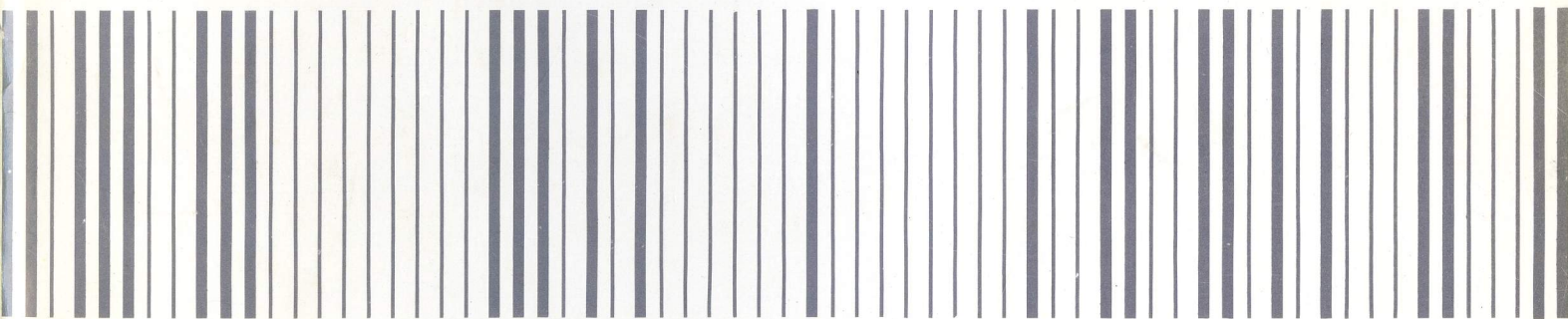


**PROPOSED UPC SYMBOL**  
**Print specification**



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## 1. INTRODUCTION

The Plessey system provides a means for the capture of bar encoded data, the information being coded in binary (hexadecimal) form as a series of vertical bars. These may have either of two widths (to represent a binary "0" or "1") and are printed on a constant horizontal pitch. The density of these bars may be up to 40 per inch, giving 10 hexadecimal characters per inch; each character may represent any of 10 numeric plus 6 special characters.

The reading device is a hand-held pen scanner used to scan across the bar code, i. e. from left to right and vice versa, thus providing a very simple and reliable method of data capture. The speed of scanning is not critical and well within comfortable human limits.

An alternative reading device is the omnidirectional stationary code scanner, whereby the bar code can be scanned irrespective of the angle at which the encoded label is slid across the stationary code scanner.

Operation of the pen scanner is independent of its orientation on its own axis; the inclination of this axis to the vertical is easily maintained between the required limits by a human operator.

The bar coded label is read optically and is nominally black bars on a white background. Colours other than white are also acceptable provided they are sufficiently reflective. It has been found that this applies to most colour dyes. Similarly the "black" bars must be sufficiently non-reflective; these reflectance figures will be defined later.

The label also contains additional information: at each end of the bar code there is a start code. These codes are distinct and can thus be read in either direction. Also, the necessity of reading a start code before the data means that the system is unaffected by extraneous light. Further information comprises an eight bit cyclic check code — this permits detection of errors, resulting in very high security for the system. It is estimated that because of the high level of error detection, combined with the good legibility of the system and consequent low intrinsic error rate, that the undetected error rate is as low as one in  $10^8$ . The cyclic check code which is appended to the label data may also conveniently be retained during the transmission of data, providing additional security and error detection facilities.

The label length may be conveniently 10 information characters; as explained two further check code characters are required, together with "forward" and "reverse" start codes. The total bar code length would therefore be 1.4 inches at 40 bits per inch.

## 1. INTRODUCTION

The primary objective of this study is to investigate the effects of various factors on the performance of a system. The study is divided into several sections, each focusing on a different aspect of the problem. The first section discusses the background and motivation for the research. The second section describes the methodology used in the study, including the experimental setup and data collection procedures. The third section presents the results of the experiments, and the fourth section discusses the implications of these results. Finally, the fifth section concludes the study and suggests directions for future research.

The study is organized as follows. Section 2 provides a detailed description of the system under investigation. Section 3 outlines the experimental design and the variables being tested. Section 4 contains the results of the experiments, which are presented in a clear and concise manner. Section 5 discusses the significance of the findings and their potential applications. Section 6 concludes the study and offers suggestions for further research.

The results of the study indicate that there is a significant relationship between the variables being tested. The findings suggest that certain factors have a positive impact on the system's performance, while others have a negative impact. These results are consistent with the theoretical expectations of the study. The study also identifies several areas where further research is needed to better understand the underlying mechanisms of the system's performance.

In conclusion, this study has provided valuable insights into the performance of the system under investigation. The findings have important implications for the design and optimization of similar systems. Further research is needed to explore the full range of factors that can affect system performance and to develop more effective strategies for improving it.

## 2. BAR CODE CHARACTERISTICS

$$\begin{array}{r} \text{Fst.} = 1,100 \\ 10 \text{ N} = 1,000 \\ 2 \text{ check} = .200 \\ \text{TERM} = \frac{.025}{1.325} \\ \text{Reverse} = .100 \\ \text{ENDS 2x.125} = \frac{.250}{1.675} \end{array}$$

The information proper is preceded, at the "left-hand" end of the label, by a "forward" start code. This comprises the 4 bit character 1101. The information then follows, considered in groups of four bits — bars are in fact printed on a constant pitch — there are no gaps between blocks. The characters may be designated as shown in table 1, where the bars (representing each bit) are printed in the order (left to right) as shown.

For the forward start code, the information characters and the check code characters, the left-hand edges of the bars are on a constant pitch. This will be 0.025 inches.

Following the last bit of the check code, there is a "terminating" bar whose left hand edge is on the same pitch as the preceding bars. The width of the terminating bar is equal to the pitch (0.025 inches).

Following the terminating bar is the "reverse" start code. This is a 4-bit block reading 0011 from left to right. Thus when the label is read in reverse (i. e. from right to left), the data will be read as 1100. These last four bars have the same widths (for a binary "0" or "1") as other bars (except the terminating bar); they are printed with their right-hand edges and that of the terminating bar on a constant pitch of 0.025 inches.

