the values advised by the site's network administrator for the IP address, subnet mask and gateway address. For more detailed info, please refer to Setup communications hardware on Discovery Panel on [page 50](#).

3. When returned to the Setup menu, press [0] [ENTER] to exit to the Communications menu.

Discovery web interface below

1. On the Discovery web interface, navigate to the Install menu > Communications > Comm paths
4. Click on the path "MANAGEMENT SOFT".
5. Ensure the Enable connection is ticked.
6. You might also need to change the account code and the computer password (default is 0000000000).
7. Click the Save all button.

CTPlus below

8. Ensure the Discovery panel's Ethernet port is connected to the Network or directly to the CTPlus computer via an Ethernet cable.
9. In CTPlus, select *Panel programming* > *Panels* from the **Navigation** bar to open the Panels form.
10. Click the **New** button on the form's toolbar to create a new panel record. Enter a description for the new panel record.
11. On the *Definition* tab, tick the **Enable** checkbox and select the Panel type: 'TSX10000 – Discovery Control Panel'.
12. On the *Communication* tab, select UDP/IP from the drop-down list for the **Type** field. Enter the Discovery panel's IP address and IP port number (for example 3001) in the **IP address** and **Port** fields, respectively.
13. Save the panel record by clicking the **Save** button in the form's toolbar.
14. Click the **Connections** button on the ribbon to view the list of panel connections. The new entry for the panel in the connections list should indicate that the panel is enabled and online.

Example 2: Programming an UltraSync connection

The steps required to connect management software to a Discovery panel via UltraSync are:

- Get the Discovery panel's SID (UltraSync serial number)
- Set up communications hardware (Comm devices) on Discovery panel
- Optionally, you may set up a user on the Discovery panel (*for this guide, we will simply use the existing default TECOM MASTER user 50*)
- Configure UltraSync on Discovery panel
- Connect to Discovery panel from CTPlus

Get Discovery Panel's serial number

The Discovery SID can be obtained a number of ways:

1. Through the Discovery web interface Dashboard version information. There is the Board and the UltraSync SID's.
2. You may also use a keypad to view the UltraSync SID by going into Menu 19 Install menu > 1 Communications > 2 Status > 2 UltraSync, this will show the "Serial No:".
3. CTPlus can also show the Discovery panel's SID if it is connected with a communication type other than UltraSync (e.g., Ethernet). This can be achieved through Diagnostics, but is also easily available in the Panels form by clicking on the Panels button (on the Panel programming ribbon tab), selecting the required Discovery panel, and then clicking on the Communication tab. The Serial number field will be pre-populated with the UltraSync SID when CTPlus is online to the panel using any connection method.

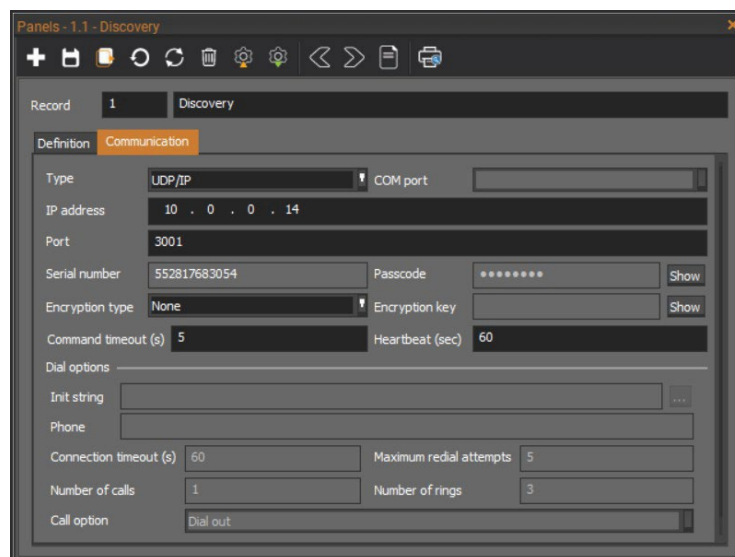


Figure 26: Panel 1.1 Ch 1

Setup communications hardware on Discovery Panel Ethernet

To use UltraSync via Ethernet, the Discovery panel communications hardware must be configured and physically connected to the network via a Ethernet cable. The network must also be connected to the Internet for UltraSync connectivity to be successful.

Discovery supports using DHCP to automatically assign IP address information or may be configured manually. Communications hardware may be configured either via keypad, using CTPlus software, or the Discovery Web interface.

Note: UltraSync to function requires a valid DNS server.

Keypad:

To configure comm hardware using the keypad, go into Menu 19 Install menu > 1 Communications > 1 Setup > YES -Ethernet , Ensure that the Ethernet interface is enabled (press * [MENU] to toggle between YES or NO):

YES-Ethernet
*-Change 0-Skip

- Configure whether DHCP is to be used or not (press * [MENU] to toggle between YES or NO):

YES-Enable DHCP
*-Change 0-Skip

- Configure whether the panel will respond to Ping commands (press * [MENU] to toggle between YES or NO):

YES-Enable ping
*-Change 0-Skip

If DHCP is not enabled, additional options for IP address information will need to be set-up using the steps below:

- Configure the Ethernet interface's IP address by entering each segment, followed by the [ENTER] key:

IP Add:
192.168.000.117
IP(1):

- Configure the Ethernet interface's Subnet mask by entering each segment, followed by the [ENTER] key:

Subnet mask:
255.255.255.000
IP(1):

- Configure the Ethernet interface's Gateway address by entering each segment, followed by the [ENTER] key:

```
Gateway add:
198.168.000.000
IP(1):
```

- Configure the Ethernet interface's DNS 1 address by entering each segment, followed by the [ENTER] key:

```
DNS 1 add:
198.168.056.001
IP(1):
```

- Configure the Ethernet interface's DNS 2 address by entering each segment, followed by the [ENTER] key:

```
DNS 2 add:
198.168.056.002
IP(1):
```

If DHCP is enabled, the IP address may be viewed by following the steps below:

- Using 19 Install Menu, option 1 Communications, press 2 Status and then press [ENTER] to view the Status menu.

```
1-Ethernet 2-UltraSync
0-Exit, Menu:    all update
```

- Press [1] [ENTER] for the onboard Ethernet interface.
- Ensure that the Ethernet interface shows "Link OK."

```
Eth: Link Ok (100 Mbps)
Press Enter
```

- Press [ENTER] to display the Ethernet interface's IP address programmed.

```
Eth: IP addr 192.168.000.117 (dhcp)
Press Enter
```

- Press [ENTER] to display the Netmask address:

```
Eth: Netmask addr 255.255.255.000
(dhcp) Press Enter
```

- Press [ENTER] to display the Gateway address:

```
Eth: Gateway addr 198.168.0.00
(dhcp) Press Enter
```

- Press [ENTER] to display the DNS address 1:

```
Eth: DNS 1 addr 198.168.056.001
(dhcp) Press enter
```

- Press [ENTER] to display the DNS address 2:

Eth: DNS 2 addr 198.168.056.002
(dhcp) Press enter

- Press [ENTER] to display the Ethernet interface's MAC address:

Eth: MAC addr 00:17:55:EE:78:d9
Press Enter

CTPlus Program:

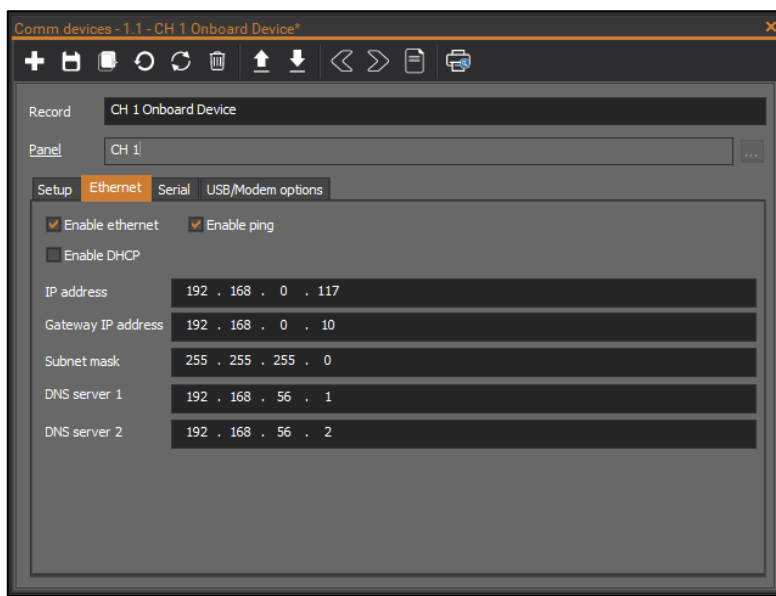


Figure 27: Comm devices

To configure comm hardware in the CTPlus software, go to Panel programming > Communications > Comm devices. On the Comms devices form, configure Ethernet on the Onboard communications device using the Ethernet tab, tick the “Enable Ethernet,” “Enable ping” and if required, the “Enable DHCP” checkbox as well.

If DHCP is not available, the IP address parameters may be configured manually by ensuring that “Enable DHCP” is un-ticked and filling in the required information.

If using DHCP, you can see what IP address, Gateway address, Subnet mask and DNS addresses are automatically assigned by viewing Diagnostics information. To do this, ensure that your Discovery panel is online to CTPlus and follow the steps below:

- Go to the Status and Control form (this can be found under the Operations tab if it is currently hidden)
- Right Click on the Discovery Panel
- Go to Diagnostics > Diagnostics
- Select “Comms device” for Diagnostics type

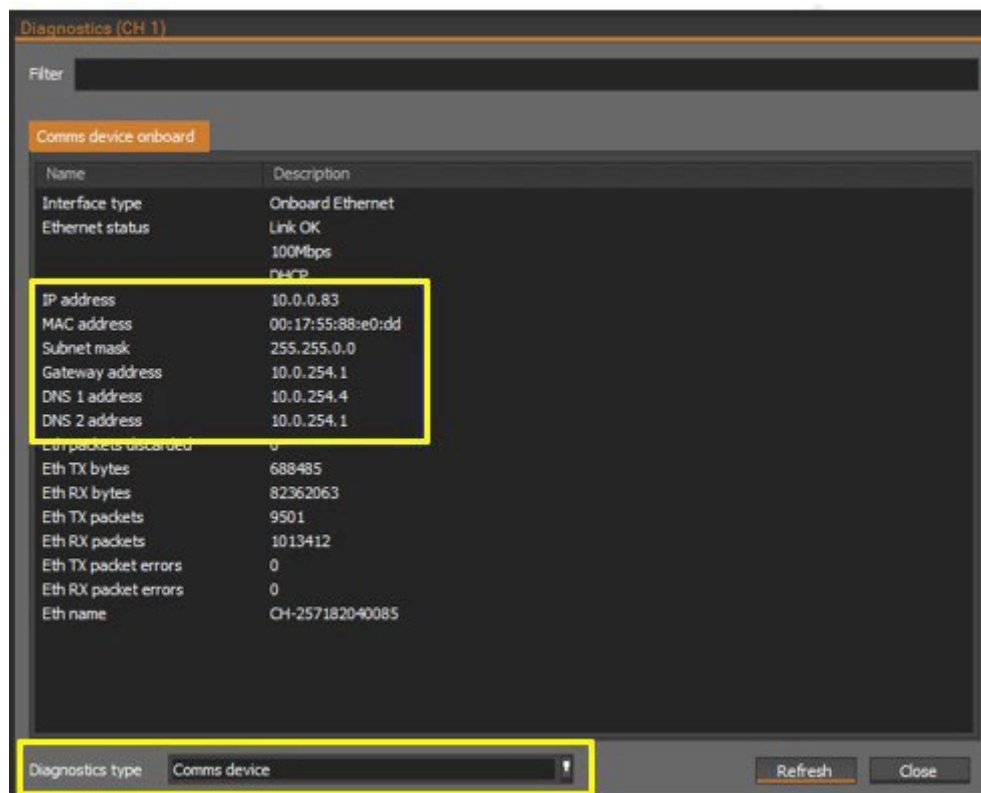


Figure 28: Diagnostics

Configure UltraSync on Discovery panel via Web interface

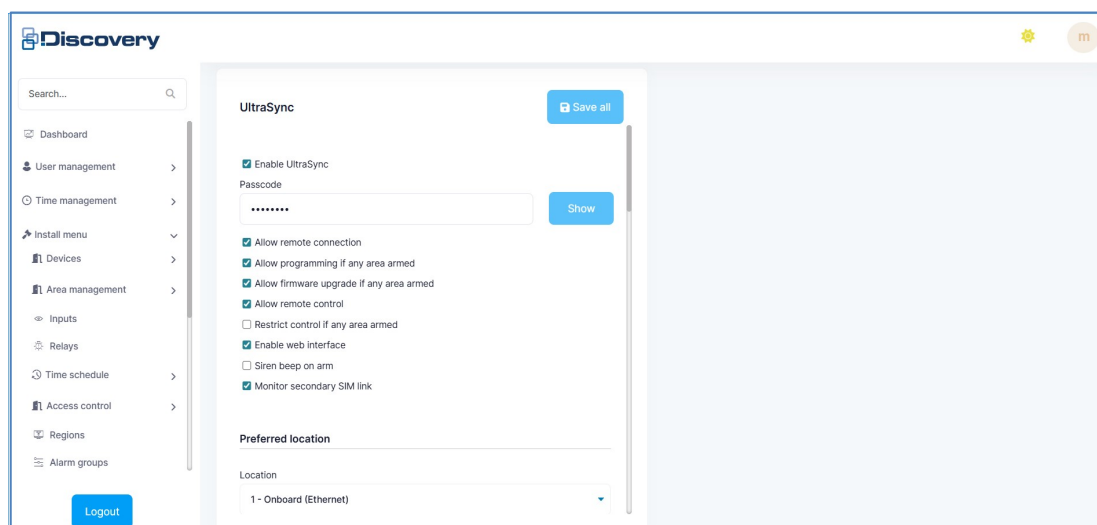


Figure 29: UltraSync Configuration

To configure UltraSync on Discovery panel:

- Navigate to Install menu > Communications > UltraSync.
- Tick the “Enable UltraSync”.
- Path: Configured Ethernet path is assigned by default. If you would like to change the path used, choose any unconfigured Location communication path by clicking the Location drop down button.
- URL and Port info have default values and should only be changed if advised by tech support.
- In addition to the Ethernet path, you can enable the radio path and use it as a backup to the Ethernet path. This will take up to two paths.
- Enter the 8-digit UltraSync passcode. This must be any numerical value other than ‘00000000’.

Connect to Discovery panel from CTPlus

To connect to a Discovery panel using CTPlus via UltraSync:

- Click the Panels button on the Panel programming ribbon tab.
- Click the New button on the form's toolbar (if creating a new panel).
- On the Communication tab:
 - Select UltraSync from the Type drop-down list.
 - Enter the Discovery panel's SID in the Serial number field.
 - Enter the Discovery panel's passcode in the Passcode field (as configured in UltraSync options)
- On the Definition tab:
 - Tick the "Enable" checkbox.
 - Select "Authentication" from the "Authentication Type" drop-down list.
 - Enter the User number in the Username field.
 - Enter the User PIN in the User password field.
 - Time zone: If panel is non-provisioned (default), set TZ to your preferred location. If the panel is provisioned (monitored), TZ is not required.
 - Click the Save button on the form's toolbar.

The screenshot displays the 'Panels - 1.1 - CH 1*' window in CTPlus. The 'Communication' tab is selected, showing the 'UltraSync' configuration. The 'Definition' sub-tab is active, displaying the following settings:

- Record:** 1, CH 1
- Enable:** ☒
- Panel type:** TS-CHPLUS - ChallengerPlus
- Account code:** 1
- Authentication type:** Authentication
- Security password:** [masked] (Show button)
- User:** 50
- User PIN:** [masked] (Show button)
- Time zone:** (UTC+10:00) Australia/Melbourne
- Card format:** Tecom 27 bit

Figure 30: UltraSync Authentication

Discovery web interface:

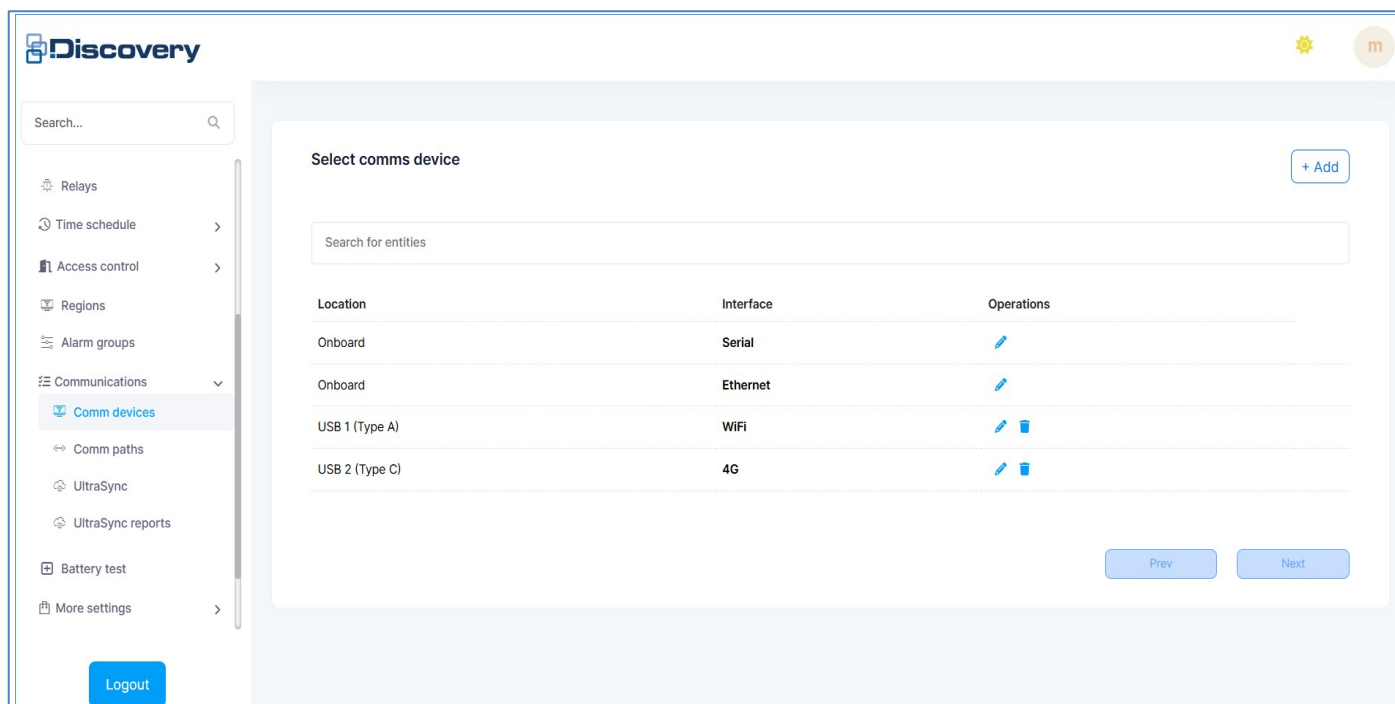


Figure 31: Comm devices

To configure comm hardware in the Discovery web interface, go to Install menu > Communications > Comms devices > Select comms device. Click on the Onboard devices to then see the Serial and Ethernet onboard devices. To configure Ethernet on the Onboard devices, tick the “Enable Ethernet,” “Enable ping” and if required, the “Enable DHCP” checkbox as well.

If DHCP is not available, the IP address parameters may be configured manually by ensuring that “Enable DHCP” is un-ticked and filling in the required information.

Configure UltraSync on Discovery panel via Discovery web interface

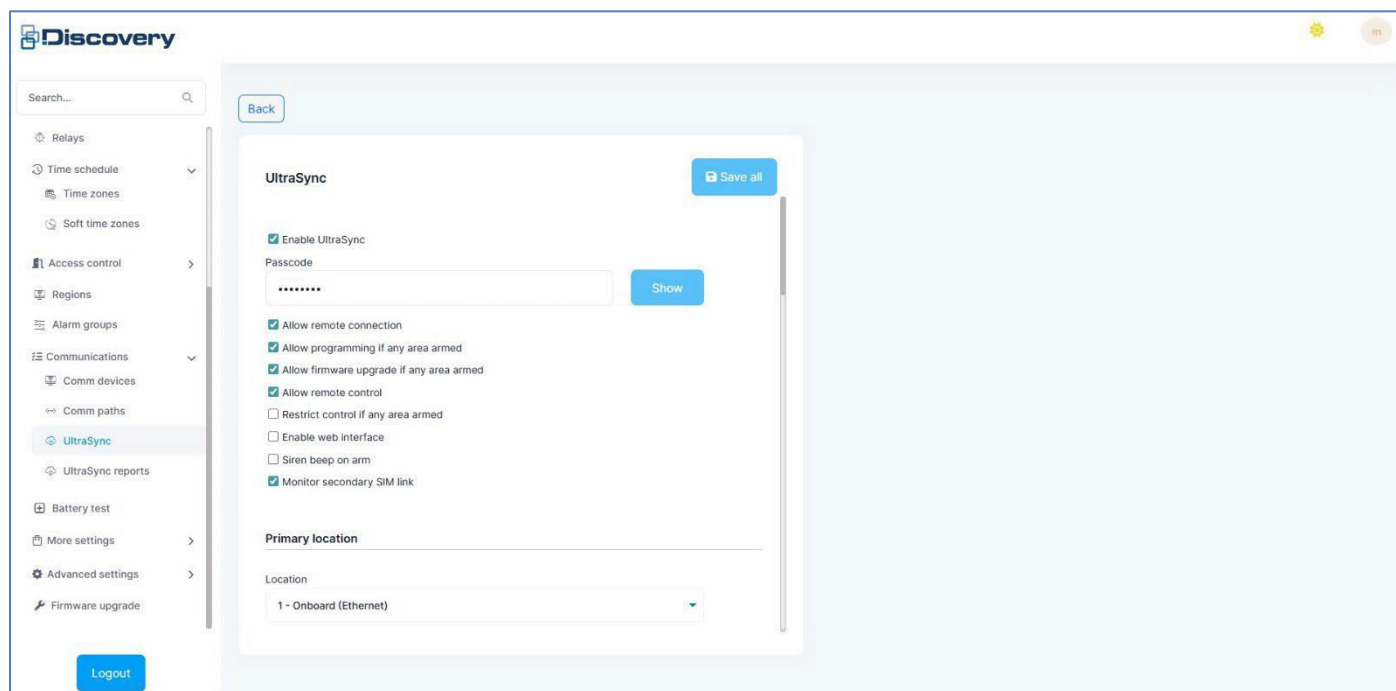


Figure 32: UltraSync Configuration

To configure UltraSync on Discovery panel:

- Go to Discovery web interface Install menu > Communications > UltraSync
- On the UltraSync page, tick the “Enable UltraSync” checkbox.
- Path: Configured Ethernet path is assigned by default. If you would like to change the path used, choose any unconfigured communication path
- clicking the drop down arrow, or by typing the path number directly into the field.
- URL and Port info have default values and should only be changed if advised by tech support.
- In addition to the Ethernet path, you can enable the radio path and use it as a backup to the Ethernet path. This will take up to two paths.
- Enter the 8-digit UltraSync passcode. This must be any numerical value other than ‘00000000’.
- To grant full access to CTPlus via UltraSync, parameters below are enabled by default.
 - **Allow remote connection:** Enables remote access between the CTPlus software and the Discovery panel via UltraSync.
 - **Allow programming if any area is armed:** If enabled, user can modify the Discovery database (when connected via UltraSync) when any areas are armed. Turn off to only allow programming when all areas are disarmed.

- **Allow remote control:** If enabled, users can send commands (e.g., open door, lock door etc.) to the Discovery when connected via UltraSync.
- **Allow firmware upgrade if any area is armed:** If enabled, users can upgrade the Discovery firmware via UltraSync connection when any areas are armed. Turn off to only allow firmware upgrades when all areas are disarmed.

Programming users

Unless you will be programming (adding) the system's users yourself, you will need to program at least one administrator who will be able to program additional users. See *Discovery Administrators Manual* for details.

The default values for User 50, the master code, are:

- Name TECOM Master
- PIN 4346
- Alarm Group 3 (contains all areas, as defined by Area Group 1)
- Door Group 1
- Floor Group 1

To add a new User click on the **+ Add**

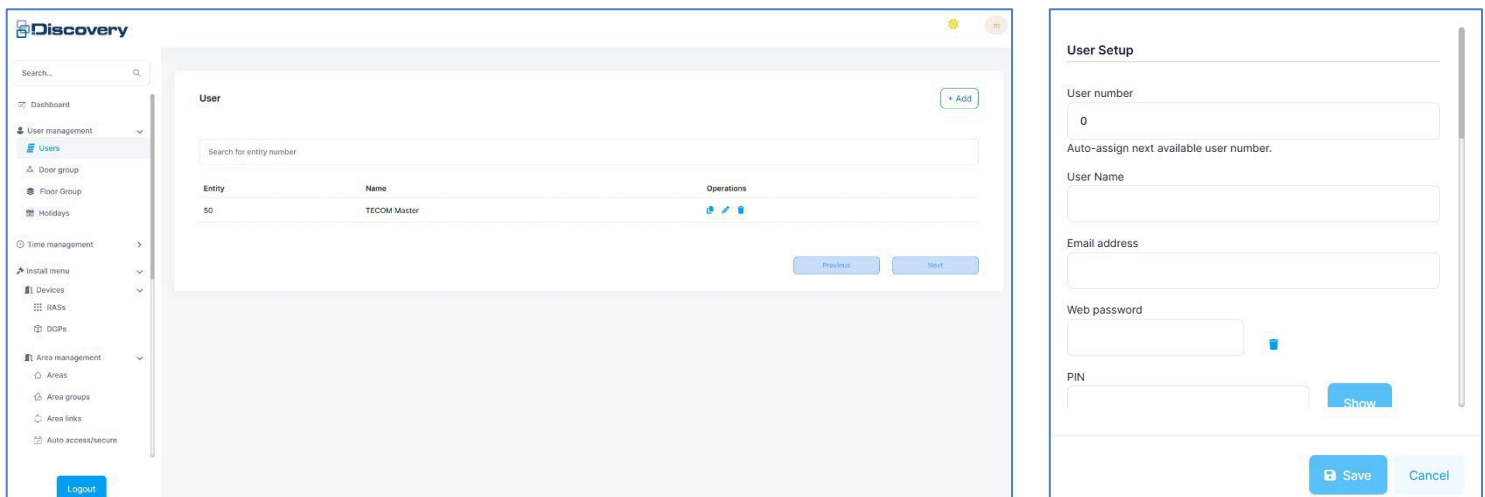


Figure 33 User and User Setup

Fill out the details as follows from the User Setup screen:

- User number – Auto-assign next available user number.
- User Name
- Email address

- Web password
- PIN
- Door group
- Floor group
- Alarm group
- Check boxes for:
 - Trace
 - High security
 - Long access
 - Privileged
- Card details:
 - Normal
 - Dual custody
 - Guard
 - Visitor
- Card data which consists of:
 - Card format
 - Site code
 - Card number
- Start date and time
- End date and time

Appendix A: TECOM Discovery System Compliance Statement

Compliance with legislated and voluntary standards has been confirmed with TECOM Discovery systems and peripherals used in typical installations.

In summary, an approved TECOM enclosure, or one complying with the requirements in Appendix B1 Table 2: Minimum Enclosure Requirements is necessary for safety. The electromagnetic emissions and immunity aspects of a Discovery system are compliant with or without an enclosure.

Legislative standards compliance (Australian RCM mark)

Safety:

AS/NZS 62368.1 Audio/video, information and communication technology equipment – Part 1:
Safety requirements:

Table 1: Australian RCM – Safety Requirements

Setup	Power sources	Enclosure	Modules inside enclosure	External Devices	Outcome
1	<u>Primary:</u> External 12VDC <u>Backup:</u> None.	TS0307	TSX10000 TS1021 TS1061 TS1041	Resistive loads, 3A total.	Complies
2	<u>Primary:</u> External 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	Resistive loads, 3A total.	Complies
3	<u>Primary:</u> 230VAC mains to internal 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	Resistive loads, 3A total.	Complies

Electromagnetic Emissions:

EN 55032 Electromagnetic compatibility of multimedia equipment – Emission requirements.

EN 6100-6-3:2021 DC Power Port Disturbance Voltage.

Table 2: Australian RCM – Electromagnetic Emissions

Setup	Power sources	Enclosure	Modules inside enclosure	External Devices	Outcome
1a	<u>Primary:</u> External 12VDC <u>Backup:</u> None.	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	<u>Radiated:</u> Class A <u>Conducted:</u> Class A
1b	<u>Primary:</u> External 12VDC <u>Backup:</u> None.	None	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	<u>Radiated:</u> Class A <u>Conducted:</u> Class A
2a	<u>Primary:</u> External 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	<u>Radiated:</u> Class A <u>Conducted:</u> Class A
2b	<u>Primary:</u> External 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	None	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	<u>Radiated:</u> Class A <u>Conducted:</u> Class A
3	<u>Primary:</u> 230VAC mains to internal 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	<u>Radiated:</u> Class A <u>Conducted:</u> Class A

Non-legislative standards compliance

Electromagnetic Immunity, performance criteria descriptions

An immunity testing program evaluates system performance in the presence of various forms of electro-magnetic interference and power line disturbances. A performance criterion is assigned to the system depending on its behaviour during each test:

Table 3: Electromagnetic Immunity performance criteria

Criteria	Description
A	Operation without intervention; No degradation or loss of state during or after the test.
B	During the application of the disturbance, degradation is allowed. After the test, operation to continue as normal with no operator intervention with no loss of state or data to persist.
C	Loss of function is allowed, provided the function is self-recoverable; Information stored in non-volatile memory shall not be lost.

Electromagnetic Immunity, part 1

EN 55035	Electromagnetic compatibility of multimedia equipment – <i>Immunity requirements</i>
EN 61000-4-3	Electromagnetic compatibility (EMC) — Part 4-3: Testing and measurement techniques — <i>Radiated, radiofrequency, electromagnetic field immunity test</i>
EN 61000-4-6	Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques — <i>Immunity to conducted disturbances, induced by radio-frequency fields</i>

Table 4: Electromagnetic Immunity, part 1

Setup	Power sources	Enclosure	Modules inside enclosure	External Devices	Outcome
2b	<u>Primary:</u> External 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	None	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	Performance Criteria A
3a	<u>Primary:</u> 230VAC mains to internal 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	Performance Criteria A

Electromagnetic Immunity, part 2

EN 61000-4-2	Electromagnetic compatibility (EMC) — Part 4-2: Testing and measurement techniques — <i>Electrostatic discharge immunity test</i>
EN 61000-4-4	Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques — <i>Electrical fast transient/burst immunity test</i>
EN 61000-4-5	Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques — <i>Surge immunity test</i>

Table 5: Electromagnetic Immunity, part 2

Setup	Power sources	Enclosure	Modules inside enclosure	External Devices	Outcome
2b	<u>Primary:</u> External 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	None	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	Performance Criteria B
3a	<u>Primary:</u> 230VAC mains to internal 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	Performance Criteria B

Electromagnetic Immunity, part 3

EN 61000-4-11	Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — <i>Voltage dips, short interruptions and voltage variations immunity tests</i>
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Table 6: Electromagnetic Immunity, part 3

Setup	Power sources	Enclosure	Modules inside enclosure	External Devices	Outcome
3a	<u>Primary:</u> 230VAC mains to internal 24VDC <u>Backup:</u> 1x 12V, 7Ahr VRLA battery.	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	Performance Criteria A
3b	<u>Primary:</u> 230VAC mains to internal 24VDC <u>Backup:</u> None	TS0307	TSX10000 TS1021 TS1061 TS1041	2x TS0870 1x CA1116 Magna-locks, strikes, resistive loads (3A total)	<u>Dip 0.5 period:</u> Performance Criteria B <u>Dip 25 & 250 periods:</u> Performance Criteria C

Appendix B1: Enclosure Specifications

Table 1: TS0307, Medium enclosure

Description	Details
Mechanical	
Dimensions	W 345.4 × H 450 × D 70 mm.
Weight	Typical installation: 5 kg modules and battery. Maximum capacity: 22 kg.
Mounting height	Top face up to 2 m above floor level.
Labelling	Rating label supplied with Discovery module to be affixed to an external surface that is visible with the enclosure door closed.
Access restrictions	IP30 or better when mounted with door sealed. Interior access must require the use of a tool.
Impact (empty)	Packaged: 1 m fall on to concrete. Unpackaged: 0.5 m fall on to carpet. DO NOT TRANSPORT WITH MODULES OR BATTERY INSIDE.
Mechanical hazard	The enclosure size, weight, and mounting height have the potential to create mechanical hazards during and after installation in typical mounting locations. - A skilled trades person must mount the enclosure, ensuring that the selected location, mounting surface, fasteners and workmanship are commensurate for the task and provide the necessary support. - Adequate measures must be taken during installation to ensure a safe working environment and prevent injury to the installer(s) and others. - The enclosure location and mounting must comply with requirements and must not create a hazard once the work is completed.

Table 2: Minimum Enclosure Requirements

Enclosures not specified by TECOM must meet the following the following minimum requirements:

Description	Details
Compliance	Must comply with local codes applicable to electrical, security and access control installations considering: - Its constituent materials and construction. - The complement of equipment fitted inside the enclosure: each item's specific mounting, wiring and environmental requirements. - The power provisioned to the devices mounted inside the enclosure and their dissipation. - The wiring requirements of the devices within the enclosure, partitioning of circuits entering and inside the enclosure and the protection, support and restraint of wiring entering and within the enclosure. It is the installer's responsibility to certify custom installations.
Labelling	Rating label supplied with Discovery module to be affixed to an external surface that is visible with the enclosure door closed.
Material	- Metal or plastic. - A metal enclosure may be required when housing commonly available off-line power supplies; refer to power supply datasheet and installation documentation.

Description	Details
Access restrictions	• Access must be IP30 or better when mounted with the door sealed. • Interior access must require the use of a tool. • If the enclosure is not sealed (e.g.: mounted in an open rack frame), access to the room hosting the enclosure must be restricted to suitably qualified personnel.
Earthing	• Metal enclosures must have a protective earthing conductor fitted; each separable metal part must be bonded to earth. Minimum earth conductor size is 1.0 mm² (AWG 18). • The protective earth wiring must comply with all local codes. • Power supplies may require a protective bond to earth; refer to the specific power supply datasheet. • The Discovery module and peripherals require a <u>functional</u> earth connection, minimum conductor size 0.5 mm² (AWG 20).
Air flow	• The enclosure must not be sealed. • Specific ventilation openings are not mandatory; it shall be possible for air to flow to the interior, via the door gaps, rear cable entry opening, conduit openings, etc.
Dimensions	<u>Minimum enclosure dimensions:</u> • Depth = 70mm. • Interior volume = 10,500 cm³ (10.5 l). For solid bottom, open-top drawer mounts with < 50 mm ventilated space above, calculate using the minimum side height. <u>Minimum clearance</u> between Discovery module to enclosure walls or other encumbrances: • Width = 20 mm per side (300 mm minimum enclosure width) • Height = 35 mm minimum above and below the connector faces • Rear face slots = 0 mm • Front face = 5 mm
Fixed movable installations	• Installations involving movable mounts (e.g.: sliding rack drawers) require particular attention to the wiring. • Wiring to be secured close to the termination points to isolate the screwed connections from wire motion. • Wiring to be routed and secured so that it is clear of rails and pinch points. • Adequate slack to be provided to allow for free movement. Free harness bundle to be managed at point of installation so that it is always clear of other encumbrances. Hinged cable management arms or cable track ducting are recommended.

Appendix B2: Power Supply Specifications

Table 1: TSX10000-PSU1, External power supply unit 24 VDC 120W

Description		Details	
Manufacturer		Xing Yuan Electronics Co. Ltd.	
Model		XY120LH-2400500VQ-FT	
Environmental			
	Operational		Storage
Location		Indoor, dry area	
Temperature		0...+40 °C	-10...+80 °C
Humidity		5%...90% non-condensing	
Maximum altitude		Up to and including 2000 meters above sea level	
Pollution degree		2: Only non-conductive pollution occurs; occasional temporary conductivity caused by condensation is allowed.	
Mechanical			
Dimensions		W 168 x H 40 x D 66 mm (excluding cables)	
IP rating		IP20	
AC lead length		1.5 m (nominal). Longer leads may be used.	
DC lead length		1.2 m (nominal). Must not be extended.	
Mounting requirements		Indoor dry room location, floor, wall, or shelf. • MUST have free air flow around its housing. • MUST NOT be located in structural cavities (wall or ceiling spaces, etc). • MUST NOT be located inside the Discovery enclosure. • DO NOT drill housing. • DO NOT affix or support using adhesives or tapes. • DO NOT hang by the AC or DC leads.	
Electrical			
Regulatory Compliance		IEC/EN61558, EN55014	
Overvoltage Category		II	
Supply voltage		240 VAC, 50 Hz (nominal) 90...264 VAC, 47...63 Hz (full range)	
Input current		2 A (Maximum)	
Output voltage		24 VDC ±5% (no load)	
Line + Load regulation		±5%	
Output current		5 A (Maximum) 10 A (Over-current protection limit, self-recovering)	
Output power		0.21 W no load 120 W maximum	
Energy Efficiency		Class VI	
Output lead polarity		Red Positive (+24 VDC) Black Negative (0 VDC)	
Enclosure earth		The Discovery enclosure safety earth must be provisioned by the installer. Refer section: Safety earth bond / page 15.	

Table 2: Fundamental requirements for installer specified power sources.

Description	Details
Environmental specifications	Suitable for custom installation environment.
Regulatory Compliance	RCM mark
Overvoltage Category	II
Isolation, AC mains to output	4 kVpk, 60s, <10 mA or better.
Isolation, output to earth	1 kVpk, 60s, <10 mA or better.
Output voltage	24 VDC or 12 VDC nominal. • Per Discovery module specifications in desired operating mode. Refer to Table 9 TSX10000, Discovery module, power input / output on pages 74 & 75
Output Current	5 A (24 VDC) or 10 A (12 VDC) • De-rate power supply according to worst case operating environment, per data sheet.
Output power	120 W
Enclosure earth	When using external 12 VDC or 24 VDC sources, the Discovery enclosure safety earth must be provisioned by the installer. As per page 15.

Appendix C: Discovery Module and Interconnect Specifications

Table 1: Enclosure wiring

Compliance			
All wiring within the enclosure must comply with at least one of the following standards. All wiring exiting the enclosure must comply all applicable local and national wiring codes. In Australia, wire approved for use inside the building fabric is compliant with the following list. Cables supplied with the Discovery module or other TECOM peripherals are compliant.			
IEC 60332-1-2	IEC 60332-1-3	IEC 60332-2-2	IEC TS 60695-11-21
UL 2556 VW-1			
AS/NZS 3008-1	AS/NZS 5000-1	AS/NZS 5000-3	

Table 2: Battery requirements

Description	Details		
When fitted, the battery must comply with the following requirements.			
Compliance			
Battey Type	Rechargeable Sealed Lead Acid (SLA) or Valve Regulated Lead Acid (VRLA).		
Example compliant parts	Power-sonic PS-1270 Power-sonic PS-12120		
Installed battery must be compliant with at least one of the listed standards:			
IEC 60086-4	IEC 60086-5	IEC 60896-11	IEC 60896-21
IEC 60896-22	IEC 61056-1	IEC 61056-2	IEC 61427
IEC/TS 61430	IEC 61434	IEC 61959	IEC 62133
IEC 62281	IEC 62485-2		
Environmental			
Location	Indoor, dry area.		
Temperature	0...+50 °C, minimum operating range (charging or discharging) on the battery surface.		
Mechanical			
Maximum Dimensions (W x L x H)	65 x 151 x 100 mm, typical of 7Ahr models, fits all TECOM enclosures. 98 x 151 x 100 mm, typical of 12Ahr models, large TECOM enclosure.		
Orientation	Upright (terminals facing up).		
Battery terminals (W x t)	<u>Quick connect tabs</u> 4.8 x 0.8 mm (0.188”), direct match to supplied battery lead. 6.3 x 0.8 mm (0.250”), with provided adaptor.		
Electrical			
Terminal Voltage			
Nominal	12.0 VDC		
Minimum	9.6 VDC		
Maximum	14.2 VDC		
Minimum rated current			
Charge	1.5 A		
Discharge	6 A		
Battery Capacity	Charging current to achieve >80% charge in 24 hours		
7 Ahr	350 mA		
12 Ahr	550 mA		
18 Ahr	800 mA		

Table 3: TSX10000, Discovery Control Panel - General

Description	Details	
Environmental		
	Operational	Storage
Location	Indoor, dry area	
Temperature	0...+50 °C (module surface) 0...+40 °C (enclosure exterior surface)	-20...+80 °C
Humidity	93% non-condensing	
Maximum altitude	Up to and including 2000 meters above sea level	
Pollution degree	2 Only non-conductive pollution occurs; occasional temporary conductivity caused by condensation is allowed.	
Mechanical		
Discovery module		
Dimensions	W 215 × H 100 × D 63 mm (no connectors fitted).	
IP rating	IP20 standalone. IP30 when housed in a TECOM enclosure.	
Weight	600 g.	
Mounting	<u>Mount on DIN rail only</u> , via the in-built channel and clip. - DIN rail per IEC 60715, T35, ≥7.5 mm high, ≥215 mm long. - Do not drill the Discovery module. - Do not clamp any surface of the Discovery module. - Do not use tape or adhesive to mount the Discovery module. - Do not apply tape or adhesives on or near any opening of the Discovery module.	
Operating orientation	<u>Wall mounted (vertical)</u> : - Long axis of the Discovery must be horizontal. - The front decal text must be upright as sighted when standing in front of the mounted unit. <u>Shelf / tray mounted (flat)</u> : - The front decal to face up (pointing towards the sky).	
Impact	Packaged: 1 m fall on to concrete. Unpackaged: 0.5 m fall on to carpet.	
Discovery module wiring connectors: Pluggable, 5 mm pitch, rising clamp screw terminals		
Screws	M3 thread, Ø 3.7 mm head for slotted blade screwdriver.	
Torque	0.56 Nm (5 Lb-In)	
Wire size	Solid or stranded conductors, 0.34 – 2.5 mm ² (24...12 AWG)	
Wire strip length	7 – 8 mm	
TECOM legacy product wiring connectors: Pluggable, 5 mm pitch, wire guard screw terminals		
Screws	M2.6 thread, Ø 3.0 mm head for slotted or Phillips blade screwdriver.	
Torque	0.45 Nm (4 Lb-In)	
Wire size	Solid conductors 0.5 – 1.5 mm ² (22...14 AWG) Stranded conductors 0.5 – 2.5 mm ² (22...12 AWG)	
Wire strip length	7 – 8 mm	

Table 4: TSX10000, Discovery Control Panel – Input Power

Description	Details	
Primary Power Terminals (Fig 12, item 1)	24 VDC	12 VDC
Battery management		
Supports battery charging	Yes	No
Voltage		
Nominal	24 VDC	12.0 VDC
Minimum	18 VDC	10.5 VDC
Maximum	27 VDC	14.2 VDC
Maximum operating current and power		
Normal operation	54W (2.3 A)	54W (4.5 A)
Siren operation, faults* (<15 min)	90W (3.8 A)	90W (7.5 A)
Faults* (<10 s)	120W (5.0 A)	120W (10.0 A)
* The system will attempt to shut down if the fault condition cannot be isolated in the specified time.		
Power source		
The Discovery must not be directly powered from a building-wide DC supply (a DC mains). DC power sources must be located within the same room as the Discovery (typically within 3m). Appendix B2 details suitable TECOM modules and requirements for custom power supplies. The data above coupled with the specific installation requirements assist in the specification of power supplies for multiple modules.		
Source Wiring		
Voltage drops on long power supply cable runs may impact system operation by triggering low voltage alarms or causing a shut-down in extreme cases. Multiple loads powered from a common source result in increased voltage drops from the additional load or from fault conditions in one of the modules. The power supply wiring must suit the installation.		
Recommended maximum cable loss at peak load (excluding fuse).	600mV	300mV
Estimated conductor voltage drops (de-rated for paired, surface run in conduit per AS3008.1.1)		
1.5mm ² conductors (AWG16)	< 2m, 300mV @ 5A	< 1m, 150mV @ 5A 300mV @ 10A
2.5mm ² conductors (AWG13)	< 5m, 410mV @ 5A	< 3m 250mV @ 5A 500mV @ 10A
Source Fusing		
Power must be limited at the supply side of the Discovery wiring at both the primary power and battery terminals. This requirement is met by:		
- RCM marked power supplies with the specified power rating (e.g.: TSX10000-PSU1), and - the fused battery lead supplied with the Discovery module.		
When powering the Discovery from high current power sources (e.g.: DC UPS supplies), or if using custom battery leads, certified circuit breakers or fuses must be used; DIN rail fused terminal blocks for M205 fuses are widely available (e.g.: Wiedmuller 1826050000).		
The 12V specifications apply to both the primary power and battery terminals:		
Source maximum power (rated limit)	120W	120W
Fuse Type	M205 (20x5mm) Glass or Ceramic body IEC 60127 time-lag	
Source fuse rating	5A T	8A T
Example parts (12 V parts suit the supplied battery lead):		
Littelfuse 215	0215005.HXP	0215008.HXP
Bel Fuse 5ET	0655R5000-19	0655R8000-19

Description		Details	
Schurter FST		0034.3124	0034.3126
Shanghai Fullness GTL		GTL1500200	GTL1800200
Battery Terminals (Fig 12, item 3)			
Battery requirements are in table 2 on page 72.			
Voltage			
Nominal		12.0 VDC	
Cut-Off		10.5 VDC	
Minimum		9.0 VDC	
Maximum		14.2 VDC	
Current			
Charge current options (installer selectable). The indicated battery is charged to >80% in 24hrs. The lowest suitable option provides the highest efficiency.		Current (±10%)	To suit battery
		350 mA	7 Ahr
		550 mA	12 Ahr
		850 mA	18 Ahr
Charge current limit (fault condition)		1.5 A	
Maximum operating current and power		As per the 12 V specifications given in the section 'Primary power terminals' above.	
Battery fusing and conductor size			
Battery cable length		<1m (inside enclosure)	
Minimum Operating Current			
The following data allows <u>estimation</u> of system run time when operating on a backup power source. The 12V current is the same when operating from the primary power or battery terminals. The <u>actual</u> backup system operating time must be verified during commissioning and periodically during the system's operational life at intervals commensurate with the installation requirements.			
TSX10000 configuration: Ext. siren: 1k (sealed), Tamper: 0R (sealed; LEDs off), Comm1: Active, 2x 120R termination, Reader 1 & 2: Wiegand mode (no connection), Relays: coils off, All other terminals: open.			
Operating Voltage		24.0 VDC	12.0 VDC
Discovery standalone minimum current		97 mA	170mA
Additional current required to operate:			
Ethernet		8 mA	15 mA
Per active, terminated COMM port		3.7 mA	6.5 mA
Per energised relay coil		19 mA	37 mA
Sealed inputs per input:		670 µA	910 µA
total for 16 inputs:		10.7mA	14.6 mA

Table 5: TSX10000, Discovery Control Panel – Output Power Specifications

Description		Details		
Power De-rating				
In small, convectively cooled enclosures, such as the TECOM TS0307, power limits need to be observed to ensure normal operation in hot environments; these are long term requirements and do not impact siren operation during alarm states:				
Power source	24 VDC	24 VDC	24 VDC	12 VDC
Power source inside enclosure?	Yes	Yes	No	No
Room ambient temperature	40 °C	40 °C	40 °C	40 °C
USB current limit	700mA avg.	0 A	700mA avg.	700mA avg.
12V output current	3 A	3 A	3 A	4 A

Description		Details		
Maximum battery charger current	550 mA	850 mA	850 mA	N/A
USB Power (Fig. 12, items 12 & 13)			USB Type A	USB Type C
Voltage				
Nominal		5.0 VDC		
Minimum		4.7 VDC		
Maximum		5.4 VDC		
Current				
Maximum supported load. Loads in excess will be disabled.		500 mA	1.5 A pk 700 mA avg	
Maximum overload trip point.		1 A	1.9 A	
12V outputs				
The Discovery module provides 12 VDC circuits to power customer loads. The terminal voltage is influenced by the primary power source and the attached load.				
The 12V specifications apply to both the primary power and battery terminals:				
Output Voltage		24V mode	12V mode	
Output voltage regulation is dependent on the system source power: - In 24V mode, Discovery regulates to the specified nominal voltage. - During 12V operation (primary or backup battery), the outputs track the source voltage.				
Nominal		13.8 VDC	12 VDC	
Minimum (during battery test)		10.5 VDC		
Maximum		14.2 VDC		
Load regulation, per output		-100 mV/A		
System Current Limit				
The total 12V current supplied to customer loads, excluding internal module and battery charger current, is limited according to the system state and active power sources:				
System state	Total customer 12V load current per active power state			
	Primary: 24V Battery: None	Primary: 24V Battery: 12V	Primary: Failed Battery: 12V	Primary: 12V Battery: None
Sealed or Tamper, No faults [1]	3.0 A	3.0 A	3.0 A	4.0 A
Sealed or Tamper, Fault, <10s [2]	4.5 A	9.0 A	5.5 A	10.0 A
Alarm, <15 min Siren outputs [3]	Will not activate	6.0 A	Will not activate	6.0 A
[1] Discovery will shut down if this value is exceeded. time				
[2] Discovery will attempt to isolate the fault; If it cannot be isolated, Discovery will shut down. time				
[3] Discovery will attempt to isolate current in excess of the siren limit by disabling siren loads; If the fault cannot be isolated, Discovery will shut down. time				

Description		Details	
Power Circuits			
The TSX10000 distributes 8 power circuits across the connector power outputs. Power is limited both at the per-circuit and system levels.			
- Individual circuit loads exceeding the specified rating will trip the fuse and be de-powered; other circuits are un-affected. - Current limits and fault detection apply to the circuit level; shared circuits cannot be isolated to an individual connector. - To prevent intermittent faults, it is recommended to only use up to 80% of the available where loads are not fully specified. This allows margin for load variations with temperature and tolerance (e.g.: copper coil resistance decreases ~ 10% from 25°C to 0°C in addition to the initial part tolerance).			
Circuit	Member connectors	Figure 12 reference	Class
1	Auxiliary (4 connectors)	4	1 A
2	External siren	5	1 A or Siren
3	Internal siren	6	1 A or Siren
4	Strobe	7	1 A
5	Reader 1 Reader 2 Comm 3	8 8 11	1 A
6	Comm 1 Comm 2	9 10	1 A
7	Relay Expander STU	15 19	500 mA
8	Lock power (2 connectors)	20	1 A
Class: 500 mA			Limit
Maximum supported load (resistive)			500 mA R > 28.4 Ω
Maximum overload trip point			600 mA
Minimum conductor size for use in building cavities			0.20mm ² , ~94 Ω/km (7/0.2mm, AWG24)
Maximum unclamped inductive load, worst case fault condition (always clamp inductive loads <u>at the load</u>)			2.4mH @ 5 A
Maximum capacitive load (in parallel with 28.4 Ω load)			300µF 3500µF
			Full voltage <25ms Full voltage <400ms
Class: 1 A			Limit
Maximum supported load (resistive)			1 A R > 14.2 Ω
Maximum overload trip point			1.2 A
Minimum conductor size for use in building cavities			0.20mm ² , ~94 Ω/km (7/0.2mm, AWG24)
Maximum unclamped inductive load, worst case fault condition (always clamp inductive loads <u>at the load</u>)			2.4mH @ 5 A
Maximum capacitive load (in parallel with 28.4 Ω load)			300µF 3500µF
			Full voltage <25ms Full voltage <400ms

Description	Details
Class: Siren Siren class outputs provide a modulated waveform to suit speakers / horns etc. Triggered sirens will only be activated if the Discovery is operating in 12V mode, or 24V mode with a functional battery.	Limit
Maximum supported load (resistive, modulated waveform).	4 A pk, 1 A avg
Maximum overload trip point	4 A
Permitted loads: - One siren connector is allowed to have a 4 Ω speaker (2x 8 Ω speakers in parallel) load. - Either or both siren connectors are allowed a 1 A class or a siren class (8 Ω speaker) load. The first output that triggers an overload will be disabled.	

Table 6: TSX10000, Discovery Control Panel – Interface specifications

Description	Details
COMM and Reader	
Data lines (D+/D-)	Termination enabled or disabled
Normal voltage	≥ 0 V, < 5 V
Maximum voltage, per pin	± 30 VDC
ESD, transients and surge	Per EN55035
Data cable requirements	
Maximum cable length. <i>Interconnected modules must share a common building earth zone.</i>	1500m
Cable style	Screened, 2 twisted pairs, e.g.: Belden 8723
Minimum conductor size for use in building cavities	0.20mm ² , ~94 Ω /km (7/0.2mm, AWG24)
Data bus termination resistors	
Internal	120 Ω $\pm 5\%$
Remote end, legacy bus only	475 Ω $\pm 5\%$
Remote end, high speed or legacy bus	120 Ω $\pm 5\%$
Wiegand	
Data line (D0/D1) voltage rating	
Normal	≥ 0 V, < 6.5 V
Maximum, per pin	± 30 VDC
ESD, transients and surge	Per EN55035
LED & buzzer driver ratings	As per Relay Expander (below)
Data cable requirements	
Cable style	Screened, 7 core, e.g.: Belden 9943
Minimum conductor size for use in building cavities Total normal load must be <1.2 A	0.20mm ² , ~94 Ω /km (7/0.2mm, AWG24)
Maximum ground conductor voltage drop (V = Idle state load x cable length x resistance/length)	1 V
Serial port (STU)	
Data lines, TX and RX: Normal voltage	≥ 0 V, < 13.8 V
Data lines, TX and RX: Maximum voltage	TX: ≥ 0 V, +15 VDC RS232 receivers biased to ± 15 VDC RX: ± 30 VDC

Description	Details
STU TX data line pullup - STU interfaces require a pullup resistor to 12V at the module transmit pin. - Discovery provides an internal pullup. The interconnecting cable or STU device may also have a pullup fitted. - No pullup, or excessive pullup load causes errors or a lack of communication. - The STU interface is also compatible with RS232 interfaces.	Internal to module: 4.7 k Ω $\pm$ 5%. Maximum external: 900 Ω $\pm$ 10%.
Data cable requirements	
Maximum cable length	3 m (same room)
Cable style 3 core supports data only. 4 core allows powering of connected device. Twisting RX and TX on a pair increases noise; it does not aid communication.	Minimum: Unshielded, 3 core, e.g.: Belden 8794 Shielded versions can be used: Connect shield at 0V Discovery terminal only.
Minimum conductor size for use in building cavities	0.20mm ² , ~94 Ω /km (7/0.2mm, AWG24)
Maximum ground conductor voltage drop (V = device load x cable length x resistance/length) If powering the target device, select cable length and conductor gauge to comply	250 mV
Relay Expander	
Maximum cable length	1m (inside enclosure)
Per output pin (direct drive mode)	
Configuration	Active low
Off state, normal load voltage	< 14.2 VDC
Off state, maximum load voltage	+30 VDC
On state, maximum terminal voltage	350 mV @ $\leq$ 500 mA
Maximum load current	< 500 mA
Fault current	< 1.8 A
Maximum unclamped inductive load (always clamp inductive loads <u>at the load</u>)	40 mH @ 1.8 A
Inputs & Tamper	
Voltage rating	
Normal	< 14.2 VDC
Maximum, per pin	$\pm$ 30 VDC
Maximum fault current	100mA
ESD, transients and surge	Per EN55035
Cable requirements	
Maximum cable length	1000m, inputs 1m, tamper (inside enclosure)
Cable style	Single pair / figure 8
Minimum conductor size for use in building cavities	0.20mm ² , ~94 Ω /km (7/0.2mm, AWG24)

Description	Details
Relay Terminals	
Terminals available per relay	NC: Normally Closed C: Common NO: Normal Open
Switched circuit power	AC or DC
Terminal type Contact oxides can cause voltage drops. <u>Minimum</u> specified terminal ratings ensure clean contacts and normal operation even on infrequently switched circuits.	Silver alloy (power loads).
Terminal voltage NOT RATED FOR AC MAINS	Minimum recommended: 5 VDC / 4 VAC Maximum: 60 VDC / 30 VAC.
Terminal current	Minimum recommended: 100 mA Maximum: 3 A (resistive load)
Capacitive & incandescent lamp loads	Limit to 5 A peak. (Discovery power outputs comply).
Inductive loads	Must fit diode clamps at the load to suppress high voltages.