

# A Complete Course in Electrical Engineering - First Edition Primer

Manas Kalia and Rajat Kalia

February 8, 2023



Part I

Communication Engineering

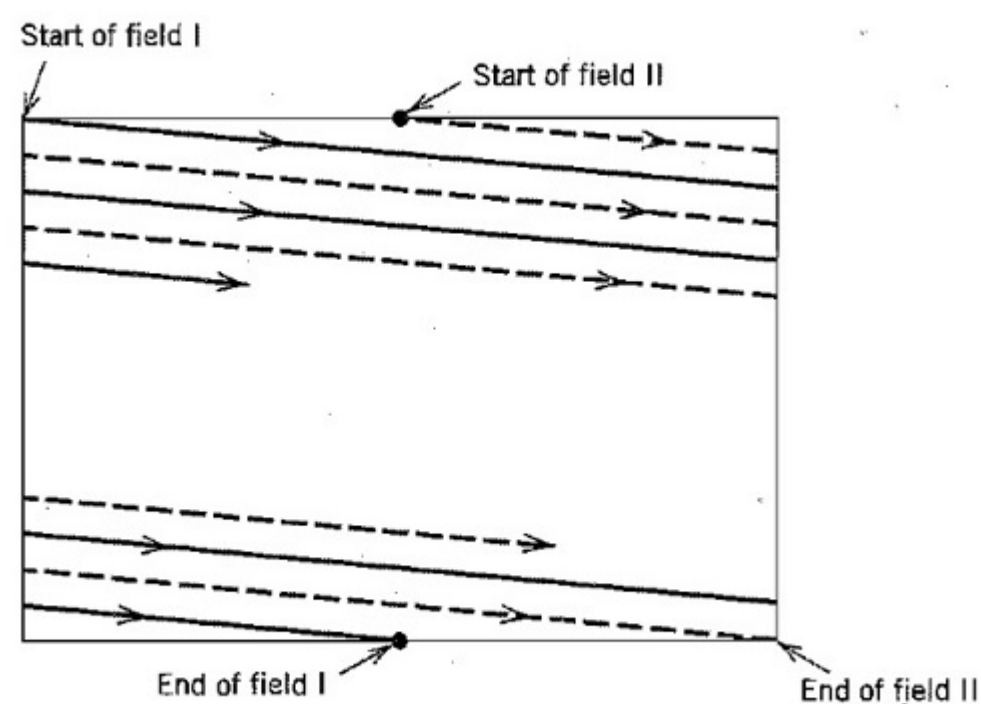


# Chapter 1

## Introduction

### 1.1 North American Black and White Television (For Historical Purposes)

The picture is divided into 525 lines, which constitute a frame. Each frame is decomposed into two interlaced fields, each of which consists of 262.5 lines. For convenience of presentation, we will refer to the two fields as I and II.



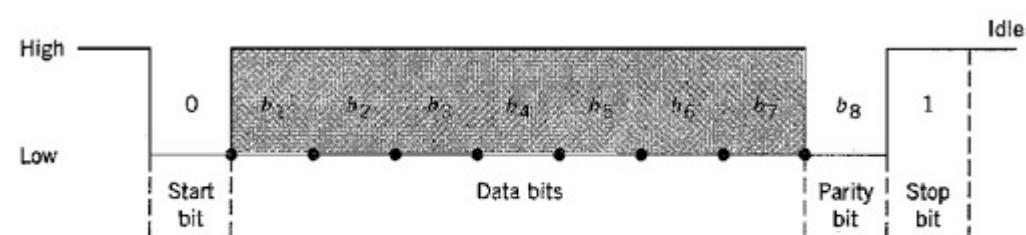
**FIGURE** Interlaced raster scan.

The time taken for each field to be scanned is  $1/60$  s. Correspondingly the time taken for a frame or a complete picture to be scanned is  $1/30$  s. With 525 lines in a frame, the line scanning frequency is 15.75 kHz.

Thus, by flashing 30 still pictures per second on the display tube of the TV receiver, the human eye perceives them to be moving pictures.

### 1.2 ASCII (via ATM{Asynchronous Transfer Mode})

Thus a total of  $2^7 = 128$  can be represented in ASCII (American Standard Code for information Exchange).



**FIGURE** The bit format for sending asynchronous serial data used in the RS-232 standard.