



## WHITE PAPER

Why checkout coupons stretch checkout printers

**The advent of receipt coupons has transformed the checkout environment. They have enhanced the customer experience and boosted sales. At the same time, they have reduced the quality of receipt printing, with illegible barcodes, streaky printouts and more frequent printer failures. This white paper looks at the problem and the potential solutions.**

POS printers in the retail sector have traditionally been designed and manufactured to print till receipts that show relatively straightforward information such as logos, product descriptions, quantities, prices and totals.

For the quality printers that are standard on the market today handling this level of information is a routine task, producing crisp and clear print, quickly and reliably over extended periods without maintenance.

However, the introduction of receipt coupons printed at the point of sale has transformed the retail sector across Europe. In part, this change has been driven by changes in legislation, such as the repeal of the German Rebates Act, and in part by a constant drive to innovate by companies throughout the supply chain.

The net result has been a rapid growth in the complexity, style and content of receipts printed at the point of sale. Typically, these now include both the traditional level of purchase data, plus detailed promotions and special offers, often with complex graphics and extensive use of black solids with text reversed out.

## The rise of receipt coupons

This proliferation of customer information is set to remain at a high level in future: according to the Checkout Study of 2016 published by the EHI Retail Institute, 80 per cent of retailers intend to use check-out coupons as a method of improving their in-store and repeat purchase experience by 2018.



The increasing complexity of receipts is now beginning to have an unexpected impact on POS printers. In particular, printer manufacturers and retailers are discovering that the addition of coupons to till receipts is resulting in considerable long-term wear on printer parts – after years of receipts being printed without any problems, end users are now contacting their printer manufacturers in growing numbers because printer heads are defective, receipts are no longer legible and barcoded coupons are impossible to redeem.

The rise in the level of reported defects in POS printers can be traced back to the introduction of checkout coupon printing; the problem is perhaps worst where the differing goals of marketing, IT and purchasing departments have to be reduced to a common denominator – often cost.

The types of problems that have been reported range from white stripes that break-up text and graphics, illegible barcodes and poor definition print, to complete printer failure. In turn, these issues lead to delays and frustration at the checkout – for both staff and customers – together with a reduction in sales revenues and reputational damage.

## Essential considerations

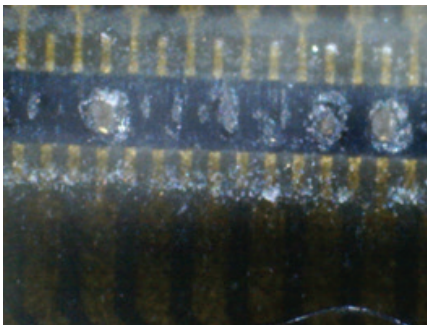
These issues can, however, be resolved if a few key facts are considered and by working closely with your printer supplier. In essence, the main factors that affect print quality and printer performance include: increasing print length and speeds, the greater use of large areas of black solids; and the use of inferior thermal paper.

**Longer print length:** an average till receipt has a length between 20 and 30 cm. If a coupon is added at the end, this length can be extended by as much again, which effectively doubles the printer duty – potentially halving the life of the print head.

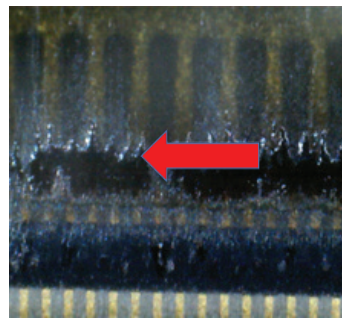
**Increase in printer speed:** printers have more than doubled their speed in the last ten years. As a result, larger volumes of paper are processed faster by each printer, leading to greater wear on moving parts, while generating considerably more paper dust; this can increase both the levels of wear and contamination of the print heads.

**Large areas of solid black ink:** an average till receipt has only around 8 per cent of the total area given over to black text. This is easily handled by standard printers, which are typically designed for up to 12 per cent blackened area coverage. Adding large areas of solid black can, however, lead to a dramatic increase in blackening, often to 50 per cent or more. Consequently, printer heads are subject to far higher operating temperatures for extended periods, leading to increased wear and a rapid accumulation of heat related deposits on the print face, which again causes a marked deterioration in print quality.

**Cheap thermal paper:** Low cost or poor quality paper requires higher levels of heat if an acceptable quality of print is to be achieved. It also produces greater quantities of paper dust. Both contribute to wear, contamination of the print head and a degradation in print quality.



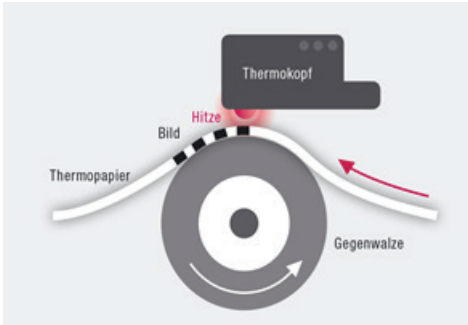
Cleaned printer head, the circles are places with melted glass



Extreme wearout

## The thermal printing process

Direct thermal printers work by using heat to blacken specially coated, heat-sensitive paper, with the required text or graphics appearing only under the areas of the head that are heated. Each head normally consists of 203 small precision designed heating points (dots), which are distributed across the entire printing width.



The performance of the heating points will be dramatically affected by the build-up of dust or debris, which effectively prevents or reduces the transfer of heat to the heat-sensitive paper.

Modern print heads are designed to work with many different types of heat-sensitive paper, and will continue to function effectively for long periods with moderate levels of paper dust. However, if levels of dust build beyond this point then performance degrades rapidly, eventually leading to a fusing of the glass surface of the print head, with a subsequent failure of individual heating points; this manifests itself as white lines across the receipt.

Similarly, the use of low quality papers, with inferior surface coatings, will increase wear on the heating elements, as they effectively act like sandpaper rubbing over glass.

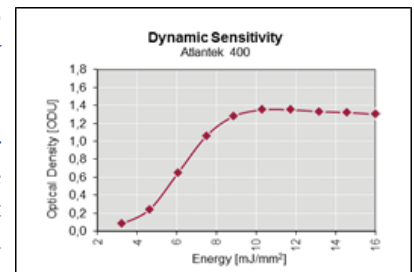
## How to achieve perfect coupon printing

The challenge of receipt coupon printing can easily be addressed by following a number of basic guidelines. The most important is simply to prevent problems occurring in the first place, by minimising the build-up of contaminants.

### 1. Using the best paper is essential.

It's worth noting that in most instances, there is little difference between the cost of cheap and good quality materials, but that the value in terms of printer life and printing quality can be considerable.

Tests using a standard label printer, with the same settings throughout, highlight clear differences between various types of paper. In particular, the dynamic sensitivity of the paper determines how it will respond to specific energy levels when it comes into contact with the heated areas of the print head. This effectively controls the speed at which text and images are created – the higher the dynamic sensitivity of the paper, the faster the thermal printer will work, assuming that all other settings remain unchanged. High-quality paper therefore requires less heat and contributes to the longevity of the printer.



High quality Paper  
Source: Mitsubishi Hitec Paper

### 2. Careful design minimises wear

The design of the till receipt and coupon can have a dramatic effect on the level of heat applied and thus on the degree of wear.

If, for example, the white text '20%' is reverse printed on a black background, the level of blackening or heat applied is far higher than if the same text is printed black on a white background. Although the information produced is the same, the load on the printer is completely different.



Extensive use of large areas of black will also use more energy, reduce the operating life of the print heads and may even cause over-heating.

These problems can be avoided by giving careful consideration to the design of each receipt and coupon.

### 3. Larger barcodes are easier to scan

One of the key advantages of coupon receipts is the ability for the consumer to be able to redeem the coupon when they next return to the store. This depends on the barcode on the coupon being clearly defined so that it can be scanned quickly and reliably at the check-out.

Although the quality of the original print is an important factor, it is also worth considering the type of barcode used. Ideally this should be a numerical, rather than alphanumeric, barcode as this can have a greater width and more widely spaced bars, which are easier to scan if the coupon has become creased, partly erased or faded over time.

### 4. Regular cleaning increases operating life

Preventative cleaning of the printer is one of the simplest and most effective ways to extend printer life. To this end, Citizen provides its customers with a free tool that they can use to manage cleaning processes. This is made even simpler with our high-end point of sale printers, the CT-S801 and CT-S851, as a 'clean printer' message automatically appears in the LCD display.

Depending on the load, the cleaning intervals can be configured individually for each customer, with the 'clean printer' message appearing only after a defined run length. Once displayed, the warning message will flash at increasingly shorter intervals until cleaning has been completed, at which point it is automatically extinguished.

It is a quick and simple procedure to clean the internal compartments of the printer, remove contaminants and dust from the thermal parts and printer head. This can be carried out when the store or check-out line is closed, to avoid disruption.



## Cleaning is an investment

Comparative tests simulating three years of normal operating conditions, highlight the value of regular cleaning.

The tests showed that when printing standard receipts there was a relatively low level of contamination. However, when coupons were added the level of contamination rose rapidly to a critical point where damage to the thermal head and possible printer failure was quickly reached.

Introducing a recommended cleaning regime immediately resolved this problem, demonstrating the point that regular cleaning extends the operating life of POS printers and protects each customer's investment.



## **Citizen Systems Europe**

Citizen Systems Europe operates from locations throughout Europe covering the EMEA region. It offers a wide range of printers for industrial, retail, healthcare and mobile applications specialising in label, barcode, portable and point-of-sale printers. In each case, the company's products are sold and supported by a network of specialised partners.

Citizen Systems Europe is a wholly owned subsidiary of Citizen Systems Japan and part of the Citizen group of companies, a global organisation that manufactures products ranging from its world-famous Eco-Drive watches, calculators, mini-printers and industrial printing systems to machine tools, quartz oscillators, LEDs and other electronic components.

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