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HYPER X

INSTALLATION MANUAL

Modular Readers

LML_3013 ; LML_3033 ; LVM_4033

Rédigé par / Written by : W. Löbert Service / Department : Engineering Signature / Sign :	Nom / Name : Service / Department : Signature / Sign :
Approuvé par / Approved by : Ph. Gobrecht Service / Department : Signature / Sign :	Nom / Name : Service / Department : Signature / Sign :
Autorisé par / Authorized by : Service / Department : Signature / Sign :	Nom / Name : Service / Department : Signature / Sign :

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INDICE / REVISION INDEX	DATE	MODIFIE PAR / CHANGED BY	OBJET / DESCRIPTION
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TABLE OF CONTENTS

1. General Information

1.1 Characteristics and Performance

HYPERX™ is a multi-tag dynamic identification system using microwaves. A 'reader' emits microwaves up to a distance of one or more meters, depending on model. When a tag enters this zone, it modulates this radiation, thereby sending its code back to the reader, which then processes the received signal and extracts the code.

The readers LML_3013 , LML_3033 and LVM_4033 are modular readers comprising of electronic modules assembled within a chassis. The antenna is external to the chassis, connected with two coaxial cables. The principal characteristics are :

- Hands-free Reader LML_3013, range 2 m (7 feet) and passing speeds up to 20 Km/h (15 mph).
- Hands-free Reader LML_3033, range 8 m (25 feet) and passing speeds up to 20 Km/h (15 mph).
- Hands-free Reader LVM_4033, range 5 m (16 feet) and passing speeds up to 100 Km/h (60 mph).
- Range adjustment by potentiometer
- Directive Microwave beam :
  - ◊ Virtually insensitive to environmental interference
  - ◊ Can be pointed to illuminate a particular area
  - ◊ Installation on metallic surface with no performance reduction
- Simultaneous identification of 5 tags in 1 second
  - ◊ Several tags can be present in identification zone, intentionally or not
- Identification in nearly all tag positions:
  - ◊ Back / Front
  - ◊ Horizontal / Vertical.
- Coexistence of 31 readers in same zone
  - ◊ access with successive access
  - ◊ acess points close together
- Précautions
  - ◊ Human bodies and metallic objects between tag and antenna can obstruct identification
  - ◊ Close contact (<5 mm) between tag and body or with metallic surface can reduce reading range

1.2 Specifications

- Chassis dimensions — 240 x 170 x 170 mm
- Chassis weight (with modules) LML_3013; LML_3033; LVM_4033 — 4,2 kg
- Antenna weight for LML_3013 (AT1) — 0,8 kg
- Antenna weight for LML-3033 ; LVM_4033 — 3 kg
- Power Supply — 12 VDC

• Power consumption (max)	900 mA
• Band centre frequency	2,450 GHz
• Reading channels	31
• Data transmission rate between tag and reader	30 000 bits/s
• Error detection	HDLC
• Error rate of incorrect identifications	1 E-7
• Identification failure rate (dans les conditions normales d'utilisation)	1 E-4
• Radiated Power LML_3013	20 mW E.I.R.P.†
• Radiated Power LML_3033	75 mW E.I.R.P.
• Radiated Power LVM_4033	75 mW E.I.R.P.
• Performance LML_3013	2 meters / 15Km/h
• Performance LML_3033	8 meters / 40Km/h
• Performance LVM_4033	5 meters / 100Km/h
• Réglage de portée	yes
• Antenna beamwidth LML_3013	90°
• Antenna beamwidth LML_3033	45°
• Antenna beamwidth LVM_4033	45°
• Relay	24 VDC et 1 A

† : E.I.R.P. : Equivalent Isotropic Radiated Power

Environment :

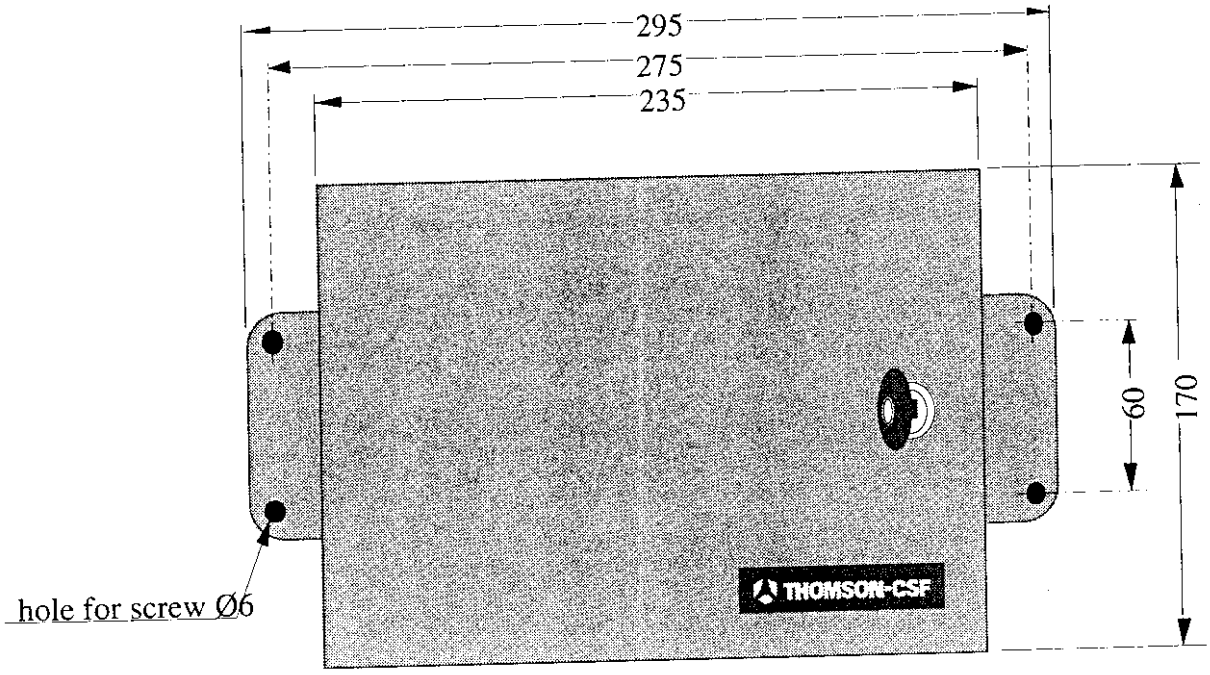
• Operating temperature	-20°C à +70°C
• Storage temperature	-25°C à +80°C
• Relative humidity	90% non condensing
• Water Protection	IP55

1.3 Installation

The HYPER X™ modular readers consist of a watertight enclosure containing different combinations of modules depending on the model. The reading antenna is connected to the enclosure via two cables. The enclosure has a door and is equipped with a lock and key.

The modules in the box perform all the main functions : power supply, microwave emission and reception, signal processing.

The box can be fixed to a wall or mounted on a mast by means of four 6mm holes.



Chassis installation, in particular the electrical connection, must comply with appropriate standards in destination country. Dimensions are in mm.

1.3.1 Reader constituents

1.3.1.1 Modular reader LML_3013

Comprises :

- 1 antenna AT1_2709
- 1 chassis CHS_2019
- 1 microwave source SHF_2339
- 1 receiver module SAM_2419
- 1 CPU + communications interface SPI_2110
- 1 power supply module FSM_2550

1.3.1.2 Modular reader LML_3033

Comprises :

- 1 antenna AT3_2749
- 1 chassis CHS_2019

- 1 microwave source SHF_2339
- 1 receiver module SAM_2419
- 1 CPU + communications interface SPI_2110
- 1 +12 Vdc power supply module FSM_2550

1.3.1.3 Modular reader LML_4033

Comprises :

- 1 antenna AT3_2749
- 1 chassis CHS_2019
- 1 microwave source SHF_2339
- 1 receiver module LAM_2429
- 1 CPU + communications interface SPI_2110
- 1 +12 Vdc power supply module FSM_2550

1.3.2 Module mounting

1.3.2.1 Inserting modules into rack

The modules consist of printed circuit boards perpendicularly mounted behind a metallic front panel.

The enclosure contains a standard-size rack for Europe-size boards. To insert a module into the desired position, place the board edges in the guiding rails and push slowly until contact is made with the back panel. Push firmly home to insure correct contact. The front panel is now aligned with the top and bottom horizontal rack bars and can be fixed in place with 2 or 4 screws (depending on module).

In general, the modules are already installed upon delivery.

1.3.2.2 Module positions

The rear panel is divided into two halves :

- a left half for the power supply module
- the right half for the remaining modules

The **FSM** module must be in the left-most position.

All other modules must be situated to the right of the FSM module as follows :

- LML_3013 and LML_3033

  SHF to the right of FSM

  SAM to the right of SHF

SPI to the right of SAM.

- LVM_4033

  SHF to the right of FSM

  LAM to the right of SHF

  SPI to the right of LAM.

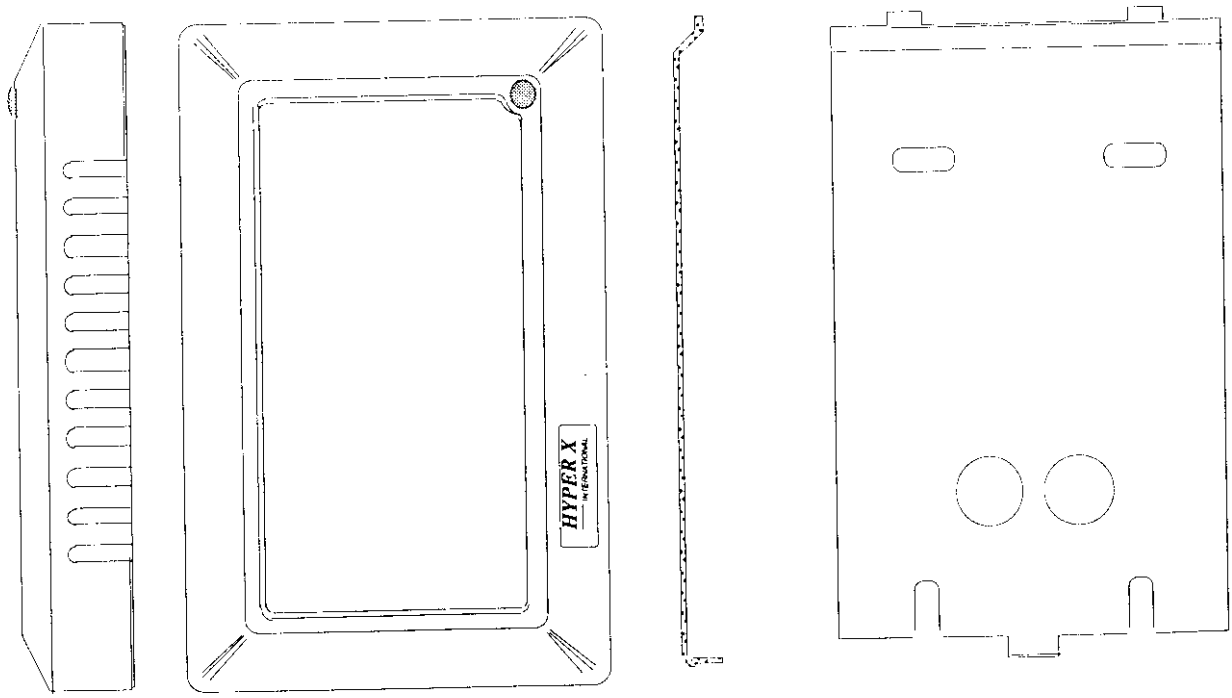
1.3.3 Mounting the antenna

The antenna emits and receives microwaves for the purpose of tag identification, so the antenna must be correctly oriented towards an obstacle-free identification zone.

1.3.3.1 Antenna AT1_2709

The antenna has two parts :

- a plastic enclosure containing the printed circuit board, connected to two coaxial cables
- a wall-mounting plate in chromed steel



Antenna enclosure and mounting plate

The antenna cables are 5 m long and can leave the box at the bottom (if the cables are to run along the wall) or leave out the back through the two holes in the mounting plate (if the cables are to pass through a wall).

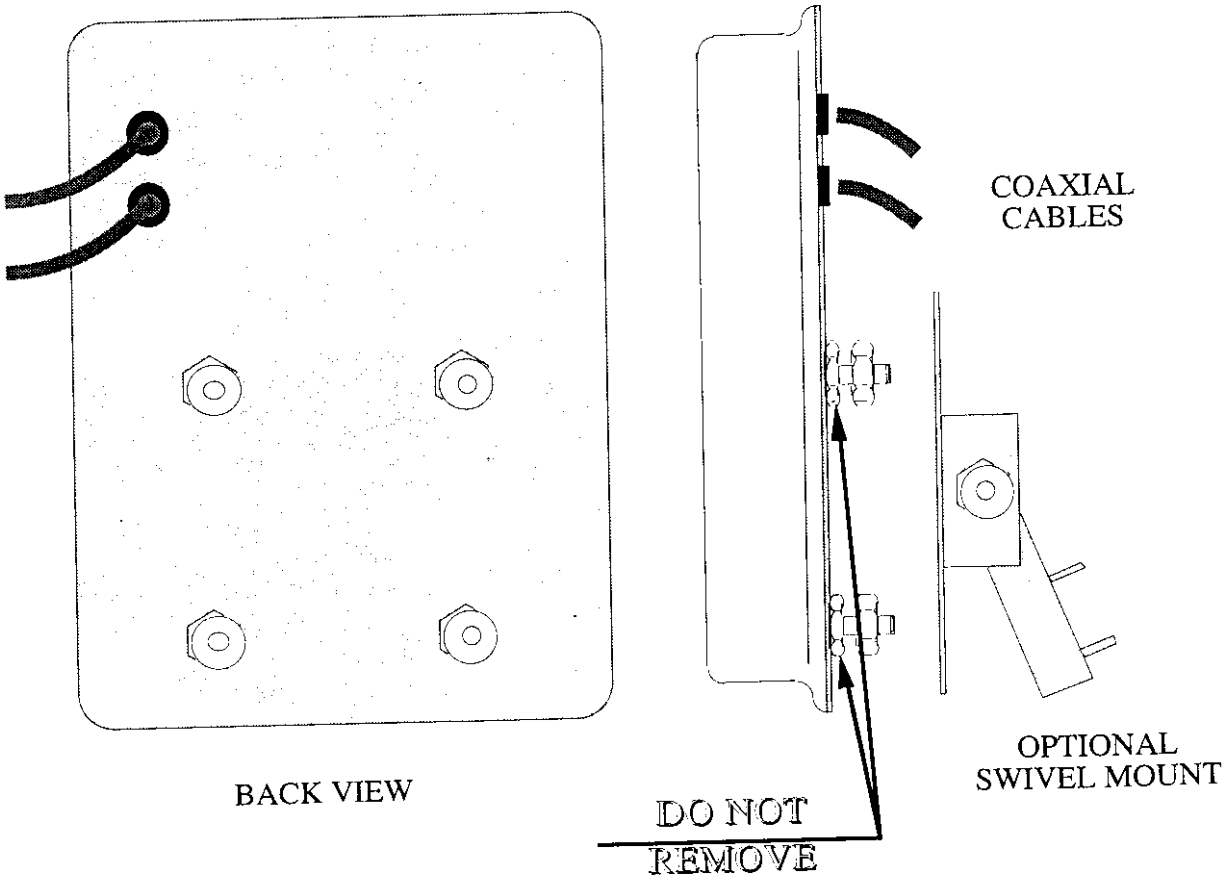
Tha antenna must be positioned so that the front-panel lamp is in the upper right-hand corner.

The mounting plate is first fixed with 2 or 4 screws (not supplied). Once this is in place, then the housing is attached and fixed into place with a small screw on the underside.

1.3.3.2 Antenna AT3_2749

This is an antenna in a watertight enclosure with two 5 m cables exiting at the rear.

Four Ø8 mm bolts with nuts for mounting are provided at the rear of the antenna.



The antenna can be fixed to a Ø 50 mm mast using a swivel mount (option ACS-2733) which is attached to the four bolts. This allows optimal pointing adjustment (azimuth and elevation).

The use of this swivel mount is strongly recommended.

It is however possible to mount the antenna on any appropriate support. The four bolts are located at the corners of a 120 mm square.

Warning: Do not remove the lower nuts which fix the bolts onto the metal plate. Only the upper nuts must be used for antenna mounting.

1.4 External Connections

Connections to the reader are of two types :

- coaxial cables with BNC connectors for microwave signals
- small-gauge wire with screw-terminal connectors for DC supply and data signals

1.4.1 Connection of microwave signals

1.4.1.1 Cables

All cables for microwaves, for connections between modules and between chassis and antenna, are supplied with the reader.

These coaxial cables have a fixed known impedance, are relatively stiff and must not be bent (restrictions on bending radius).

1.4.1.2 BNC Connectors

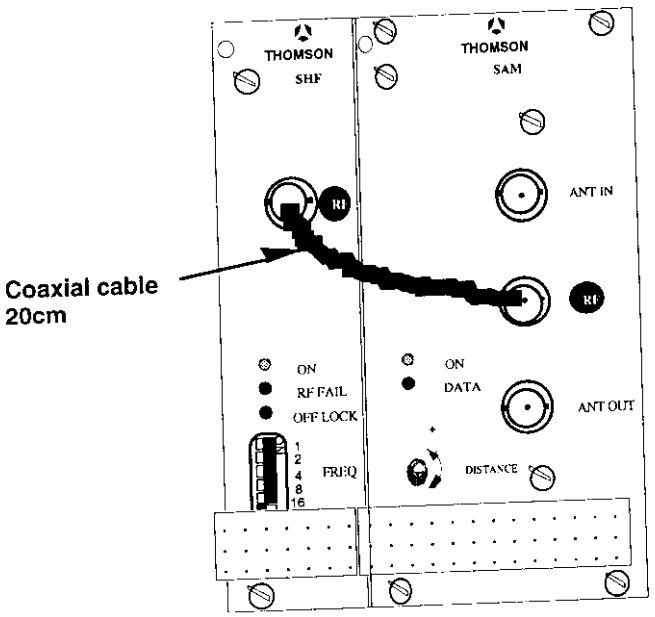
Cable ends have male BNC connectors. Modules are equipped with female BNC connectors.

The two connectors must be properly locked together (push in then turn) in order to insure a good connection.

The enclosure door should be locked (with key) in order to prevent cable disconnection.

1.4.1.3 Connection of modules SHF and SAM (or LAM)

The SHF module must be connected to the SAM module (or LAM depending on the model) using the short coaxial cable supplied. The two connectors are identified with a white "RF" marking in a black circle (see diagram below).



1.4.1.4 Connection of antenna to module SAM or LAM

The antenna has 2 cables terminated in male BNC connectors. The cable ends bear the following inscriptions :

For reception : "ANT IN" or "I"

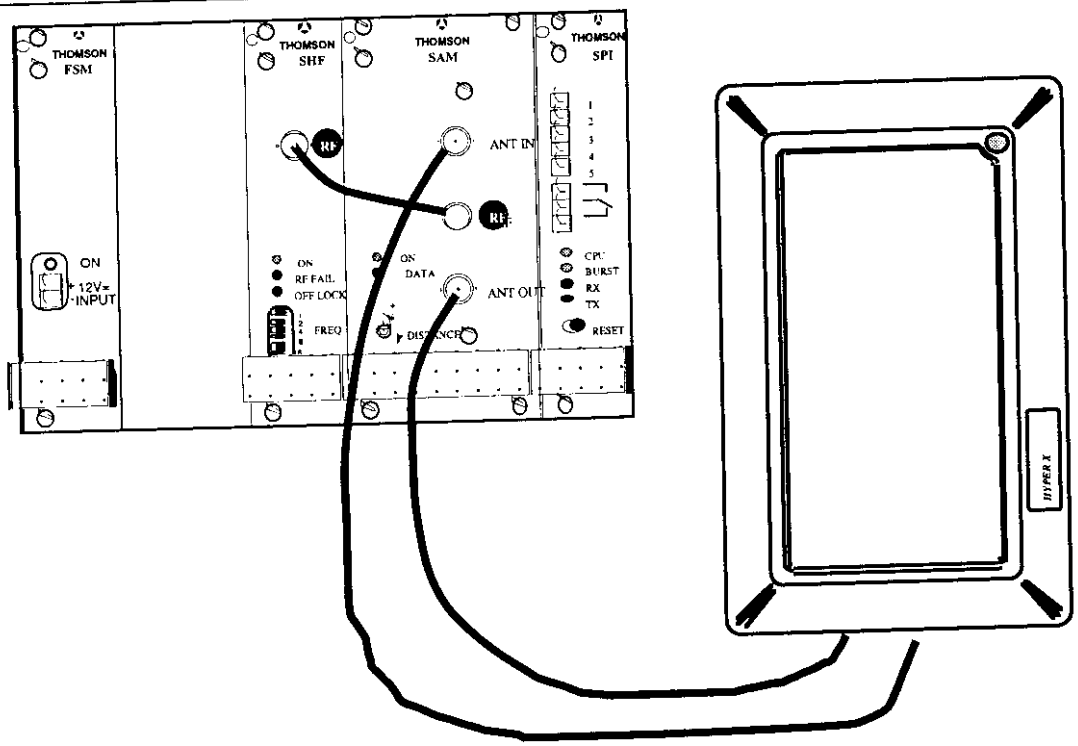
For emission : "ANT OUT" or "O"

The corresponding BNC connectors on the SAM (LAM) front panel are also labelled "ANT IN" and "ANT OUT".

Be sure to make the right connections : "ANT IN" on cable to "ANT IN" on front panel.

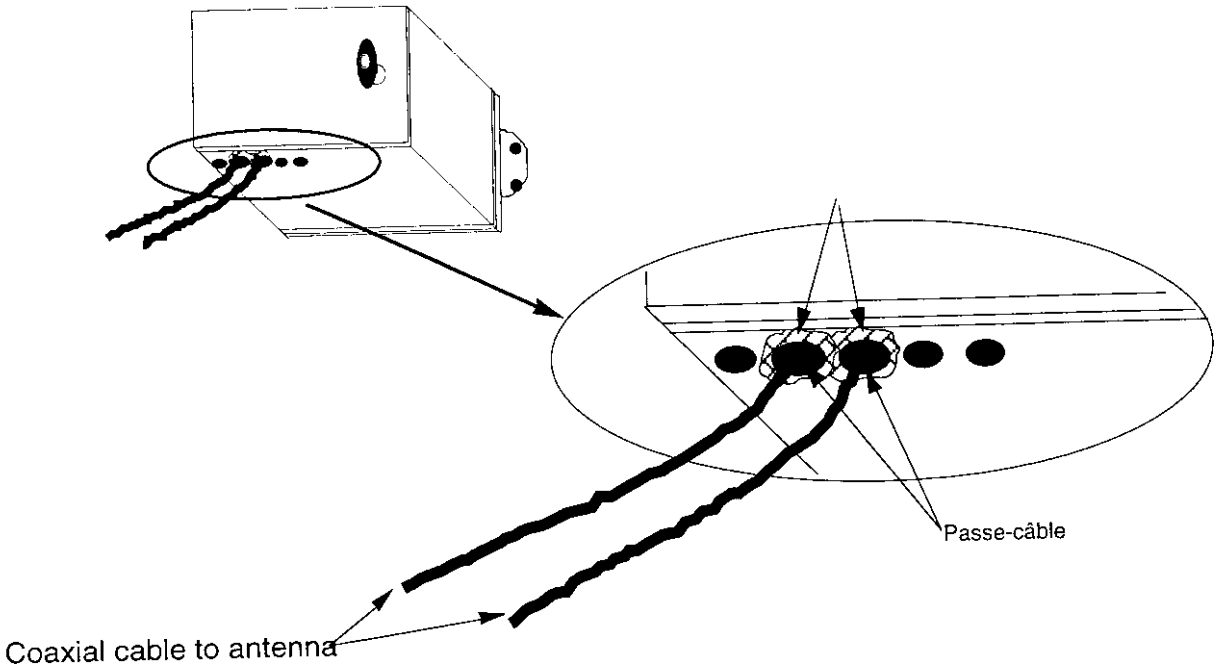
In case the cable markings are not present or have come off, the "ANT IN" cable has a black ring at its end and the "ANT OUT" cable a red ring.

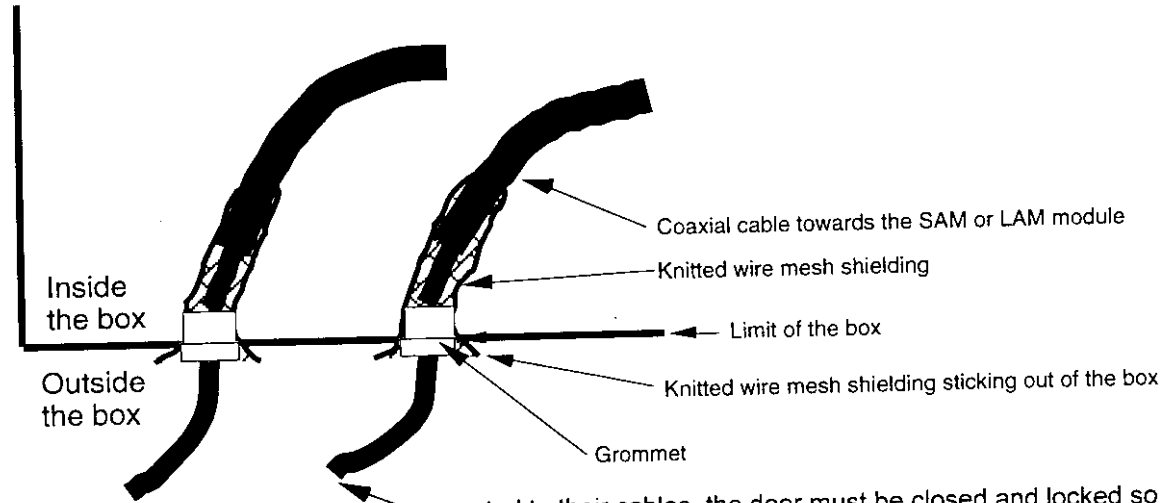
Inverting the cables will cause the reader to malfunction.



Coaxial cable connections

Before connecting the antenna cables, they must be passed through the appropriate holes in the bottom of the reader enclosure. After connecting the cables to the BNC connectors on the modules, the cable grommets must be positioned on the cable so that they can be covered by the wire mesh shielding. The cable is then manoeuvered into place with the grommet firmly in place in the enclosure hole and the mesh sticking out as shown in the diagram below.



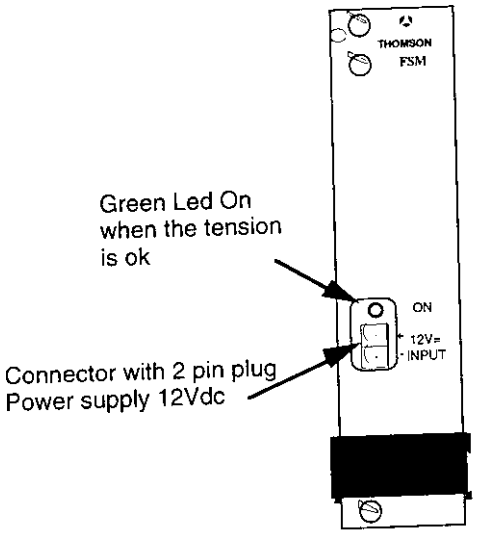


With all modules in place and connected to their cables, the door must be closed and locked so that the antenna cannot be disconnected.

1.4.2 Connecting power supply and communications to host

1.4.2.1 12V Power Supply

Power is supplied via a 2-pin plug (supplied). The plug has screw terminals to which the two wires are connected :



Pin	Name
+	+12Vdc
-	0V

Power consumption for the whole reader is typically 700 mA / 12 V .

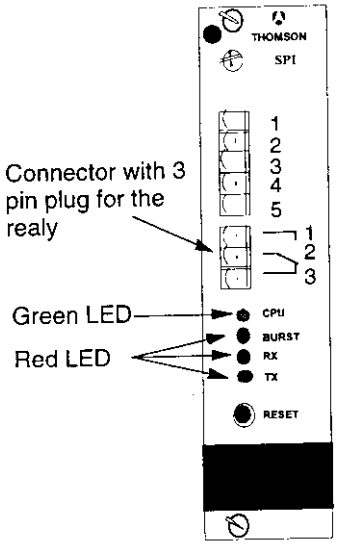
Wires (copper) used must be minimum 1.5 mm_ (AWG 15).

For long wires, voltage drop may be significant. It should be checked that input voltage at the FSM connector lies within 11.5 V and 15 V. Noise and hum should be less than 50 mVrms.

For the readers LML_3033 and LVM_4033, the supply wires must be equipped with a ferrite bead, located on the cable portion inside the enclosure (ref Steward : 28B2029-0A0 or equivalent).

1.4.2.2 Connection of relay on SPI module

Relay connection is via a 3-pin plug (supplied). The plug has screw terminals to which the three wires are connected :



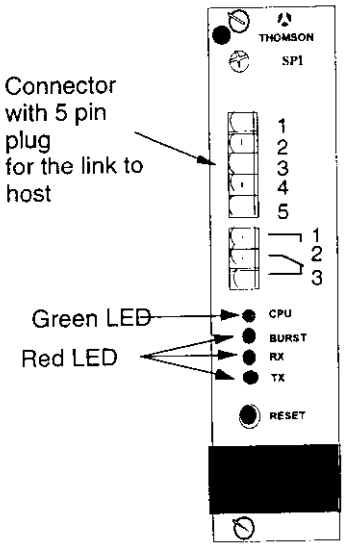
Pin	Name	I/O
1	Make	O
2	Common	I
3	Break	O

The relay is energised by on-board software. When it is not energised, pins 2 and 3 are connected, when it is energised, pins 1 and 2 are connected.

NOTE: This relay is designed to switch only 24 VDC / 1 A. In order to switch mains circuits, an external relay must be used.

1.4.2.3 Link from SPI to host

The reader end of the cable connection to host is made with a 5-pin screw-terminal plug (supplied). This cable type typically uses AWG22 wire and must be shielded.



Pin	Name	I/O
1	O1	I/O
2	O2	I/O
3	O3	I/O
4	O4	I
5	GND	

Pins O1 to O4 are associated with different signals depending on the type of link :

Name	RS-232	RS-422	RS485	ISO2	WIEGAND
O1	TX	TX+	+V	STROBE	DATA '1'
O2	--	TX-	-V	MDATA	DATA'0'
O3	--	RX+	--	PRES BADGE	--
O4	RX	RX-	--	--	--
O5	GND	GND	GND	GND	GND

The shielding braid must be connected to the chassis with a terminal of type 'fast-on' doubly-crimped.

For the readers LML_3013, LML_3033 and LVM_4033, this cable must be equipped with a ferrite bead, located on the cable portion inside the enclosure (ref Steward : 28B2029-0A0 or equivalent).

1.4.3 Power-up

Power may be applied once all modules are inserted and all cables connected.

Correct operation of each module can be determined by checking the lamps on each module's front panel :

For the LML_3013 :

FSM	lamp "ON" is green
SHF	lamp "ON" is green
SAM	lamp "ON" is green
SPI	lamp "CPU" is green and slowly blinking
AT1	green and regular blinking

For the LML_3033 :

FSM	lamp "ON" is green
SHF	lamp "ON" is green
SAM	lamp "ON" is green
SPI	lamp "CPU" is green and slowly blinking

For the LML_3033 :

FSM	lamp "ON" is green
SHF	lamp "ON" is green
LAM	lamp "ON" is green
SPI	lamp "CPU" is green and slowly blinking

1.5 Installation and connection procedures for the asynchronous links

1.5.1 Electrical specifications

- **Interface RS-232** :

Input (RX)	Input voltage range	- 30V min, + 30V max
	VIL threshold	1,2V typ
	VIH threshold	1,7V typ
Output (TX)	Output voltage	± 5V min, ± 9V typ

- **Interface RS-422** :

Input (RX)	Common-mode voltage	± 7V max
	Differential-mode voltage	± 12V max
	V_{IH} threshold	2V min
	V_{IL} threshold	0,8V max
Output (TX)	$V_{OH}(I_{OL}$ = -20mA)	2.5V min
	$V_{OH}(I_O = 0)$	5V
	V_{OL} (I_{OL} = 48mA)	0.5V max
	V_{OL} (I_O = 0)	0V
	Differential voltage V_{OD1} (I_O = 0)	2V min, 5V max
	Differential voltage (R_L = 100Ω)	$0.5V_{OD1}$ (2V min)
	Common-mode voltage (R_L = 100Ω)	±3V max

- **Interface RS-485** : Identical to RS-422

1.5.2 Cables

The reader end of the cable connection to host is made with a 5-pin screw-terminal plug (supplied). This cable type typically uses AWG22 wire and must be shielded.

The cable's shielding braid must be fastened to the chassis with a doubly-crimped 'fast-on' terminal.

For the readers LML_3013, LML_3033 and LVM_4033, this cable must be equipped with a ferrite bead, located on the cable portion inside the enclosure (ref Steward : 28B2029-0A0 or equivalent).

1.5.3 Line Termination

For a simplex link, the termination (if present) should be placed at the receiving end of the line.

For a duplex link, the termination (if present) should be placed at the each end of the line.

For baud rates less than 1200 bauds, no termination is necessary. For baud rates greater than 9600 bauds and line lengths greater than 1000 metres, a resistor equal to the line impedance (120 ohms) is usually necessary. For cases in-between, there is no clear-cut rule and depends on individual installations (combination of baud-rate, line-length, cable quality, emitter/receiver characteristics).

1.5.4 Electrical connections

For an RS-232 link, wiring up is straightforward, the TX and RX lines of both equipments are connected together.

For a differential link (RS-422 or RS-485), the polarities are not always clearly defined. Normally the "+" line is at a high level at rest and is active low. For the "-" line, the opposite is true. This is the case for the differential interface for the HYPERX readers. However if the differential signals are generated by a converter acting on RS-232 signals, then the "+" line can be at a low level at rest and active high. In this case, the "+" line of one equipment must be connected to the "-" line of the other equipment.

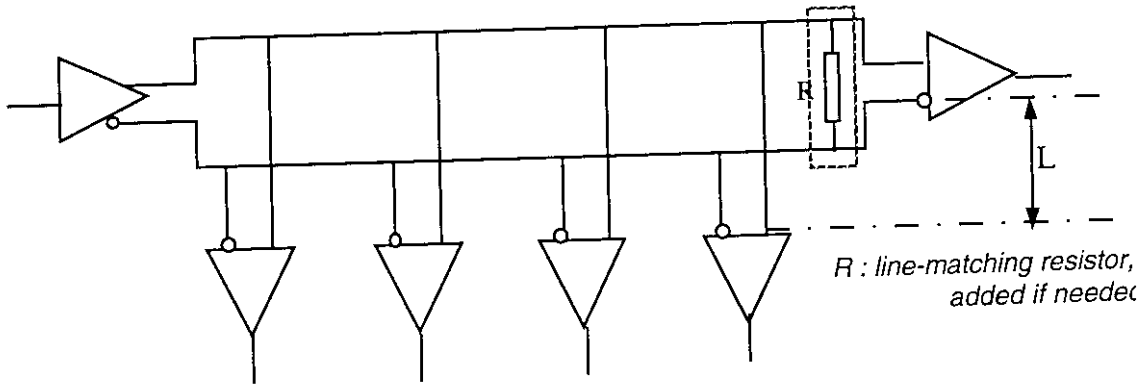
Connection of 0V

Whether this is necessary or not, depends on the installation. If host and reader are distant with different local ground potentials, then an RS-232 link may not work if the 0V references are not connected. However connecting them will cause ground currents to circulate. In general, for large link lengths, a differential link should be used. This also tolerates a large common-mode voltage difference.

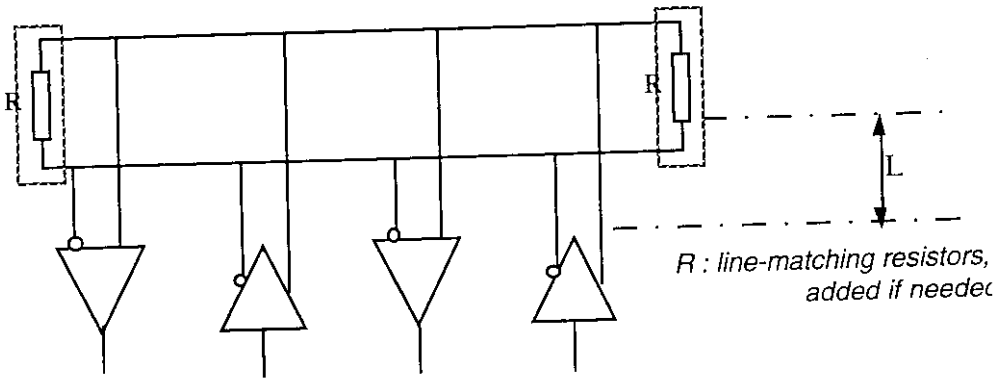
1.5.5 Networking

1.5.5.1 Topologies

The preferred topology is the bus.



Simplex link



Half duplex link

The length of the derivation should be as short as possible (< 30 cm).

The maximum length allowed can be calculated from the cable characteristics using the equation below.

$L < 1300 / (Z_0 \times C_L)$ L in metres, Z_0 in ohms and C_L in pF/m

1.5.5.2 Line biasing

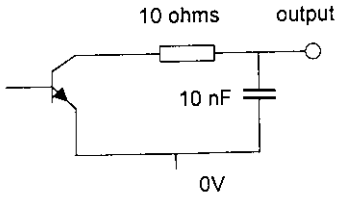
For RS-422 and RS-485, line biasing may prove necessary and must be done externally and only at one point on the line.

The line "+" is connected to +5V via a 4.7KΩ resistor.

The line "-" is connected to 0V via a 4.7KΩ resistor.

1.6 Output circuit for Open-collector interface

Circuit diagram for open-collector output stage :



These links require the connection of an external resistance at the receiving end of the link.

For connecting to a +5V supply, use a 470 Ω resistor.

For connecting to a +12V supply, use a 1 KΩ resistor.

1.7 FCC Notice

This equipement has been tested and found to comply with the limits for a classB digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipement does cause harmful interference to radio or television reception, which can be determined by turning the equipement off and on, the user is encouraged to try to correct the interference by one or more of the following measures :

- Reorient or relocate the receiving antenna.
- ncrease the separation between the equipement and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

2. Visual Interface

2.1 Control Lamps

If one or more front-panel lamps are on, then the reader is powered up.

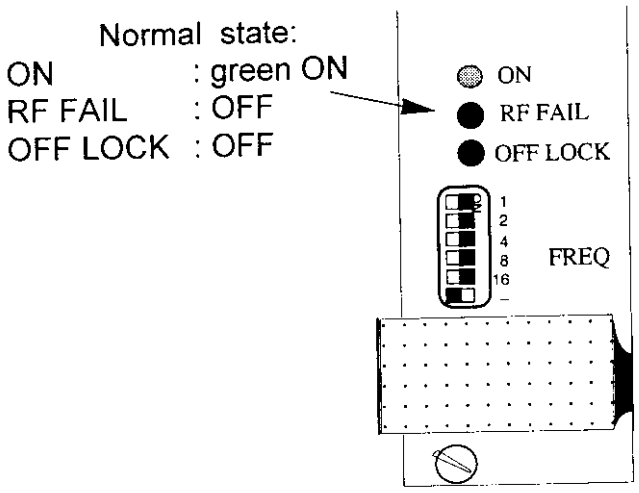
2.1.1 Module FSM

A green lamp indicates that the reader is correctly powered.

2.1.2 Module SHF

The SHF module has 3 lamps :

- a green lamp 'ON' indicating that power is on
- a red lamp 'RF FAIL' indicating that microwave power out is incorrect
- a red lamp 'OFF LOCK' indicating that there is a problem with the microwave frequency channel



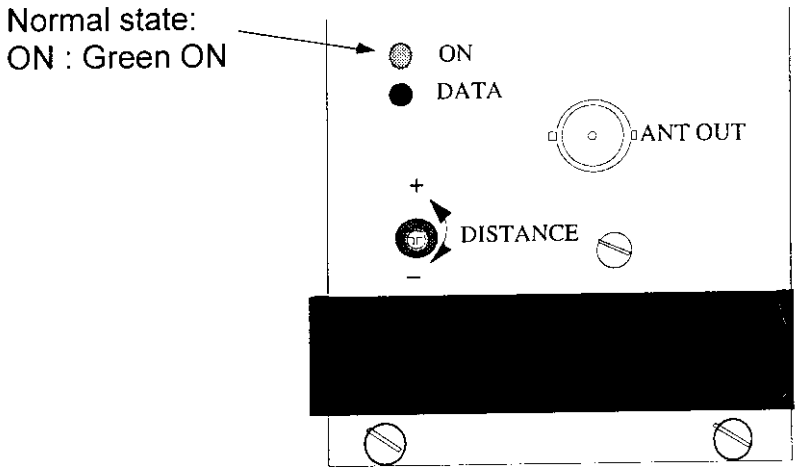
For correct operation :

- the 'ON' lamp is on (green)
- the 'RF FAIL' lamp is off
- the 'OFF LOCK ' lamp is off

2.1.3 Module SAM or LAM

The SAM (or LAM) module has 2 lamps :

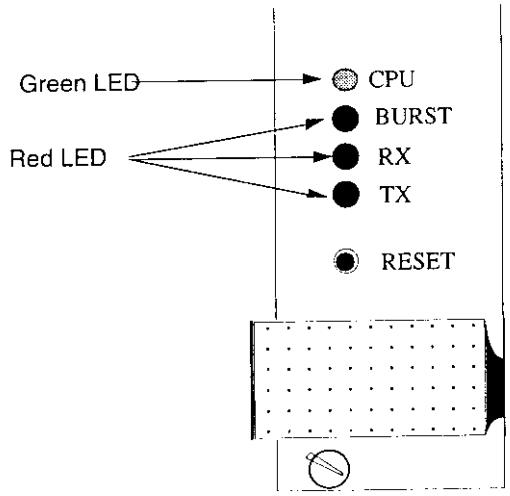
- a green lamp 'ON' indicating that power is on
- a red lamp 'DATA' indicating the presence of a data signal



For correct operation :

- the 'ON' lamp is on (green)
- the 'DATA' lamp can be on or off (this lamp presents no useful user information)

2.1.4 SPI Module



Four leds indicate the state of the module and tag activity.

- **Processor LED (CPU)**

  This green LED can have one of two flashing rates :

  ◊ slow, roughly 0.5s on 0.5s off, indicating all modules are working normally.

  ◊ fast, roughly 0.05s on 0.05s off, indicating a problem with one of the modules in the rack.

  Any other behaviour indicates faulty processor operation.

  NB : If the reset button is held down, this LED should be on.

- **Tag activity (BURST)**

  This red LED flashes (50 ms) to indicate that a tag has been detected by the reader.

- **Sending message (TX)**

  This red LED indicates electrical activity on the front panel connector line 01 (TX for the RS-232/422/485 link). It is permanently on in the case of the interfaces ISO2 and WIEGAND.

- **Receiving message (RX)**

  This red LED indicates electrical activity on the front panel connector line 04 (RX for the RS-232/422/485 link).

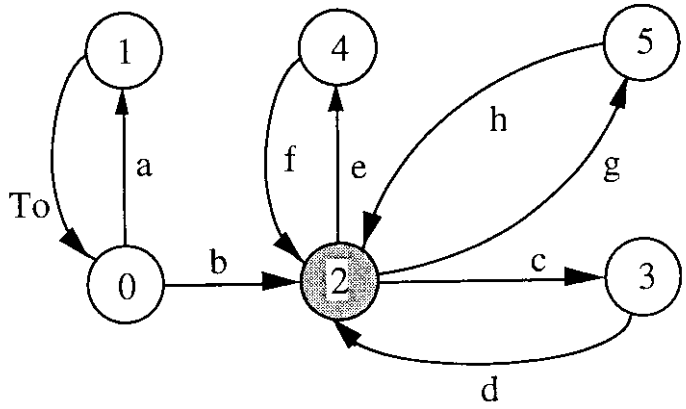
2.1.5 Antenna AT1 (LML_3013)

The antenna AT1 has a two-coloured lamp in the upper right corner. When the reader box is closed, this is the only visible signal that the user perceives. The lamp is under reader-software control, either in automatic mode or controlled by the host via the serial link.

Normal operation is a slow blink (0.5 s on, 0.5 s off) with the lamp remaining off for 1 second when a tag is first detected.

The state diagram below shows the different possible states during power-up (or after a processor rest) and their meaning.

State Diagram :



Events :

a. internal hardware fault detected
b. autotest OK
c. module fault detected
d. module fault disappears
e. internal hardware fault detected
f. internal hardware fault disappears
g. received command "turn reader off"
h. received command "turn reader on"

State	Name	Antenna LED	Emission	CPU LED	status word	
					ds	dm
0	Test	red, fixed	off	on	nd[2]	nd
1	Hardware fault	see note 1	off	fast blink	0	nd
2	Normal	green, regular blink	on	slow blink	1	1
3	Module fault	green, irregular blink	on	fast blink	1	0
4	Reader not ready	red, slow blink	off	fast blink	0	x[3]
5[4]	Reader OFF	off	off	slow blink	x	x
6[5]	Tag detected	off	off	x	1	x

Notes :

1. The LED behaviour and the timeout duration depend on the nature of the fault. In the case of a faulty configuration, the reset is immediate and the LED stays red. For a hardware fault, reset takes place after 4 seconds.
2. nd = not defined
3. x = don't care
4. This state only exists for the modular readers.
5. This state is not shown in order not too overload the diagram. It lasts for 1 second, then normal operation resumes.

2.2 Buzzer

The buzzer is located on the SPI module and is under reader software control. It sounds at power-up and on processor reset (for about 2 seconds).

When enabled, the buzzer emits a short sound (duration 50 ms) each time a tag is read. Thus, for a tag that remains in the reading area, the buzzer will sound continuously. This is independent of issuer-code filtering (see §3.6).

Buzzing on tag detection can be disabled by user switches (see §3.5).

2.3 Reset button

The reset button is on the front panel of the SPI module. Pushing it causes a processor reset (the button does not need to be held in) which lasts about 2 seconds. During this time, both 'CPU' and 'BURST' lamps light up. Upon reset, any user settings loaded by the host via the serial link are lost.

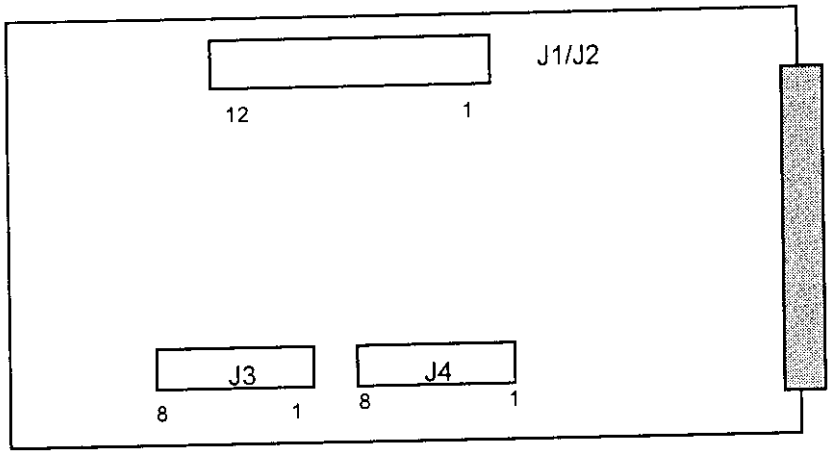
3. Reader Configuration

Except for Reading Range and Channel Operation all other configuration takes place on the SPI module. Here, the different operating modes are selected using switches which are either :

- ON or
- OFF

They are identified by their positions on four connectors:

- J1/J2 12 positions 1 to 12 (electrical interface)
- J3 8 positions 1 to 8 (operating parameters)
- J4 8 positions 1 to 8 (transmission parameters)



The serial link to a host can be one of two types :

- Open-Collector (ISO2 or Wiegand)
- Asynchronous RS 232, RS 422 and RS 485.

NB: Only one of these interfaces can be active at a time

Certain switch combinations are forbidden. If these combinations are detected during the initialisation period (immediately following a reset), an internal reset is generated after a period of 4 seconds. The following combinations are forbidden :

- Message mode 3 together with WIEGAND interface
- Message mode 2 together with POLLING mode

3.1 TTL interfaces : ISO2 et Wiegand

3.1.1 ISO2 Interface

Positions 1 to 4 of **J4** must be as follows :

4	3	2	1	Message length
OFF	OFF	OFF	OFF	variable
OFF	OFF	OFF	ON	fixed

3.1.2 Interface WIEGAND

Positions 1 to 4 of **J4** must be as follows :

4	3	2	1
OFF	OFF	OFF	ON

3.1.3 Tag persistence

Positions 5 and 6 of **J4** must be as follows :

6	5	Persistence time
ON	ON	1 s
ON	OFF	2 s
OFF	ON	5 s
OFF	OFF	10 s

3.1.4 Minimum Time Between Messages (MTBM)

Positions 7 and 8 of **J4** must be as follows :

8	7	MTBM
ON	ON	1000 ms
ON	OFF	100 ms
OFF	ON	200 ms
OFF	OFF	500 ms

3.1.5 Tag message repetition

Position 3 of **J3** must be as follows :

3	Repetition
OFF	disabled
ON	enabled

3.2 Asynchronous serial link

3.2.1 Address

The module's physical address is the logical slave address that the host application software uses to address the module.

The four positions 1 to 4 of **J4** determine the physical address:

4	3	2	1	Address
ON	ON	ON	ON	MINITEL
ON	ON	ON	OFF	1
ON	ON	OFF	ON	2
ON	ON	OFF	OFF	3
ON	OFF	ON	ON	4
ON	OFF	ON	OFF	5
ON	OFF	OFF	ON	6
ON	OFF	OFF	OFF	7
OFF	ON	ON	ON	8
OFF	ON	ON	OFF	9
OFF	ON	OFF	ON	10
OFF	ON	OFF	OFF	11
OFF	OFF	ON	ON	reserved use
OFF	OFF	ON	OFF	ISO2
OFF	OFF	OFF	ON	WIEGAND
OFF	OFF	OFF	OFF	ISO2

NB : A JBUS command message which has a slave address equal to 0 corresponds to a broadcast message, which explains why a reader cannot have an address of 0 for polling applications.

3.2.2 Character Format and Baud rate

Baud rate is chosen using positions 5 and 6 of **J4**:

6	5	Baud rate
ON	ON	9600 Baud
ON	OFF	4800 Baud
OFF	ON	1200 Baud
OFF	OFF	19200 Baud

Format is chosen using positions 7 and 8 of **J4**:

8	7	Format
ON	ON	7 bits data 1 bit even parity
ON	OFF	7 bits data 1 bit odd parity
OFF	ON	8 bits data no parity
OFF	OFF	not used

3.2.3 Protocol : polling or interrupt

The type of protocol, polled or by interrupt, is chosen with position 5 on **J3** :

5	Protocol
OFF	Interrupt
ON	Polling

3.2.4 Frame format

Position 8 on J3 determines the frame format, ASCII text or JBUS (binary).

	frame format
OFF	Test - ASCII text
ON	Normal - JBUS frame

The test format allows connection to a dumb terminal for easy on-site display.

3.3 Message mode

The mode is chosen using positions 1 and 2 on **J3** . The mode determines in what cases the detection of a tag causes a message to be transmitted to the host.

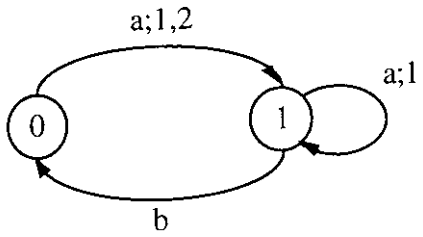
Type 0 - Each time a tag is detected, a timer is armed (nominal value = 1s). Tag detection only causes a message to be transmitted if this timer is not active. Each tag detected has a timer associated with it.

Type 1 - This mode is no longer supported

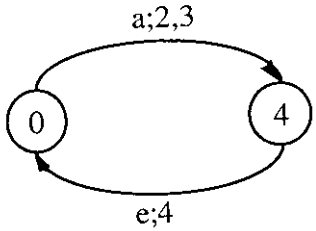
Type 2 - At each tag detection, a message is transmitted to host. During message transmission, microwave emission is switched off. Only available for the ISO2 interface and the asynchronous start/stop interface in the interrupt mode.

Type 3 - When a tag "disappears" (is removed from internal memory), an extra message is transmitted to host which includes the tag's code as well as the number of times that the badge was detected. This number cannot be greater than 99. Not available for the Wiegand interface. Otherwise identical to type 0.

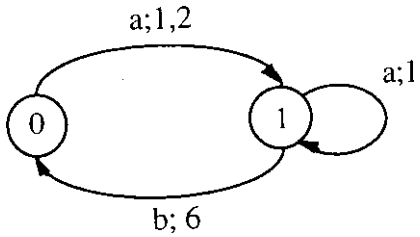
2	1	message mode
OFF	OFF	Type 3
OFF	ON	Type 2
ON	OFF	Type 1 - no longer supported
ON	ON	Type 0



Type 0



Type 2



Type 3

Events		**Actions**	
a :	tag is detected	1 :	arm anti reread timer
b :	timeout anti reread	2 :	start message transmission
e :	message is sent	3 :	turn off reader
		4 :	turn on reader
		6 :	send tag disappearance message

Flow Graph describing the three message transmission modes

3.4 Relay operation

When a tag is detected, the relay operates. The switch in position 3 on **J3** determines one of two modes of deactivation (for ISO2 and Wiegand, deactivation is automatic) :

- automatic relay deactivation after 2 second delay
- relay deactivation controlled by host via JBUS

J3 n°3	Deactivation
OFF	Automatic
ON	Under host control via J-BUS

3.5 Buzzer operation

The switch in position 4 on **J3** activates or deactivates the buzzer on tag detection. When enabled, the buzzer emits a short sound (duration 50 ms) each time a tag is read.

J3 n°4	Buzzer
OFF	Enabled
ON	Disabled

When enabled, the buzzer sounds for 50 ms at every tag detection.

3.6 Code filtering with the Distributor code

The switch in position 6 on **J3** enables or disables this feature. A description is given in chapter ?. Applies only to ISO2 and asynchronous interfaces. For the WIEGAND interface this feature is automatically enabled.

6	Filtering
OFF	Disabled
ON	Enabled

3.7 Electrical interface

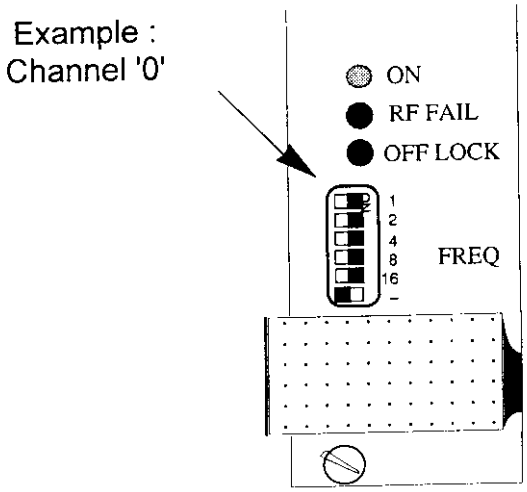
The switch in position 7 on **J3** enables or disables this feature. A description is given in chapter ?. This feature must be disabled for single readers.

Type	Position J1 and J2
RS-232	1 , 11
RS-422	2 , 4 , 9 , 10 , 12
RS-485	2 , 4 , 6 , 7 , 12
ISO2	3 , 5 , 8
WIEGAND	3 , 5 , 8
Minitel	2

3.8 Reading range

This can be performed but is not recommended, the factory setting is for the maximum reading range.

3.9 Operating Channel

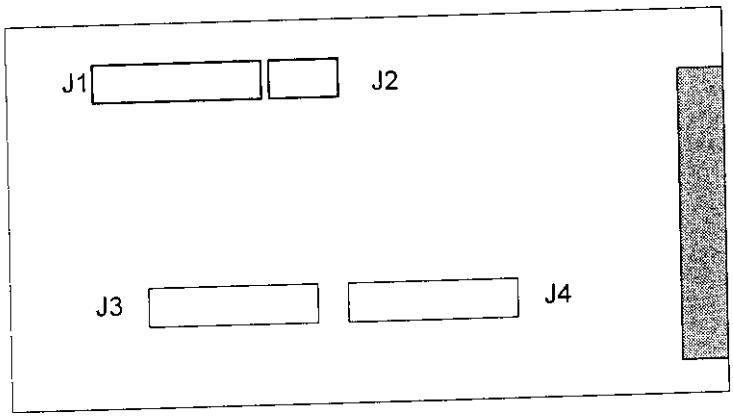


The reader can operate using 31 different channels. Each channel corresponds to a separate microwave frequency band. This is useful when several readers must be positioned close together. Using different channels on each reader eliminates mutual interference. The SHF module has 6 small switches on the front panel allowing a selection of 31 different channels (switch 6 is not used and 2 channels - 0 and 9 - are identical and use the same frequency).

Channel selection for the module SHF_2339 (the OFF position for switches are indicated by a blank in order to make the table more readable):

-	16	8	4	2	1	Channel
x	ON	ON	ON	ON	ON	0
x	ON	ON	ON	ON	-	1
x	ON	ON	ON	-	ON	2
x	ON	ON	ON	-	-	3
x	ON	ON	-	ON	ON	4
x	ON	ON	-	ON	-	5
x	ON	ON	-	-	ON	6
x	ON	ON	-	-	-	7
x	ON	-	ON	ON	ON	8
x	ON	-	ON	ON	-	9
x	ON	-	ON	-	ON	10
x	ON	-	ON	-	-	11
x	ON	-	-	ON	ON	12
x	ON	-	-	ON	-	13
x	ON	-	-	-	ON	14
x	ON	-	-	-	-	15
x	-	ON	ON	ON	ON	16
x	-	ON	ON	ON	-	17
x	-	ON	ON	-	ON	18
x	-	ON	ON	-	-	19
x	-	ON	-	ON	ON	20
x	-	ON	-	ON	-	21
x	-	ON	-	-	ON	22
x	-	ON	-	-	-	23
x	-	-	ON	ON	ON	24
x	-	-	ON	ON	-	25
x	-	-	ON	-	ON	26
x	-	-	ON	-	-	27
x	-	-	-	ON	ON	28
x	-	-	-	ON	-	29
x	-	-	-	-	ON	30
x	-	-	-	-	-	31

4. Annexe A : Switch Settings



Address **J2**

8 7 6 5 4 3 2 1

ASYNCHRONOUS

ISO2 / WIEGAND

Interface **J1**

12 11 10 9 8 7 6 5 4 3 2 1

RS 232
RS 422
RS 485
ISO2 / WIEGAND
MINITEL

Reader addresses
1
2
3
4
5
6
7
8
9
10
11

reserved 12

MINITEL

Baud rate
9600
4800
1200
19200

character format
7/even
7/odd
8/none

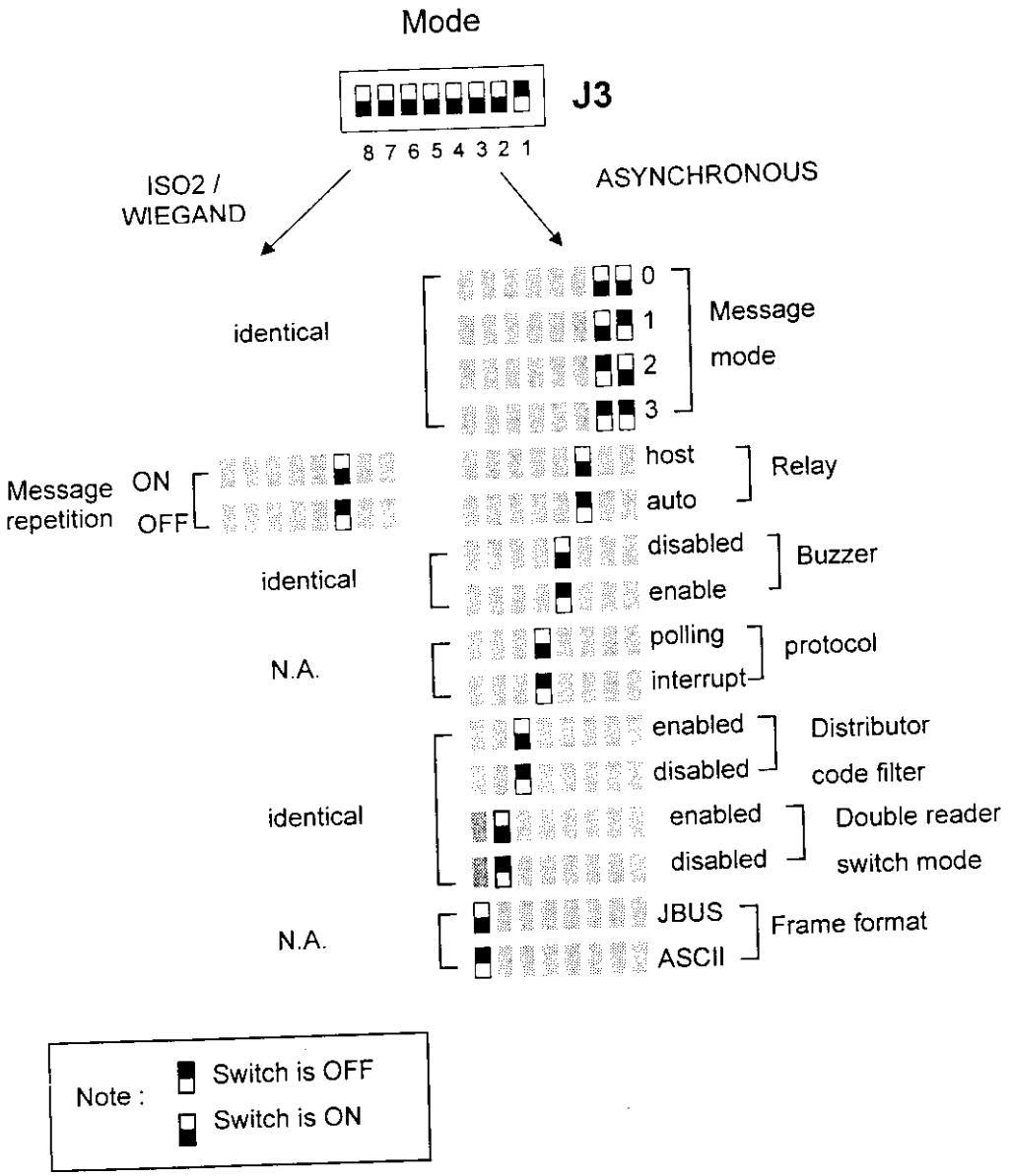
WIEGAND
ISO2 variable
ISO2 fixed

Hold time
1 s
2 s
5 s
10 s

MTBM
1 s
100 ms
200 ms
500 ms

Note : Switch is OFF / Switch is ON

CLASSIFICATION SOCIETE/ CLEARANCE LEVEL	REFERENCES DU DOCUMENT / DOCUMENT REFERENCES						PAGE
	Code Fabricant / Manufact. Code	Numéro / Number	Code Doc / Doc. Code	Tome / Volume	Indice / Revision Index	Langue Language	
NON PROTEGE	F0057	46 322 782	108			E	38



Note :
- Switch is OFF
- Switch is ON

5. Annexe B : Special Modes (Test Mode And Minitel Mode)

Test Mode

This mode is configured using switch 8 of J3 (see 3.2.4)

The information transmitted from the reader to the host normally uses a JBUS frame format.. During system installation, the host computer may not yet be connected or available. For this reason , an ASCII transmission mode exists, allowing the connection of a dumb terminal in order to visualise the messages sent and thus to verify correct system operation. This is called **test** mode and is enabled using a board jumper configuration

This mode has the following characteristics :

- interrupt mode is used (the tag-code is sent immediately)
- tag persistence = 1 second
- frame structure = 24H / status tag / 20H / code / 0DH / 0AH
- transmission characteristics (baud rate and character format) must be configured

Example:

During system installation, the reader is put into test mode. A terminal is connected to the reader via an RS-232 link. Transmission characteristics of reader and terminal are matched, and tags are held in front of antenna. The terminal will display messages of the type :

$0 001ABCDEF-100

$2 XYZHYPER X.007

The messages have the following structure :

$ <status badge>(space) <distributor code> <user code>

where status badge : 0 = antenna 1, tag battery good
1 = antenna 1, tag battery low
2 = antenna 2, tag battery good
3 = antenna 2, tag battery low

distributor code : nnn where n is a digit (0 à 9)

user code : from 1 to 30 characters

message	antenna	battery	distr. code	user code
0 001ABCDEF-100	1	good	001	ABCDEF-100
2 XYZHYPER X.007	2	good	XYZ	HYPER X.007

Mode Minitel

This mode is configured using switches 1 to 4 of J4 (see §3.2.1)

This mode is similar to test mode, in that the messages sent have the same format (see above), yet it takes the specific nature of minitel operation into account. On a reader reset, special codes are sent which :

- clear the screen
- position the cursor in the upper left corner
- configure the minitel in scroll mode

Additionally, transmission characteristics are fixed independently of switches 5 to 8 of J4 : 1200 baud, 7 bits data, even parity. Only switches 1 to 4 of J4 need to be set.

This is a simplex link, reader to minitel, and needs switch 2 of J1 to be ON.