

# CHOOSING A TAGGING SYSTEM

## THE SELF INSTALLERS GUIDE



**With the growth in online sales of new and used EAS tagging systems it makes financial sense to choose & possibly install your own. This publication can help you...**

- **Avoid the many pitfalls during installation.**
- **Be sure to buy the right equipment**
- **Avoid obsolete equipment**
- **Buy the correct tags**
- **Basic servicing if it goes wrong**
- **Chose a vendor, installer or service agent**

MAXTEC Technical Services

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## Professional Security Solutions

Established provider of integrated retail, commercial and residential security solutions

### EAS Merchandise & Building Security Systems

Also referred to as Security Tagging, EAS has proven one of the most effective methods of reducing retail customer theft and increasing sales by open merchandising. Contact us for systems, tags, labels, installation & service

### Fire Safety & Disability Systems

CCTV is now crucial in both crime prevention & detection in retail and commercial sectors as well as in domestic homes. With technology evolving at a rapid rate CCTV is also used as a tool for public Health & Safety, productivity and staff management

### High Security Safes & Access Control

Main applications of Access Control are to protect & secure any unmanned entry/exit areas of premises. These may be retail outlets, flats, offices or even schools & hospitals

### **Welcome to choosing a tagging system the self installers guide..**

(downloadable version), an aid to those contemplating the purchase of an EAS tagging system and those considering self installing. It contains information on system types, tag types, a guide to installing and what to avoid. For those who find it a little daunting, there is an appendix of vendors, installers and service providers towards the back.

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## IDENTIFYING SYSTEMS

There are two competing system types, using different technology for retail theft prevention. They are the **Radio Frequency (RF)** systems that work at 8.2Mhz and the **Acousto-magnetic (AM)** systems working at 58Khz.

Both have advantages and disadvantages, most are not of interest to the self installer. Both are used for High St. fashion. Mixed goods retailers (e.g. Boots) tend to use AM systems. Supermarkets tend to use RF, so they can have labels applied at source. The main issues of interest will be ease of installation and maintenance. For self installations that don't go as planned no need to worry. The appendix of this document gives a list of contact information for established engineers and businesses that can help. If you have installed the system well, adhering to the guidelines, any of the listed contacts will be able to commission or service the system for a modest hourly rate.

**The AM systems** most likely to appear on the used market will require PC based bespoke software to make adjustments. If you follow the instructions in the installation section you are much less likely to run into problems that require



AM Systems



adjustment by software, as long as the system was working prior to removal.

As RF and AM system construction now looks very similar, it's easier to identify type by the accessories that go with it. Hopefully your used purchase came with tags and

accessories.

Below are some of the typical tags and accessories you may need with your AM system.



AM Supertag and remover



The Sensormatic supertags, (there are as many as 4 variants, mark 1 tag shown in picture. Later variants are slimmer or shorter) all will require either the hand held detach

remover shown here, or a desk mounted powered version, available in flush or surface mounting, suitable for higher traffic stores.

## IDENTIFYING SYSTEMS



Adhesive label sheet and  
'kiss pad' deactivator

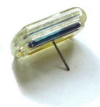


Shown are Sensormatic labels (referred to as DR, or later APX). There are also labels available from 3<sup>rd</sup> party manufacturers, such as Signatronic. They require deactivating at the point of sale. With a simple 'kiss pad' as shown (touch [kiss] label to pad, *don't rub!*), or a powered deactivator (rapid pad) in higher traffic stores.



Stylus (or pencil) tags and detacher

If using stylus or pencil type tags, you will require a magnetic tag detacher to release the pin. Please note, there are two or more strength detachers, normally Standard lock & Super (or code) lock. If unsure what type of tags you have always order a Superlock detacher.



Accessories available for all system types  
example shown: Lanyard, spectacle tag, ink pin

## IDENTIFYING SYSTEMS

The RF systems that will appear on the used market, most are unlikely to require PC software to make adjustments. Although there are a few exceptions (*Checkpoint, later Crosspoint, some Gateway*) otherwise changes are made with small switches, potentiometers, or push buttons.

More advanced troubleshooting RF systems usually requires an oscilloscope. But as with AM systems above, with carefully installing and adhering to the installation guidelines, most self installs should go well.

Below are some of the typical tags and accessories you may need with your RF system.



RF tags and detacher

There are a wide variety of RF tags available. Shown are 'UFO' style, in large and small. The UFO design allows for parabolic coils to be used improving detection. The bigger the tag, the better the detection, in all cases.

There are square tags, round tags, pear shaped tags, stylus tags and pencil tags. All RF tags use magnetic detachers (above) for removal.



Adhesive labels and typical label deactivator

Adhesive labels come in various sizes. The most popular are 4x4cm and 5x5cm approx. There is plain or dummy barcode finish. Bigger labels give better detection.

## IDENTIFYING SYSTEMS

**This simple guide should help you identify your system. It is not possible to cover all system types, so it concentrates on a few of those more likely to be found on the European used market that may be more suitable for self-installers.**

### IDENTIFYING AM SYSTEMS

If your choice is a used AM system, be sure to purchase the system complete with cables and power supply. Many systems use a simple CAT5 cable between transmitter and receiver antennas, if so it would be wise to use a new one.

All Systems sold within the last two decades require PC with bespoke software to make service adjustments.

#### **Compact max (N&L)**

Remove the top plate (4 screws), slide the Plexiglas panel out for service and installation. Transmitter antenna houses the main electronics board. Receiver antenna houses a small preamp board. Mono antennas have different electronics board. Important you receive the bespoke power supply. Link cable is a CAT5.



Marketed in the UK as Compact Max, manufactured in Spain. Available as Mono or Twin. Widely available Software (from independent engineers) required for adjustment.

## IDENTIFYING SYSTEMS

### Dexilon (older)

Identified by an almost, semi-circular aluminium base-plates. Remove the top, slide out the wobbly plastic side panel for service and installation. Transmitter antenna houses the main electronics board, Receiver antenna houses pickup antenna. Requires older software (v5 or lower)



Marketed in the UK as Dexilon Antares, manufactured in Spain. Twin system. Widely available Software (from independent engineers) required for service.

### Dexilon (later and current)

Remove the side cover (4 screws) for service and installation. The transceiver (TRX) antenna houses the main electronics board, Receiver antenna houses small receiver board and pickup antenna.

Important you receive the bespoke black power supply, Black (power) and White (link for dual) cables intact for this system. Although they look like flat ribbon CAT5 they have different plugs. TRX antenna will work on its own as a Mono antenna.



Marketed in the UK as SG2 AM or Dexilon manufactured in Spain. Twin or Mono system. Widely available time limited software (from approved independent engineers) required for service.

## IDENTIFYING SYSTEMS

### Ultrapost

Remove the complete side (2 cross head Dzus fasteners at bottom) for service and installation. Antenna is anchored by a removable 'foot'. Master (TRX) antenna houses the main electronics board. Slave antenna houses antenna coils and resonator capacitors.



Manufactured by Sensormatic in several countries. Twin or Mono use. Newer systems require software from Sensormatic or their approved agents. *[More likely to want to sell you a new system]* (Independent engineers may be able to service early units)

Important that you receive the linking cable, No separate power supply for this system, it's built into master antenna (Std. 230v Kettle lead) TRX (Master) antenna will work on its own as a Mono antenna. Master antenna power supply fans tend to fail with age causing system failure, *if it sound like a cement mixer don't buy!* Manufacturer tends to cling to its software like an only child. However, once working, they were normally free from needing much adjustment. Many older refurbished systems with replaced TX/power supply units and fans were sold into the UK

### Other AM systems

There are several other manufacturers of these systems and more emerging. Some that may be currently on the used market may have been omitted from this guide as they have either been deemed to be too complicated, require specific service tools, extremely difficult to obtain software/engineering expertise or have little chance of a successful installation.



Sensormatic also sold the Euromax system, which was essentially the same as the Ultramax, but with the electronics mounted remotely in a grey box and the antennas manufactured in Perspex.

However this may be beyond the self installer and there may be confusion over which version of electronics is the more easily serviced. Many systems have remote electronics equipment boxes that would make self install more difficult, for this reason these have been omitted from this guide.

## IDENTIFYING SYSTEMS

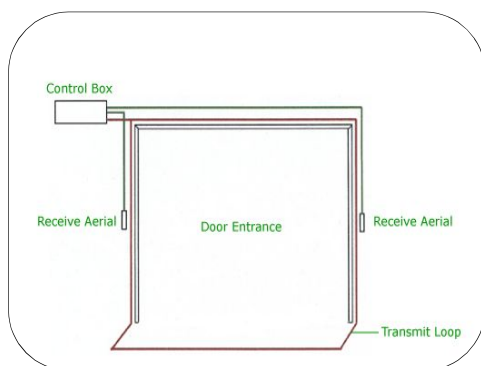
There are several other varieties of AM system, such as the 'floor mat' system and the 'loop' systems that may sound tempting. But performance of these systems is unlikely to live up to expectations and their performance is heavily influenced by the environment. They all require professional installation and never perform as well as the antenna pedestal systems featured here.

Some of the new AM systems from China allow servicing via a basic on board push button system and some via android phone app. However none are as simple as they sound. With registration complications for the app versions that are probably best left for dealership networks. They are unlikely to appear on the used market for some time.

### Recommended you avoid:



*AM Floor systems* (sometimes called mat systems), are basically a mono antenna lying on its side that is sunk into the floor and covered in resin. So will never have the performance of a vertical pedestal system and are more prone to suffering environmental problems. Not suitable for self install and also not recommended for professional install by many engineers.



*AM Loop systems* use a small loom of cable around the door frame and across the floor (must complete loop) and small 'pods' each side of the doorway. The loop cabling is used to transmit the energy to the tag and the pods contain small receive antennas. They also require a clean electrical environment and are not suitable for self install.

# IDENTIFYING SYSTEMS

## IDENTIFYING RF SYSTEMS

There is a difference in the way Mono (single antenna) RF systems and Dual antenna systems work. Mono systems are pulse transmitting, where twin antenna systems use a continuously swept transmit signal. The two systems cannot be mixed and will mutually interfere with each other. Earlier systems were manufactured from chrome or painted tube (some still), later from extruded aluminium section or plastic.

**Mono.** If installing a Mono (single) antenna (for example a single door exit). It will have an AC power supply (transformer), be sure this comes with your purchase. Multiple Monos of the same manufacture should work together on a larger or multiple doorway, as long as they are on the same mains phase. *These RF mono systems are the simplest to install and ideal for the self installer, new or used.*

**Dual.** If installing a used Dual (Swept RF system), old cable recovery is not normally a problem, as most systems connect with 2 core cable (recommended is twisted pair, screened cable Belden 8723 or equivalent) Belden can be incredibly expensive, most engineers would use an equivalent. Be sure to get the power supply with your purchase, although most systems use a 24v DC power supply which can be readily obtained. Multiple Swept RF antennas (normally more than 3) and multiple doorways require a slaving, which is beyond the intended scope of this guide.

### MTC (SG2, SG1)

**SG2.** Popular European built system, using the very popular 'Lucatron style'<sup>1</sup> electronics. Remove the lower side panel (2 cross head screws) for service and



Marketed in the UK as MTC or SG2/SG1  
Manufactured in Germany.  
Twin or single antenna system.  
No software required for adjustment of either. Test equipment may be required for SG2 if site issues experienced.

installation. Antennas are anchored by 2 bolts. Transmitter (TX) antenna houses the TX electronics assemblies, Receiver (RX) antenna houses RX assemblies.

TX and RX link with twin cable (shielded, twisted cable recommended. Separate 24v DC or 18v AC power supply feeds the TX then 'daisy chain' to RX.

Install antennas at 1.6m apart for trouble free performance. Detects RF hard tags and paper labels.

## IDENTIFYING SYSTEMS

**SG1.** Popular European built single antenna system, manufactured in Germany and using a central European electronics board. Remove lower side panel (2 cross head screws) for service and installation. Antenna is anchored by 2 bolts. Looks identical to SG2 system. Transceiver (TRX) antenna houses the electronics assembly. Antenna links with twin cable (shielded, twisted cable recommended). Separate 18v AC ONLY power supply feeds the system. It's then possible to 'daisy chain' one more SG1 antenna.

The antenna will detect tags up to 1m from the frame (paper labels a little less)

### Century

Manufactured in China, dual antenna systems, many using a variant of the <sup>1</sup>Lucatron electronics. Remove lower side panel (cross head screws, varies) for service and installation. Anchored by 2 bolts. Looks vary with model. Transmitter (TX) antenna houses the electronics assemblies, Receiver (RX) antenna houses RX assemblies.

TX and RX link with twin cable (shielded, twisted cable recommended). Separate 24v DC or 18v AC power supply feeds the TX then 'daisy chain' to RX.

Install antennas at 1.6m apart for trouble free performance. Detects RF hard tags and paper labels.



Marketed in Europe as the Century Ceptor Classic Manufactured in China. Other antenna designs are manufactured. Twin antenna system. Mono system also available. No software required for adjustment of either. Test equipment may be required if there are site issues

# IDENTIFYING SYSTEMS

## Crosspoint.

Manufactured in the Netherlands, dual antenna systems. Older systems have XR23 manually adjustable electronics, later XR24 and above electronics require PC based bespoke software (Several approved distributors in UK/Europe) Remove lower side panel (4 cross head screws, varies) for service and installation. Antennas are anchored by 2 bolts. Transmitter (TX) antenna houses the electronics assemblies, Receiver (RX) antenna houses RX assemblies.

Older XR23 TX and RX link with twin cable (shielded, twisted cable recommended. Separate 24v DC power supply feeds the TX then 'daisy chain' to RX.

Later XR24 and above use Separate 15v DC power supply and TX to RX connect with a CAT5 cable.

Install antennas at 1.6m apart for trouble free performance. Detects RF hard tags and paper labels.



Marketed in Europe as the Crosspoint Supra (XR23) and Nexus (XR24+) Manufactured in the Netherlands. Other antenna designs are manufactured. Twin antenna system. Bespoke software required for adjustment of Nexus series. Test equipment may be required (XR23) if site issues are experienced.

## Inomatic/Magic 200/250 (300/350)

Far East built system, using the very popular 'Lucatron style'<sup>1</sup> electronics. Remove lower side panel (4 cross head screws) for service and installation. Antennas are anchored by 2 bolts. Transmitter (TX) antenna houses the TX electronics assemblies, Receiver (RX) antenna houses RX assemblies.

Mono version also available using UMB 200 electronics (18v AC only), for single doorways.

## IDENTIFYING SYSTEMS

TX and RX link with twin cable (shielded, twisted cable recommended). Separate 24v DC or 18v AC power supply feeds the TX then 'daisy chain' to RX.

Install antennas at 1.6m apart for trouble free performance. Detects RF hard tags and paper labels.



Marketed in UK by Catalyst as the Magic series. 200/300 have grey covers, Newer 250/350 have black covers. Manufactured in China. Twin antenna system. Mono system also available. No software required for adjustment. Test equipment may be required if site issues experienced.

### Other RF and AM Systems

All of the above RF system manufacturers and a few AM manufacturers also produce solid Plexiglas antennas with antenna pattern routed into the material. These are more expensive and normally very heavy.

While trying to limit system info to those that might become available in the UK market. You also may come across:

**Gateway** (Gunnebo) Swedish manufacturer, Older RF systems do not require software, all AM systems will.

**WG** Chinese manufacturer of AM systems. Early systems require a hand held i/r remote for service, later units bespoke PC software.

**Amersc** Czech Republic manufacturer of RF and AM systems. AM systems will require bespoke software. Most RF systems currently installed should not require software for service.

**Iridium** Interesting, all push button (with WiFi option) driven RF mono & dual systems made in Slovakia that may interest self/new installers. Sold by at least one of our sponsors in appendix A.

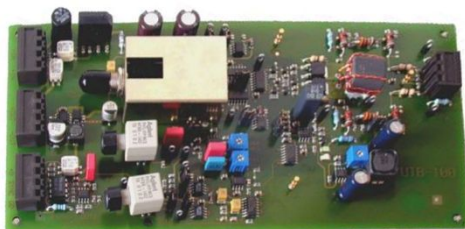
New systems are constantly emerging from with a variety of adjustment methods, Online, PC, smart phone.

# IDENTIFYING SYSTEMS

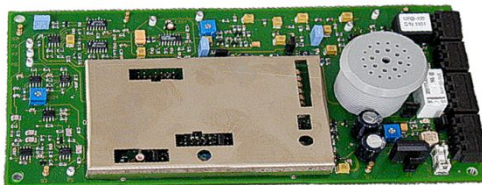
## <sup>1</sup>Lucatron RF system electronics

These popular electronics boards have been heavily 'cloned' and these or very close copies appear in many RF systems.

The advantage is that they are all interchangeable, even between manufacturers. Also there is a good market in spare parts. They all appear similar to the images below; there may be slight variance between suppliers. Often listed as UTB 100 (TX) and URB 100 (RX)



TX PCB (UTB 100)



RX PCB (URB 100)



A small antenna matching board is also used in each antenna to mix the signal from/to multiple loops. This is present with all RF systems, that use the '3-loop, 2-loop' layout to improve planar detection in the middle of the system.

# INSTALLING SYSTEMS

The most important part of the process, without exception, is the physical installation of your chosen system. Care and attention to detail at this stage is paramount. Carefully read through this section before getting busy with tools.

## 1. Survey your surroundings.

Before doing anything, read the section on identifying systems, then take a walk within 20-30 meters of the doorway you intend to protect.



You are looking for other EAS tagging systems. Note that if you are installing an AM system, other AM systems may be of the 'hidden' type (loops or mats *[not suitable for self install]*) so it's best to look what tags are on the garments or goods.

If you are installing an RF system, nearby AM systems will not be an

issue and vice versa.

However, if there is another system of the same type as yours within 20 meters, you may need to take steps to avoid mutual interference.

**AM** If installing an AM system and there is another within 20m, they may 'see' each other. If this is the case, you may need an engineer to adjust the 'phase' (AM systems transmit is triggered by the 230v mains) If the other system is on a different mains phase (shopping centres are powered by 3 phase electricity) yours can be aligned via the service software. In most cases this will not necessary.

**RF** If installing an RF system and there is another within 20m, they also may 'see' each other. This is not as simple to resolve. More recent systems have 'blanking' circuitry, which can help to alleviate the problem. Adjusting the 'sweep frequency' in the transmitter can also help. As with phase adjustment, engaging a service engineer may be required. In most cases this will not necessary.

## 2. Local environment.

Next thing to investigate is the doorway you intend to install in and it's surrounding area.

The distance of a pair of system antennas apart is a critical factor.

## INSTALLING SYSTEMS

Radio waves travel by an inverse square law. In layman's terms it means that the intensity of a radio wave falls off real quickly! Not in a linear fashion. So breaking guidelines on aisle width has very noticeable consequences.

A universal distance of **1.6m** is normally employed within the industry. Wider installations, i.e. 1.8m will have performance compromises and be more susceptible to electrical interference. Larger tags must be used when encountering such aisle widths.

There are large antennas that can perform better in wider aisles in low electrical noise environments, but these are not recommended for the self installer.

Keep all cabling clear of the system, including the systems own cables. There should be no cables within **1m** of either antenna. This may be difficult to achieve in older premises but everything you can avoid helps.

Vertical cables close to either antenna will have a strong detrimental effect on the systems performance. Less so with AM systems, but still highly recommended.

Metal doors, doorframes and structures all have to be factored in when planning an installation.

Antennas should not be installed within **200mm** of a metal doorframe, installing too close to the frame will cause antenna tuning issues and power loss into the frame.

If the doors are metal and open inwards, then the same applies. The antenna should be positioned **200mm** back from the end of the open door.

Never install behind metal doors.

### 3. Power requirements

All RF systems and most AM systems (exceptions; Ultrapost, WG) require a 230v spur fitting within 1m of the doorframe. Using a socket leaves you vulnerable to the unscrupulous pulling the plug out.

Manufacturers recommend a dedicated supply (wired direct to the consumer unit).

System cables to the first antenna and across the aisle can then be contained in a sub conduit, or within a floor capping. (*Do not contain mains 230v cables in floor capping*)

## INSTALLING SYSTEMS

### 4. Cable routes and containment.

With reference to the installation pictures, on the next page. If the floor is complete, laminate or vinyl covered, with little to no chance of laying a conduit, or grinding a chase to drop the system cables in. Then bevel edged surface capping is recommended. This can be cut to length and mitred on site and is available from at least one of the suppliers listed in appendix A.

As this will not be acceptable to everyone, the preferred solution is either to lay a sub conduit, or chase a groove in the floor or tile grout line (system cables normally fit, especially RF system) and finish with Rockite\* (recommended) or quick drying cement/grout.

For twin antenna RF systems you can circumvent the cable across the aisle problem by buying an additional power supply. Never leave spare cable in a loop, either cut to length or zigzag and cable tie flat.

## Installation photographs

### Some examples of layout and cable containment discussed.

Systems installed using bevel edged surface capping, note the mat on the supermarket installation picture for additional safety. As doors open both ways on the supermarket installation, note the position of the antennas.



## INSTALLING SYSTEMS



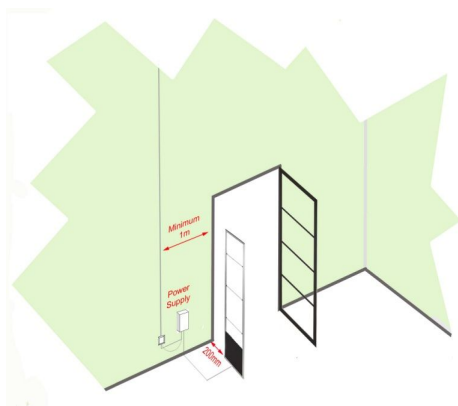
Systems below are installed using a sub conduit which produce the smartest installations. If engaging a contractor, be sure to instruct them regarding the important dimensions and criteria discussed in the previous chapter. Remember to route conduit to avoid the antenna anchor bolts.



## INSTALLING SYSTEMS



Suggested layout for single (mono) antenna system installations.

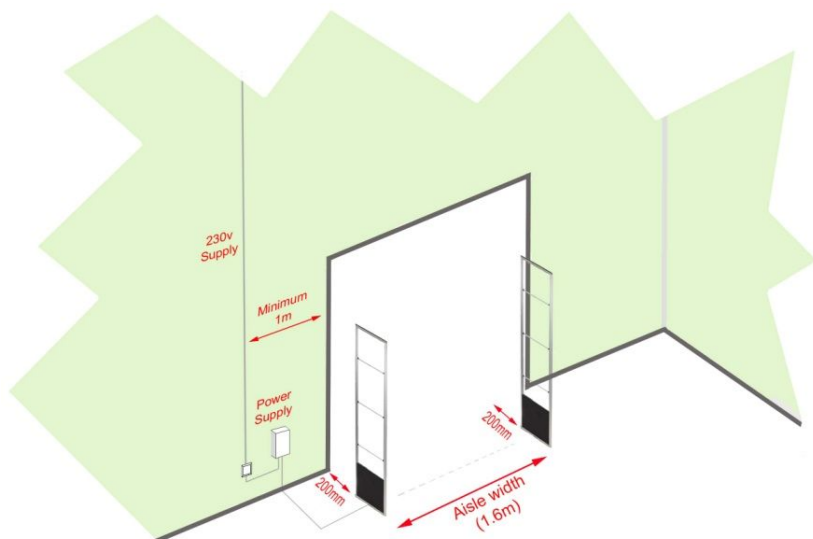


### Single antenna RF or AM system.

The dimensions and layout shown are suitable for all RF and AM Mono systems. If there is an inward opening door, as in the diagram, install the antenna opposite the hinge side. As performance is limited, most traffic will pass close to the antenna. Also this avoids any door issues. Try to adhere to these as much as possible as each transgression will degrade performance and reliability.

Suggested layouts for twin antenna system installations.

## INSTALLING SYSTEMS



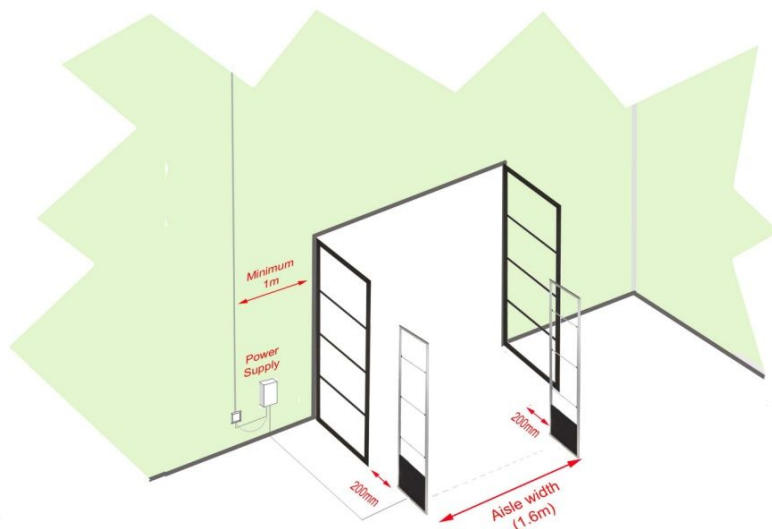
### **Twin antenna RF or AM system.**

The dimensions and layout shown are suitable for all RF systems and most AM systems (*AM systems with remote power supply*) installed with an open doorway. Such as roller shutter entrance (*remember to allow space for internal shutters*) or doors opening outwards only

Optimum dimensions are shown. Try to adhere to these as much as possible, each transgression will degrade performance and reliability.

## INSTALLING SYSTEMS

### Suggested layout for twin antenna systems with inward opening doors



#### **Twin antenna RF or AM system with metal doors.**

The dimensions and layout shown are suitable for all RF systems and most AM systems (*AM systems with remote power supply*) installed with metal structured doors opening inwards.

Optimum dimensions are shown. Try to adhere to these as much as possible, each transgression will degrade performance and reliability.

# INSTALLING SYSTEMS

## Avoiding problems.

There are two main reasons for systems not working, working poorly or false alarming.

- 1) The first one is simply tags too close. Leave a 2m tag free zone around the antennas if you can. If installing a single antenna, remember they work the same both ways! So don't tag behind it.
- 2) Tagging systems are radio based products so prone to unwanted radio interference (noise).

The world is becoming progressively radio noisy, as consumer devices and networks leak RF radiation and pollute the radio environment. Faulty and poorly manufactured lighting are a major source of this noise. So the first step is to turn off all lighting and see if the problem goes. Then find the culprit by process of elimination.

*Dichroic lighting* is usually powered by a switch-mode power supply, as are most consumer electronic products. These use electronics rather than basic transformers. Poorly constructed or faulty ones can generate interference for several meters by radiating from the connected cables.



All the current domestic type LED replacement lamps contain a switching voltage reducer within the bulbs construction; we have not found any to be problematic so far.

*HQI lighting* these discharge lights can cause heavy interference if the bulb is failing (flickering or cycling on/off). Simple fix, remove or replace the bulb.



*Monitors* positioned too close to the antenna will most likely have a detrimental effect on performance. Plasma based screens can disrupt systems from several meters away.

Keep all loose cables, monitors, TVs and EPOS screens 1m or more away. Much more if a plasma screen.



# INSTALLING SYSTEMS

## Commissioning tips



### For AM systems only

Transmit health check. Hold a **Supertag** (ferrite tags won't work) very close to the **transmitting** antenna and you should hear it rattle.

If not check connections, leds on board are active, etc.

Holding a mains power tester (volt stick) also works as an indicator and will flicker.

This works for all AM antennas except those constructed with shielded cables (Ultrapost) where it is more difficult to pick up the rattle or volt stick flicker.

### For RF systems (Lucatron & clones only)

The main adjustment for sensitivity/false alarming is an easy adjustment with these receiver boards, it is achieved by small dip switches. Which ones will depend where the board is manufactured. Chinese boards will have the S3 layout. European manufactured, mostly the S1 layout.

The diagram below shows the recommended default setting, which allows a small margin for safety.

**S3 version:** If your system is false alarming set 1 to on and 2 to off, if false alarming persists set 1 and 2 to off. J4 jumper 'in' (gain patch off)

**S1 version:** If your system is false alarming set 5 to on and 6 to off, if false alarming persists set 5 and 6 to off. On this version the gain patch is J1 be sure it's 'in'



	1	2	3	4	5	6
<b>S3</b> on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	1	2	3	4	5	6	7	8	9	10
<b>S1</b> on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
off	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# INSTALLING SYSTEMS

## Installation materials



Plastic conduit for cable containment in concrete



Flexi conduit for surface cable containment



Capping for surface cable containment on walking surfaces



Self adhesive mini trunking for surface cable containment



Anchors, 10mm coach screws  
12mm Fischer nylon plugs



Belden cable 8723 for  
wiring RF systems

# INSTALLING SYSTEMS

## Installation tools

For those doing a 'one off', self install these can probably be begged or borrowed. Not all will be necessary for the simpler installations.



24/36v Cordless drill with pneumatic action is the installer's preference.



Diamond bladed cutter, (often labelled wall-cutters) with dust removal shield.



Vacuum capable of removing spoil from the working cutter

## INSTALLING SYSTEMS

**Containment.** The different containment methods shown above should suite all installation scenarios encountered. It may not always be necessary e.g. If using a diamond disk floor cut.

**Belden Cable.** Genuine Belden is very expensive. The 8723 cable shown has two twisted pairs with individual foil screening and a drain wire. This helps by electrostatically shielding the cable. When terminating the cable at either end, we do not recommend terminating the drain wire to ground (cut back flush with the sheath). You could substitute the cable for a different shielded pair cable. The second pair in the 8723 cable is useful for additional features (external alarms, slaving) but if not used (most cases) can be used to double the cable capacity by 'doubling' the pairs. Equivalent 8723 cable can be purchased for around £25-30 per 100m roll. Regular twisted flex cable can be used (although not recommended) on shorter cable runs if no potential interference issues are noted.

AM systems normally come with their own linking cable, or use a CAT5 cable.

**Anchors.** The anchors shown (plastic plugs and coach screws), are the simplest, cost effective method of anchoring the antennas. Lesser brands than 'Fischer' plugs tend to give poor results. This should be effective on most floors. Poor quality floors (loose mixed or powdery concrete) may require a chemical alternative such as resin, or Rockite\* and threaded studding. Some floors can be challenging and require you to get creative.

**Drill.** The drill needs to be a little more powerful than domestic types, May be wise to borrow, if just doing a one off installation. If using above anchors a 12mm masonry drill bit will be required.

**Diamond bladed cutter.** Not a tool I would expect a self installer to purchase. But if you can get access to one, ideal for cutting across a concrete floor quickly (adjust blades to cut approx 5/6mm groove), or opening up a grout line in tiles. Into which you can drop the link cable or Belden (low voltage or signal only) and cover with grout or Rockite\*

**Vacuum** essential for removing spoil from the above cutter. It is possible to cut in a working retail environment without contamination with a good vacuum cleaner.

## INSTALLING SYSTEMS



\*Rockite A bit of a wonder product, used by all professional installers. A fast drying (very), self levelling, anchoring and patch repair cement. Good for anchoring studding, grouting a diamond cut and repairing damaged concrete.

### Summary:

With the information provided, a self installer should be able to perform a quality installation of an RF or AM system. To help with confidence, we have provided a list of suppliers in the appendix who can provide systems, spares, installation materials, consumables (labels), tags, accessories, label deactivators, tag detachers, technical help and engineering services within the UK.

Self installing a new or used system could save hundreds of pounds on the system cost and adhering to the guidelines, between £300-500 on installation. Should the worst happen (unlikely) and the system not perform. The most likely outcome will be a visit required from an engineer for around £120-150 to commission and adjust.

### Buying consumables

Most of the vendors in appendix A will be able to supply Systems, tags, pins, detachers, lanyards, labels, etc.

Be aware that label quality varies heavily, poor labels are likely to perform badly (low detection rate) and be difficult to deactivate (require several passes) or be 'stuck' (not deactivate). Manufacturing occurs in USA, Europe and China. The lowest cost labels may not always be the best buy.

*Decided self installing isn't for you...Check **Appendix A** and our sponsor's adverts for a professional service.*

Other EAS related publications from Maxtec Technical Services include **Servicebook** and **Servicebook Lite** now only available as a download on Google books or Amazon.

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Service  
Installation

## Appendix A

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1<sup>st</sup> Point - supplier of retail security products, including EAS and RFID security systems [1stpt.co.uk](http://1stpt.co.uk)



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[accord@accordtechnical.com](mailto:accord@accordtechnical.com)

Aspro - Skelmersdale based supplier of security services, including EAS security systems [asprosecurity.co.uk](http://asprosecurity.co.uk)

Arnage - Liverpool based supplier of security services, including EAS security systems [arnagesecurity.com](http://arnagesecurity.com)

Amberstone - Midlands based supplier of security solutions, including EAS security systems [amberstone.co.uk](http://amberstone.co.uk)

B 2 B Links - supplier of EAS tagging, CCTV and labelling solutions [btoblinks.net](http://btoblinks.net)

Black Swan Security Systems - S.W. UK supplier of security products  
[blackswansecuritysystems.co.uk](http://blackswansecuritysystems.co.uk)

Catalyst - supplier of retail security products, including EAS and RFID security systems [catalyst-direct.com/uk/](http://catalyst-direct.com/uk/)

Catchpoint - supplier of retail security products, including EAS security systems [catchpointuk.co.uk](http://catchpointuk.co.uk)

Checkpoint - manufacturer and supplier of EAS security systems & consumables  
[checkpointsystems.com/uk/](http://checkpointsystems.com/uk/)

Clipper - S.E. UK based supplier of labelling & EAS accessories  
[clipper-retail.co.uk](http://clipper-retail.co.uk)

## Appendix A

CSS Ltd - Scotland based supplier of security & EAS system services <a href="http://cssltd.co.uk">cssltd.co.uk</a>	
Duchy Alarms - supplier of security & EAS system services <a href="http://duchyalarms.co.uk">duchyalarms.co.uk</a>	
ENA Systems Ltd - South UK supplier EAS system services <a href="mailto:enasystemsLtd@btinternet.com">enasystemsLtd@btinternet.com</a>	
ESPlus - supplier of security & EAS products, including systems <a href="http://esplus.co.uk">esplus.co.uk</a>	
Fuse - Belfast based supplier of security/fire equipment & EAS systems <a href="http://fusesystems.co.uk">fusesystems.co.uk</a>	
GCS - Kent based supplier, including EAS security systems <a href="http://gcs.gb.com">gcs.gb.com</a>	
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Intrepid - supplier of retail security products, including EAS and library security systems <a href="https://intrepidgroup.net/">https://intrepidgroup.net/</a>	
Insight - supplier of retail security products, including EAS <a href="http://insightuk.co.uk">insightuk.co.uk</a>	
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MTS Ltd - Yorkshire based provider of EAS Services <a href="mailto:maxtecserve@sky.com">maxtecserve@sky.com</a>	
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Nedap - manufacturer of EAS security systems & consumables <a href="http://nedap.com">nedap.com</a>	
Premier Security Products - supplier of EAS and display security systems <a href="http://premiersecurityproducts.co.uk">premiersecurityproducts.co.uk</a>	

## Appendix A

Redcliffe - Yorkshire based supplier of EAS accessories & shop supplies  
[redcliffretailsupplies.co.uk](http://redcliffretailsupplies.co.uk)



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Sensormatic - manufacturer of EAS systems & consumables [sensormatic.com](http://sensormatic.com)

SG Systems - Southern UK based supplier of retail security products [sgsystems.co](http://sgsystems.co)

Shopguard - manufacturer of security & EAS systems [shopguard.com](http://shopguard.com)

Sierra - Manchester based supplier of EAS & communications products [sec-solutions.co.uk](http://sec-solutions.co.uk)

Signal Solution - S.W. UK based supplier of EAS and security product services  
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Tag Company - Midlands based supplier of EAS products & services [tagcompany.com](http://tagcompany.com)

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## Appendix B

### GLOSSARY OF USEFUL TERMS

**3M**, EAS library system manufacturer, among many other things

**3G**, Pulse operated digital Checkpoint system requiring propriety software

**Actron**, EAS manufacturer taken over by Checkpoint

**Aislewidth**, distance between antennas in a normal pair configuration

**AM System**, Tagging system (Acousto-Magnetic) using pulsed transmissions at 58Khz (below long wave radio band)

**Analogue**, 'traditional' electronics process by voltage variations (non-digital)

**Bandwidth**, width of transmit signal after modulation (see sweep frequency, often about 1200Khz)

**Beatnote**, fundamental signals beating with the system sweep (normally unwanted)

**Belden**, U.S. cable manufacturer, normally refers to the shielded cable they make, loved by tagging men.

**Blanking**, a circuit that completely stops a receiver from working during a noise burst

**Centre frequency**, system operating frequency (frequency tag is tuned to, often 8.2Mhz)

**Century**, EAS manufacturer (China)

**Checkpoint**, EAS manufacturer (USA)

**Compact Max**, Spanish manufactured AM system

**Crosspoint**, EAS manufacturer (Netherlands)

**CSU**, master oscillator for wire slaved, multiple RF system installations

**DAC**, digital to analogue converter

**Deactivator**, a device for "killing" labels at the point of sale.

**Default**, in our context, normally refers to going back to manufacturer's settings, sometimes on power down

**Detacher**, device for removing tags at point of sale

**Deviation**, see sweep

**Dialoc**, EAS company (Dutch)

**Dichroic lighting**, small 12v plug in lighting system often used in window displays (switch mode versions can give trouble)

**Digital**, electronic information process by a data bitstream (as opposed to analogue)

**Door Noise**, parasitic electrical noise generated by movement of two metal surfaces coming into intermittent contact

**DSP**, Digital signal processing

## Appendix B

**EAS tester**, a frequency counter giving centre frequency, bandwidth and sweep frequency of swept RF system transmitter

**EAS**, Electronic Article Surveillance (tagging)

**EM system**, Magnetic EAS system

**EPOS**, Electronic Point of Sale

**Fashion tag**, small rectangular 8.2Mhz tag

**Ferrite**, a chemical composition of various metallic oxides, iron oxide being the major constituent. Designed to alter the permeability of an inductive circuit. Used in pencil tags.

**Ferrite tag**, AM or RF pencil or stylus tag using ferrite to lift the Q of the tag coil.

**Fibre optic cable**, used for slaving complicated RF installations

**Fluke**, test equipment manufacturer (see scopemeter)

**Fundamental**, the original transmitted (centre) frequency

**Galaxy Board**, DSP electronics (RX) early Lucatron style electronics

**Gateway**, EAS company, parent company Gunnebo (Swedish)

**HQi lighting**, gas discharge lighting system, normally slow starting when striking. (Faulty bulbs give problems)

**Ink tag**, tag, or pin has glass vial contains ink for benefit denial

**Knogo**, EAS company taken over by Sensormatic in 1995 (in Europe)

**Led**, light emitting diode

**Loop**, a hidden AM tagging system, professional install only

**Lucatron**, European RF system manufacturer

**Master**, the transmitter or unit providing the oscillator signal for synchronisation to slave units

**Megamax**, older wider aisle Perspex version of Sensormatic's 'Ultra' family (needs software)

**Meto**, EAS company taken over by Checkpoint

**Mini-master**, Small two-output fibre optic transmitter, fits inside RF system tx

**Mini-UFO**, RF tag shaped like one, but smaller

**MM system**, Magnetic EAS system

**Molex**, a connector manufacturer, connectors popular on loop systems

**Mono system**, a system that uses a single antenna (pulse operated) can be RF or AM technology

**Multi-Guard**, 58Khz pedestal system from WG

**Multiplexing**, appearing to do several functions at once by sharing time (different time slots)

**Nedap**, EAS manufacturer (Dutch) (RF)

**Noise**, unwanted signal in the receiver

**Null**, the position where minimum signal is received

## Appendix B

**Nuway mat**, Aluminium sandwich and steel wire construction doormat, unfavourable to tagging systems

**Oscilloscope**, general purpose signal display device, (tagging engineers eyes!)

**PCB**, printed circuit board

**Pen tag**, a ferrite based tag

**People counting**, footfall, counted normally by i/r beam

**Power Detacher**, powered tag remover (for Supertags on AM systems)

**PSU**, power supply unit (frequently 24v or 18v)

**QS or Quicksilver**, an early Checkpoint 8.2Mhz label system.

**Rapid Pad**, Deactivator for 58Khz (AM) labels

**Resonance**, Nearby object or cable parasitically oscillating to the transmitter fundamental

**RF System**, Tagging system (Radio Frequency) using swept (FM modulated) or pulsed transmissions mostly at 8.2Mhz (short wave radio band)

**RG174**, thin coax cable (50 ohms)

**RG58**, coax cable (50 ohms)

**RG59**, coax cable (75ohms) mostly used for CCTV

**Scopemeter**, a cross between multi-meter and oscilloscope (digital) very useful

**Securitag**, EAS company taken over by Sensormatic

**Sidep**, EAS manufacturer (French) (RF)

**Sky-guard**, a 58khz loop system from WG

**Slave**, a transmitter or unit providing amplification only (no oscillator)

**Slaving**, connecting two or more RF transmitters together to avoid mutual interference

**Sonalert**, popular buzzer

**Stylus tag**, a ferrite based tag, available at many different frequencies

**Supertag**, Acousto magnetic (58Khz) tag requiring special detacher

**Sweep frequency**, modulating frequency applied to an RF transmitter carrier frequency (often 82Hz)

**Sweep**, amount of modulating waveform applied to the centre frequency (see sweep frequency)

**Switch-mode psu**, a power supply that works at high frequency, to reduce the transformer size and cost

**Telsec**, EAS manufacturer (Netherlands) (RF)

**Transceivers**, single antenna systems (pulse operating)

**UFO**, RF tag shaped like one, mostly 8.2Mhz

**Ultragator**, the original Sensormatic tag in Ultramax form

**Ultramax**, Pulse operated acousto-magnetic system (Sensormatic)

## Appendix B

**Ultrapost**, a popular AM system, master (can stand alone) and slave antenna (systems require software for service)

**WG**, Manufacturer of EAS systems (Chinese)



### Universal Servicebook

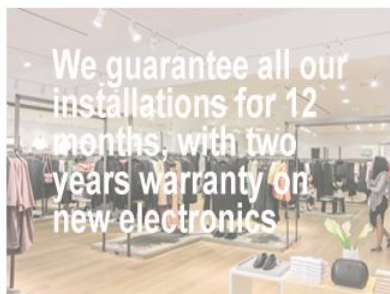
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