ParSec READER

INSTALLATION MANUAL

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ParSec READER

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CONTENTS

1.   **CAUTION - STATIC PRECAUTIONS**

   Some devices used in the ParSec reader are static sensitive.
   Anti-static precautions *must be taken* when handling the printed circuit boards.
   Static discharge will permanently damage the boards.

2.   **GENERAL INSTALLATION NOTES**
2.1.   **Reader Design**

The reader is mounted in a 2-part enclosure for surface mounting. The rear casing has 2 keyholes and 1 slotted hole for the 3 fixing screws and a variety of knock-out positions for ease of cable entry.

The reader contains two PCB's for ease of installation and maintenance. The rear BACKPLANE PCB comprises two cable termination blocks, the power supply regulator and alarm relay, and two connectors to the front LOGIC PCB. The Backplane PCB will normally remain permanently mounted after the reader case has been sited and the cables installed.

The LOGIC PCB contains the radio receiver, the microprocessor and communications circuitry, and the KEYPIC personality module. All reader adjustment and configuration is performed via the logic PCB, which is mounted onto the Backplane PCB via two push-fit connectors.

This method of construction enables replacement of the logic PCB for maintenance purposes and also makes it possible for the physical mounting and cabling of the reader enclosure and Backplane to be carried out prior to system configuration and commissioning.

The reader front cover is protected from unauthorised entry by a recessed security screw.
For this to be removed for installation, you will need a Newmark security driver (Part no SS0001 or RS part 541-983). Any attempt to remove the front cover will operate an anti-tamper switch which may be set to trigger a local or remote alarm (e.g. sounder/lamp) and, if the reader is connected to a computer-based system, to raise an alarm at the system control console.

There are 2 types of reader.   The model PSR-232-1 has an RS232 port and is normally used with TransAsset or other third party asset management software.   The model PSR-W26-1 has a 26-bit industry standard wiegand card type data output and is normally used with access control systems. It is possible to convert from 1 model to another by simply changing the socketed KeyPIC.

All the tags transmit at 418 MHz using a power level which in the UK is MPT 1340 licence exempt by the DTI. For those countries where 418 MHz is not acceptable, tags and readers operating at 433 MHz will become available in mid 1998.   All units are CE marked and comply with European EMC directives. However, to maintain this compliance, it is essential that you follow the installation procedures in this manual and in particular use grounded screened cables where specified.

2.2. Siting the reader

The physical location chosen to site each reader will depend principally upon

    (1)   The area of coverage required for Static Asset Tags (PS-SAT1-1's).

    (2)   The exit/entry points to be protected or monitored with Portable Asset Tags (PS-PAT1-1's) and Personnel Tags (PS-PET1-1's).

For 'portal monitoring' with PS-PAT1-1's and PS-PET1-1's, the reader should be sited in line with the centre of the doorway and midway between the top of the door and the ceiling. (This is not critical and, in some cases, it may be appropriate to site the reader in a higher position to deter vandalism.)

Where the system is used solely for monitoring unauthorised movement of items protected by PS-SAT1-1's, the reader should be mounted 0.5m below the ceiling and in the centre of a convenient wall in the location, to optimise the polar pattern of the receiving antenna.

Up to nine of the RS232 type readers can be chained to provide extended coverage of a wide or irregularly shaped area. (For details of reader addressing, see section 4.3.)

Notes

    "DIFFICULT" LOCATIONS

    (1)   The reader enclosure is partially screened to reduce the sensitivity to tags from the rear. Where REAR DETECTION is a problem, a new type of uni-directional antenna is being developed. Contact your supplier or Newmark for more information.

    (2)   The reader is supplied with aluminium shield which can be fitted to the reader after installation to reduce its sensitivity to tags being read through the ceiling from the floor above. If this is required, peel off the self-adhesive backing strip and place it inside the top of the reader enclosure. Note that it covers the 2 upper fixing screw holes, so you will need to use countersunk head fixing screws.

    (2)   The presence of steel girders, metal filing cabinets/office furniture, false ceiling supports and aluminium backed plasterboard in the building structure will cause reflections and will cause blind areas and hot spots. If this occurs, it will be necessary to move the reader to an alternative location, which may be as little as 10 cm away in some cases. Installation survey equipment will be available from Newmark in due course. Radio signals can often travel down corridors, lift shafts and may even go round corners. Always try and test the reader temporarily in the intended location first to check that it will work properly in that location.

    (3)   Peoples bodies absorb the tag transmissions and it is always good practice to

mount the reader as high as possible or even facing downwards from the ceiling so that bodies do not shield the reader. In some cases it may be necessary to mount more than 1 reader to provide adequate coverage.

(3)   The readers are not weather-resistant and so must only be mounted outside in an all *plastic* suitably rated enclosure.

CAUTION

In common with all low power radio frequency based systems, ParSec Universal Readers should be sited as far away as practicable from sources of electromagnetic interference.

Whilst the internal surfaces of ParSec Readers are partially screened, it is strongly advised that they should not be mounted close to VDU screens, TV monitors or other sources of radio frequency emission. The minimum recommended separation is 1.5m from a 15 inch CRT screen.

2.3.   Power Supply Requirements

The reader requires a 12V/300mA, DC power supply, which must be CE approved.

The on board voltage regulator allows the input voltage to vary +/- 3 volts from the nominal 12 volt supply. The reader is protected against reverse polarity but *not* voltages greater than 16V.

It is recommended that power and signal cables to the reader should be separated from 3-phase mains supplies by at least 1m and from single phase mains supplies and all types of cable runs by at least 0.5m. Use screened cables e.g. 2-core Belden 8760 for reader power, 2-core Belden 8761, 9841 or 9501 for RS-232 and 6-core screened e.g. Belden 9536 for Wiegand data and LED drive. Connect the screen to earth/ground at the remote end.

2.4.   Communications Interfaces
2.4.1.   RS-232 Data Port (PSR-232-1 model only)

Serial data input and output connections and switch settings are detailed in Section 4.6.1. Full details of the RS-232 protocol are contained in the separate document "ParSec reader RS-232 Data Specification".

2.4.2. Wiegand Data Port (PSR-W26-1 model only)

Wiegand data format allows ParSec Readers to be connected directly to access control systems using this standard. This 26-bit version uses the industry standard format as follows.

Bit 1   Even parity on bits 1-13
Bits 2 - 9   Site Code as printed on tags
Bits 10 - 25   Tag no as printed on tags
Bit 26   Odd parity on bits 14-26

Connections for use with an InterPoint are shown below.

ParSec Reader TB1	InterPoint TB4	Function
1	1(12V)	12V
2	3 (0V)	0V
8	4 (R1)	D0
9	6 (R3)	D1
13	7 (RED)	Red LED
11	8 (GRN)	Green LED

Set the InterPoint reader mode DIL switch 5 to 8 all off i.e. as for a wiegand card.

2.5.   External PIR Operation

If an external PIR is used, it must be fitted with the appropriate Fresnel lens, and be fixed in its operational position and set to the desired attitude prior to commencing the reader commissioning procedures.

3. INSTALLING THE READER
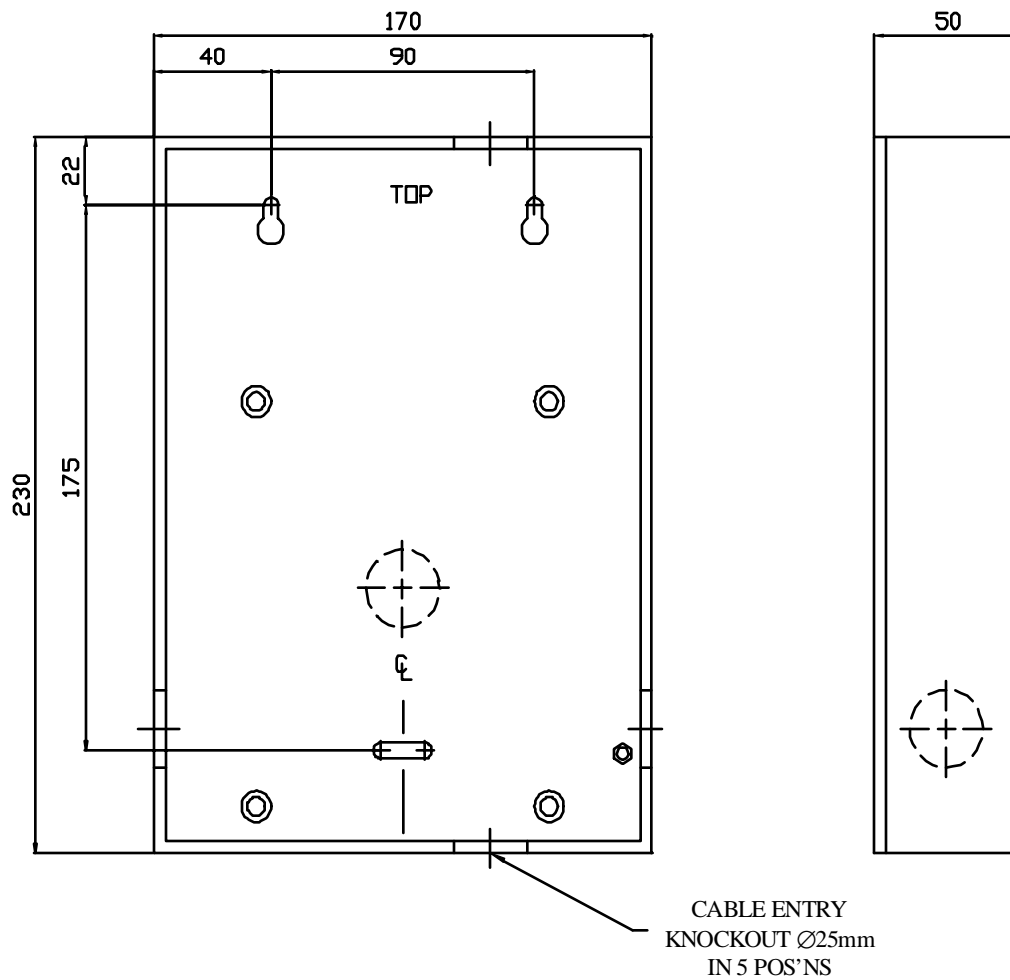
3.1. Fixing the reader enclosure

FIG. 1 - READER REAR CASE

The rear case should be fixed in position with appropriate. screws in the two upper slotted holes and secured with a third screw in the lower hole.

3.2. **Installing the Backplane PCB**

It is recommended that power and signal cables are routed via the hole in the centre of the Backplane PCB prior to fixing the PCB and terminating the connectors.

The Backplane PCB is secured to the rear case by the four M3 screws provided.

Cable connections should be made to the two connector blocks shown below. The designations are also shown on a label affixed to the top inside of the reader housing.

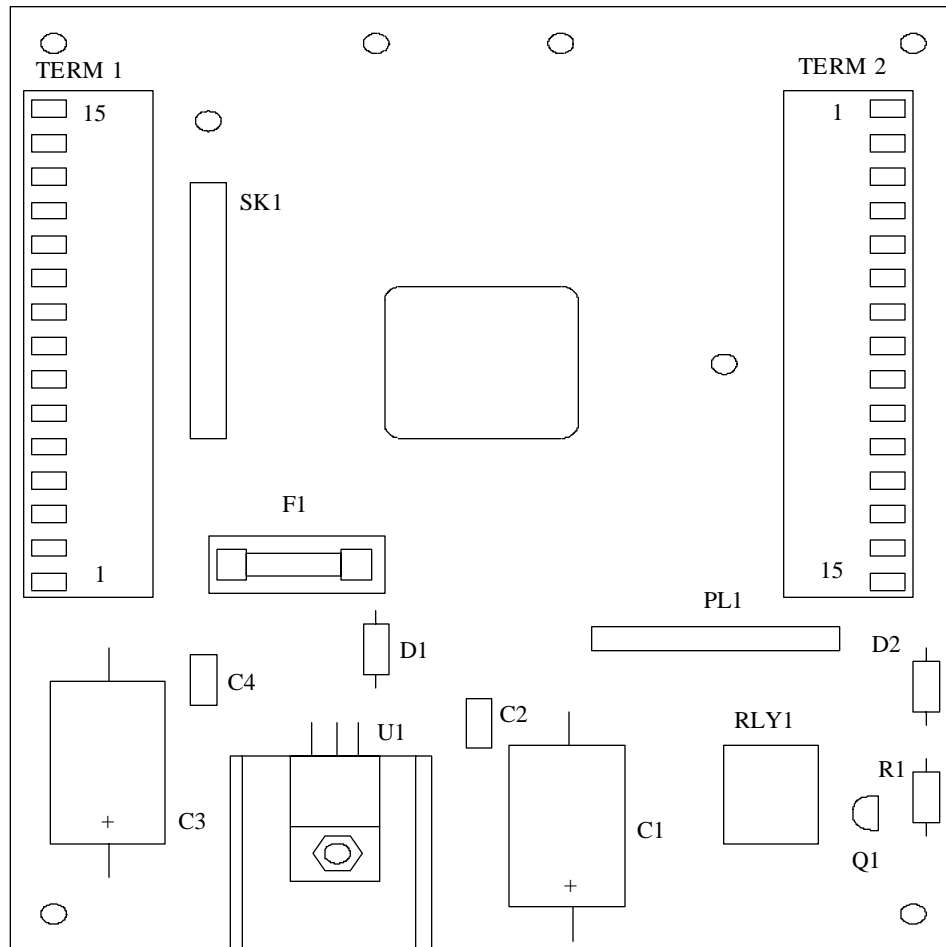FIG. 2 – BACKPLANE PCB LAYOUT

The connector blocks are of the sprung type to ensure ease of installation. Prepare each conductor by stripping back 5 mm insulation then follow the steps below.

1. Insert a 2.5 mm screwdriver in the slot above the required terminal and twist the screwdriver a few degrees in either direction.
2. Insert the conductor.
3. Withdraw the screwdriver to ensure a reliable connection.

TERMINAL BLOCK	TERMINAL NUMBER	DESIGNATION
1	1	+12 volt supply input
	2	0V
	3	0V
	4	+5 volt output
	5	Reader inhibit input
	6	Long range inhibit input
	7	Not used
	8	Wiegand data 0 (D0) out
	9	Wiegand data 1 (D1) out
	10	Wiegand inhibit input
	11	Green LED external input
	12	Amber LED external input
	13	Red LED external input
	14	External sounder input
	15	Data ground

2	1	External PIR +12V output
	2	External PIR 0V output
	3	PIR contact input
	4	RS-232 data input
	5	RS-232 data output
	6	RS-232 data ground
	7	RS-232 bypass (looped to 8)
	8	RS-232 bypass (looped to 7)
	9	Tamper loop from S1
	10	Tamper loop to S1
	11	Alarm reset input
	12	Alarm 0V input
	13	Alarm relay C
	14	Alarm relay NC (powered down)
	15	Alarm relay NO (powered down)

TABLE 1 – BACKPLANE PCB CONNECTOR DESIGNATIONS

3.3. Installing the Logic Pcb

Following installation and wiring of the Backplane Pcb, the Logic Pcb is installed by plugging it onto the two Backplane connectors. Aligning these connectors requires care and some practice because you are working blind. Mis-aligning them can result in bent or broken pins. Press the connectors firmly home without exerting undue pressure on the Logic PCB.

CAUTIONS

The Logic Pcb must only be installed or removed from the Backplane Pcb with the power supply disconnected.

Take great care to ensure that the two connectors between the Backplane and Logic Pcbs are correctly located. The L-shaped layout of the connectors is designed to assist with correct location.

Once the two Pcbs are firmly mated, refit the M3 screw and washer.

4. COMMISSIONING THE READER

Figure 3 shows the layout of the switches on the reader Logic Pcb which are used to configure the reader to its required installation settings. It is important that the commissioning procedure is performed strictly in the sequence which follows.
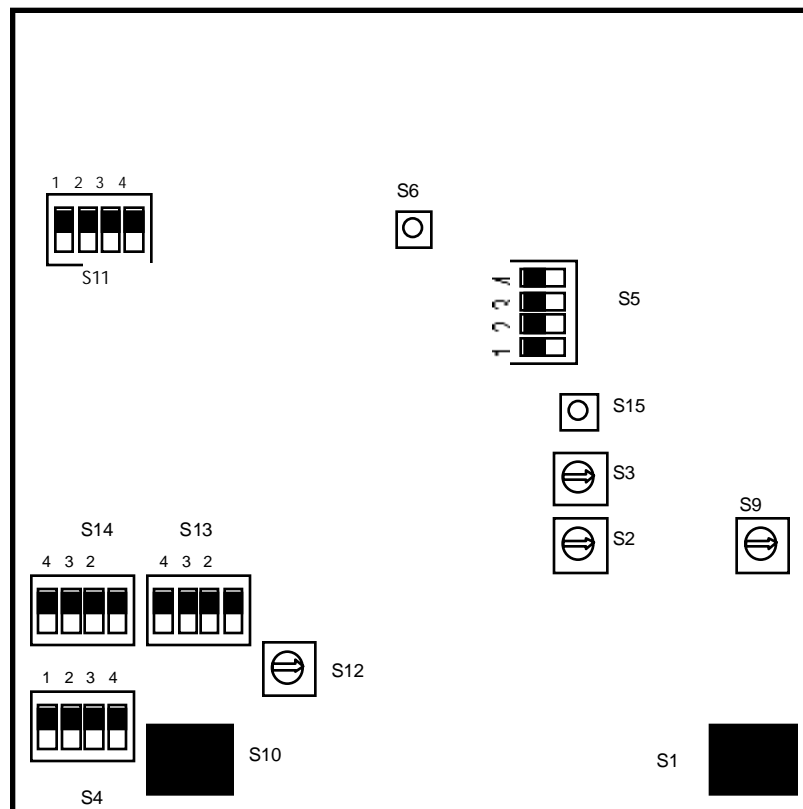

FIG.3 – LOGIC PCB SWITCH LOCATIONS

4.1.   **Default Switch Settings**

Table 2 below lists the functions of all switches on the Logic Pcb. When installing a reader for the first time, set the switches to their default conditions shown in *italics* in the table.

SWITCH	POLE	SENSE	FUNCTION
S1		Depressed	Front panel tamper OFF (ON when cover removed)
S2		0-9 (*0*)	Reader Number - Units (User set) for PSR-232-1 type only
S3		0-9 (*0*)	Reader Number - Tens (User set) for PSR-232-1 type only
S4	1	*ON*	Enable external sounder input (+5 to +12VDC)
	2	*ON*	Enable tamper sounder (set to OFF until unit is installed and front panel fitted)
	3	*ON*	Enable static asset tag detect peep
	4	*ON*	Enable portable asset tag detect peep
S5			Not used - leave all 4 sections off
S6		Press	Scanner master reset (starts scanner - indicated by flashing power LED)
S9		1-7 (*3*)	Static asset tag pulse count setting 1=1, 7=7 (8,9 & 0 unused - default to 1); also determines number of Static tag pulse counts before Wiegand data output (RS-232 not affected)
S10		Depressed	Front panel tamper OFF (ON when cover removed)
S11	1	*ON*	Disable PIR usage
	2	*OFF*	No external PIR set
	3	*OFF*	Disable internal PIR
	4	*OFF*	Enable internal LED control (ON disables internal and enables external LED control; logic = active low input).
S12		0-9 (*4*)	Static asset tag alarm time setting (controls relay contacts and internal alarm sounder) 0=2s, 1=5s, 2=10s, 3=30s, 4=1m, 5=2m, 6=5m, 7=10m, 8=15m, 9=20m
S13	1	*OFF*	Internal sounder volume low (ON = high volume)
	2	*OFF*	RS-232 data 9,600 baud (ON = 2,400 baud)
	3 & 4	*OFF*	Position dependent on sub-system code; both must match Static asset tag switch positions;
S14	1	*ON*	Enable Portable asset tag alarm relay
	2	*ON*	Enable Static asset tag alarm relay
	3	*ON*	Enable Portable & Static asset tag tamper internal alarm relay
	4	-	Not used
S15		Press	Master processor and KeyPIC reset; only used in total data/reader lock-up condition which may be caused by bad power or other data error

TABLE 2 – LOGIC PCB SWITCH FUNCTIONS

4.2. Adjusting the Read Range

The range at which Portable Asset and Personnel Tags is read by the reader is adjustable from a maximum free space range of c. 25m down to a few cm. to suit the requirements of the individual installation.

Notes

(1)   The nominal 100m long range reading of Static Asset Tags is *not* adjustable

(2)   Tamper alarms, routine reports and low battery conditions are signalled by Static *and* Portable Tags at high power (i.e. long range); the Personnel Tag always signals at low power (short range).

The range of portable asset and personnel tags is adjusted by using the Range Adjusting Tag (PS-RAT1-1)

4.2.1   Range Adjustment Procedure

1. Power on the reader
2. Press the Scan Reset button (S6) - the red power LED will flash
3. Move to the position where you would like tags to be read and press and hold down the FIND button on the PS-RAT1-1. Within about 10 seconds the reader will then find the RAT and set the range. This will be signified by the tone sounder on the reader operating and the left hand red LED flashing. You can now check the range by pressing and holding down the SEEK button on the RAT. When the reader sees the RAT it will operate the tone sounder and the red LED.
4. If you would like to make some minor adjustment to the range you can use the + & - buttons.   Press these keys momentarily and check the red LED on the reader flashes each time.   Note that very brief presses of less than 0.3 seconds will be ignored.
5. Use the SEEK button and check the range in different locations in the area where you want tags to be read.   In all except very large open areas or outdoors, you will find blind spots and hot spots. This is caused by the radio signals from the tag being reflected off walls, ceilings, furniture and people.
6. Once you are satisfied with the reading range, press and release S6 and this will store the range adjustment in the reader memory. The power LED will now show a solid red.   The range setting is stored in non-volatile memory, so it will be retained even if the reader power is removed.
7. If at any time you wish to alter the range, you can repeat the above procedure as many times as you like.

Notes

(1)   Owing to the nature of RF at the frequencies used in the ParSec system, it may be desirable to carry out the set up procedure a few times to optimise reader performance to the location.

(2)   Mounting Portable asset tags on metal surfaces may result in a severe loss in range unless care is taken to find the best location. Generally these tags should be located as near to a corner as possible with the arrow on the tag pointing to the outside edge. Although laptop computers appear to have a plastic outer

case, there is always a metal screen behind the display. You may have to try several different positions on a laptop before you find one that does not impair the range. We recommend that you should always temporarily fit the tag on assets containing metal and check the range is adequate before fixing it down permanently. Once you have found the best position on, for example, a particular model of laptop, you will then be able to fit the tag in the *same* position for all similar models. Remember to ensure that the tamper switch spring is pushed in when doing these tests. The tamper alarm always operates at high power at long range. Never re-use the adhesive pads on tags.

If you have to re-locate a tag replace the adhesive pad and always de-grease the mounting surface using methylated spirits or other de-greasing agent.

(3)   The range set using the RAT is designed to compensate for the reduction in range that occurs when asset tags are mounted on metal or when personnel tags are worn close to the body e.g. in a pocket. You will find that tags held clear of metal or bodies will operate at a greater range than that set by the RAT.

(4)   The level of ambient background noise will affect range consistency; whilst noise filtering is employed in the reader design it cannot filter certain types and levels of noise which are within the scope of the data rate. Please refer to the Important Installation Notes in Section 2.2 'Siting the Reader'.

(5)   If after setting the range, the red power LED continues to flash slowly, then the range setting is invalid. Repeat the range setting process.

4.3.   Setting the Reader Identity
4.3.1. Reader Number Programming

Switch S2 programs the 'units value' and S3 programs the 'tens value'. Set the required values before applying power to the reader. Should the reader number need to be changed, select the new number then depress the reset switch (S15); the new number will be read by the reader software.

Notes

    (1)   The reader number is only reported via the RS-232 data port; it is not reported via the Wiegand data port.

    (2)   It is possible to set as many Readers as required to the same reader number.

4.3.2. Sub-system Code Programming

This facility is normally only used where more than one Static Asset tag system is used at the same location; it provides 'isolation' between adjacent systems and prevents Static tag on one system being read spuriously by the other system.

Four sub-system codes are available and they are set via switches S2/3 on the underside of the Static tag.
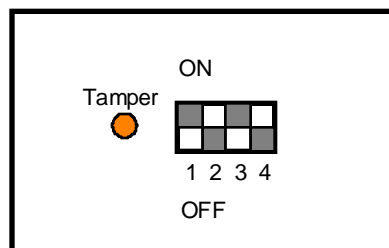
Switch 1   - On/Off
Switch 2/3 - Sub-System Code
Switch 4   - Hourly Routine Report

FIGURE 4 – STATIC TAG SWITCH LOCATIONS

The code setting on the reader (switch S13 poles 3/4) must match the setting chosen for the Static tags belonging to that system. *Note that PS-SAT1-1 switch 2 corresponds with reader switch S13/4, and PS-SAT1-1 switch 3 with reader switch S13/3.*

Notes

    (1)   Sub-system code programming applies *only* to Static tags.

    (2)   Portable Asset tags are equipped with the same switch block but switches 2/3 are non functional.

    (3)   Portable Asset tags will also give hourly routine reports if switch 4 is turned ON.

    (4)   If an asset tag is moved or tampered with the next routine report will be about an hour later.   In other words the internal 1-hour timer inside the tag is reset every time the tag transmits.

4.4.   **Setting the Indicators & Alarm Functions**
4.4.1. Indicator LED Programming

Control of the reader status indicator LEDs is set by switch S11/4. In its default position - OFF - the LEDs are driven by the internal control lines i.e. amber for the personnel and portable asset tags and green for static asset tag.

Portable   Static   Power

FIGURE 5 – INDICATOR LED FUNCTIONS

All indicator LEDs are individually programmable (except the Power/Scan LED) under the control of switch S14; see Table 3 for details of the settings.

When switch S11/4 is set to ON, the LED is diverted to the main connector panel where they can be controlled by an external voltage source; see Section 3.2, Figure 2 for details of the connections. The external source logic is active low.   In an access control application you may wish to use external LED control to indicate if access has been granted, denied or if the door is permanently unlocked, locked or forced.

4.4.2   Internal Sounder Programming

The internal sounder may be programmed to selectively operate on detection of conditions generated by

   (1)   Portable Tags
   (2)   Static Tags
   (3)   Tamper alarms from both Portable and Static Tags.

The sounder may also be activated by external equipment generating a DC voltage between 5 & 12 volts. The activation settings are programmed by switch S4; see table 2 for details.

The volume level of the internal sounder is controlled by switch S13/1; the default setting of OFF gives low volume, whilst ON will select high volume.

4.4.3. Alarm Relay Timer Programming

The reader is equipped with a relay which may be used to trigger external equipment or, for example, to supply power to external sounder devices.

The relay can be programmed via switch S12 to de-activate after a pre-set time interval; details are given in Table 2. Current UK legislation requires that external audible alarms shall not be operated for longer than 20 minutes. When the internal alarm relay is used, the pulse count setting determines when the relay is triggered, whilst switch S12 determines how long the relay will remain latched.   Note that this relay is normally operated when power is applied to the reader. If power is lost, then the relay will de-operate and activate any external alarm device connected to it.   To meet alarm system regulations, once the relay has been

operated, it cannot be re-operated until a time equal to its set time has elapsed. For example, if you set S12 for 5 minutes and a tag is read which causes it to operate for 5 minutes, then it will not operate again until a further 5 minutes have passed.

4.5.   PIR Operation

The default state of switch S11/1 is ON, which disables PIR usage. If either, or both internal and external PIRs are used, switch S11/1 should be set to OFF.

4.5.1. The Internal PIR

The internal PIR is not fitted with any lens and is only a crude presence detector with very limited range. Where a more specific zone of detection is required it is recommended that and external PIR is used. To use the internal PIR, switches S11/1&2 should both be set to OFF.

4.5.2. Using an External PIR

An external PIR may be connected via the Backplane Connector PCB - see Section 3.2 for terminal identification.

When an external PIR is used, switch S11/2 should be set to the ON position.

Notes

(1)   It is possible to enable both the internal and external PIRs - switches S11/2 & 3 should both be set to ON.
(2)   It is important that switch S11/1 is set to the OFF position for the PIRs to operate.
(3)   When neither PIR is required, it is important that switch 11/1 is set ON with switches S11/2 & 3 set OFF otherwise the reader will not detect either Portable or Personnel Tags.
(4)   When setting the scan range using the RAT (Section 4.2.1), switch S11/1 must be ON.

4.6.   Setting up the Communications Interfaces
4.6.1. Baud Rate Programming for RS-232 Data Comms

The default RS-232 port speed is 9,600 baud, with switch S13/2 set to OFF.

A reduced speed of 2,400 baud is available by setting switch S13/2 to ON. It is not necessary to power down/up to change this setting. The lower speed allows cable lengths up to 60m to be used; 9600 baud is limited to 15m.

4.6.2. Static Asset Tag Sensitivity

By adjusting switch S9 it is possible to adjust the sensitivity of the reader to Static Asset Tag movement. So that small movements by say for example the office cleaner will be ignored, but deliberate attempts to move the asset will be detected. The reader processor resets a sensitivity counter every 5 seconds, and the global "sensitivity" of all Static Tags is

determined by the number of pulses detected within this interval.

With switch S9 in position 1, the tag's code will be transmitted immediately it is moved (this is equivalent to 1 pulse count). If this is too sensitive try another higher setting. The standard setting for the Static Tag is between 3 and 5 counts.

5. TROUBLESHOOTING
5.1. Reader Reset

Switch S15 provides a reader reset and should be used, by pressing it for 1-2 seconds, only if the reader appears to have "hung up"; symptoms may include

      (1)   Corrupt or no data output.
      (2)   No scan response to the RAT.
      (3)   Irregular LED status.

5.2 No response when Tags are activated

The KEYPIC in the reader will only respond to tags with the same company and site codes. All Newmark readers and tags normally use the company code 01. Demonstration units use the site code 63.

6. Repair

If for any reason you wish to return the reader for repair or upgrade, before shipping the reader call the Operations Department at Newmark on +44 (0) 1737 788825 and obtain a Repair and Service number (RAS No.). When calling, please have the following information available:

- Reason for return
- Reader serial number
- Our invoice or sales order number - if known

Mark the package with the RAS number and return it to the address on the front page of this manual.

For readers which are no longer covered by our 12 month warranty, you will need to send us a new purchase order.

7.   Change Record

Change	Date	Description of Change	Affected Sections
ERN 11145	Sept 1997	First release	
ECN 11154	Jan 1998	CaT replaced by RAT	4