III. RAILS

The RAILS presentation comprises two major subsystems: A set of moving screens and moving video projectors that travel on a rail system, and a table with a square array (matrix) of lights and a video camera on an X-Y carriage. Both the screen/projector system and the light matrix are interactive in that they include proximity and motion sensors which provide input to the control system. The RAILS system is controlled by a Host Computer; the light matrix subsystem is directly controlled by a separate computer that communicates with the Host Computer.

The two major subsystems are shown schematically in Figs. III-1 and III-2.

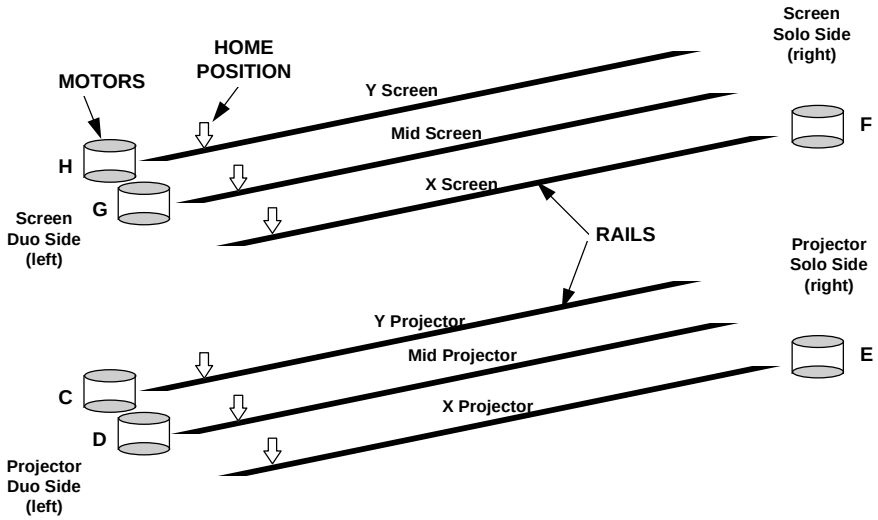


Figure III-1. Screen/Projector Schematic

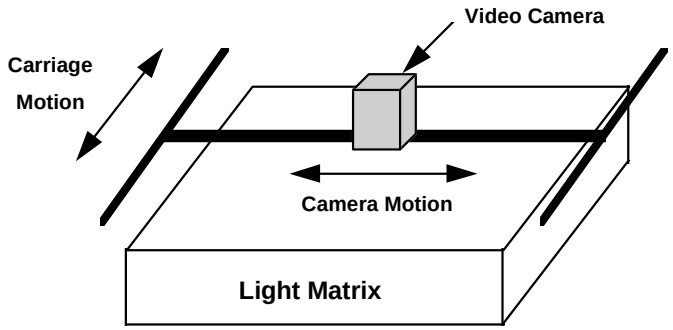


Figure III-2. Light Matrix Schematic

A typical screen rail is shown in Fig. III-3, and a close-up view of one of the motors is shown in Fig. III-4.

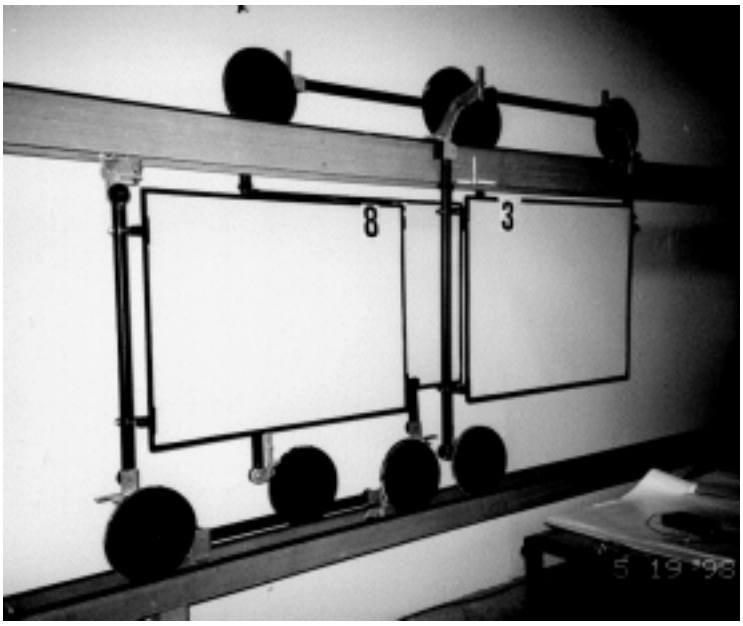


Figure III-3. Screens

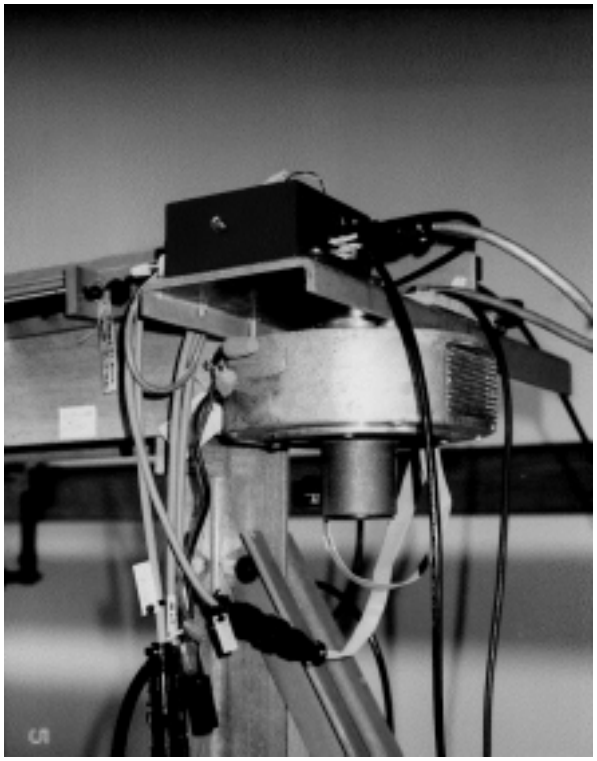


Figure III-4. Typical Motor Installation

The light matrix table is shown in Figure III-5.

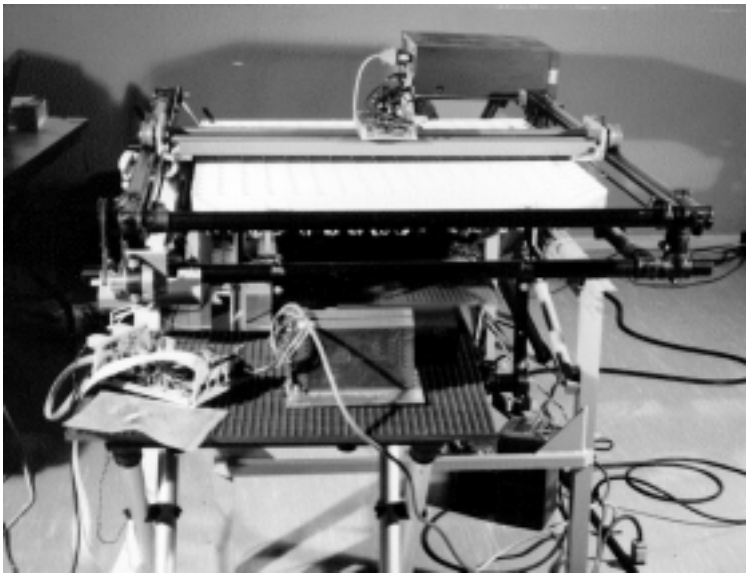


Figure III-5. Light Matrix Table

A block diagram of the entire system is given in Fig. III-6.

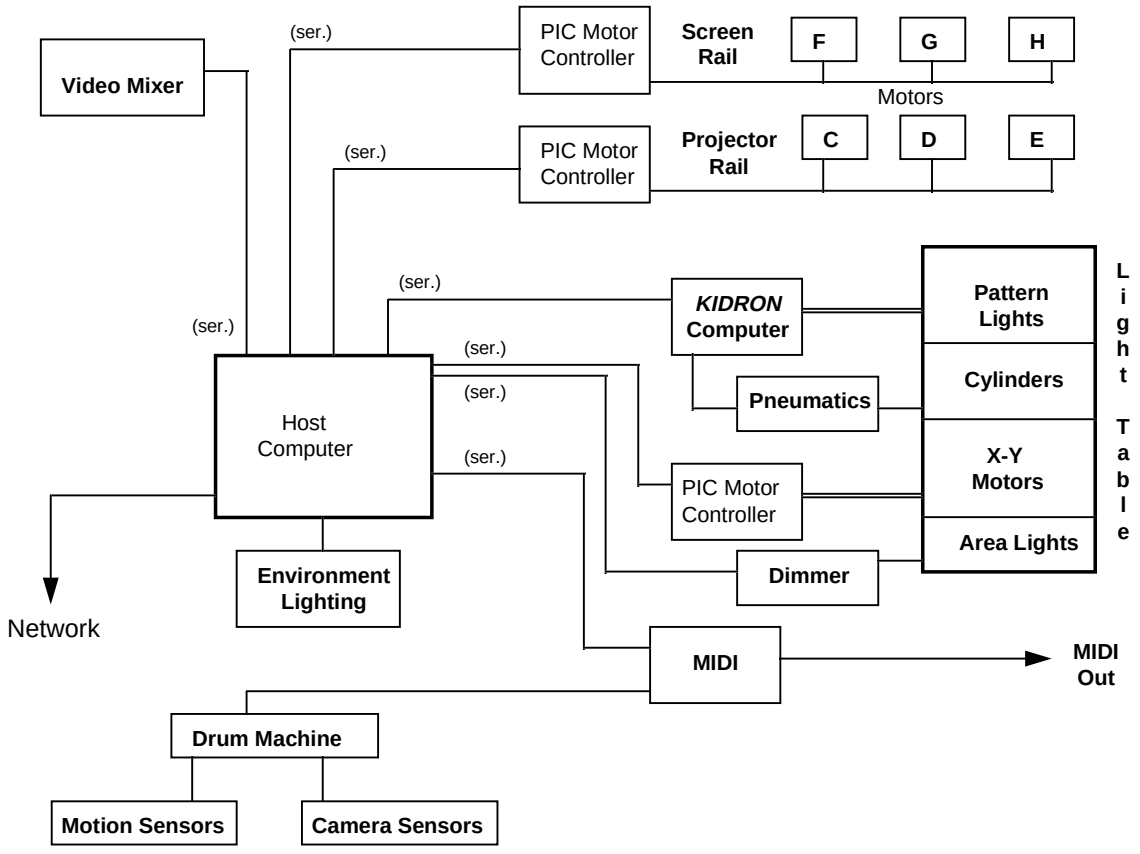


Figure III-6. The RAILS System

The light matrix is a 17 by 17 array of cells, each 2” square, and each containing two small lamps. One of the lamps is to illuminate the cell (area lamp), and the other is to provide a brighter display, i.e., to “light up” the cell (display lamp). The area lamps are electrically ganged into quadrants, but the display lamps are individually addressable. Figure III-7 shows the general layout.

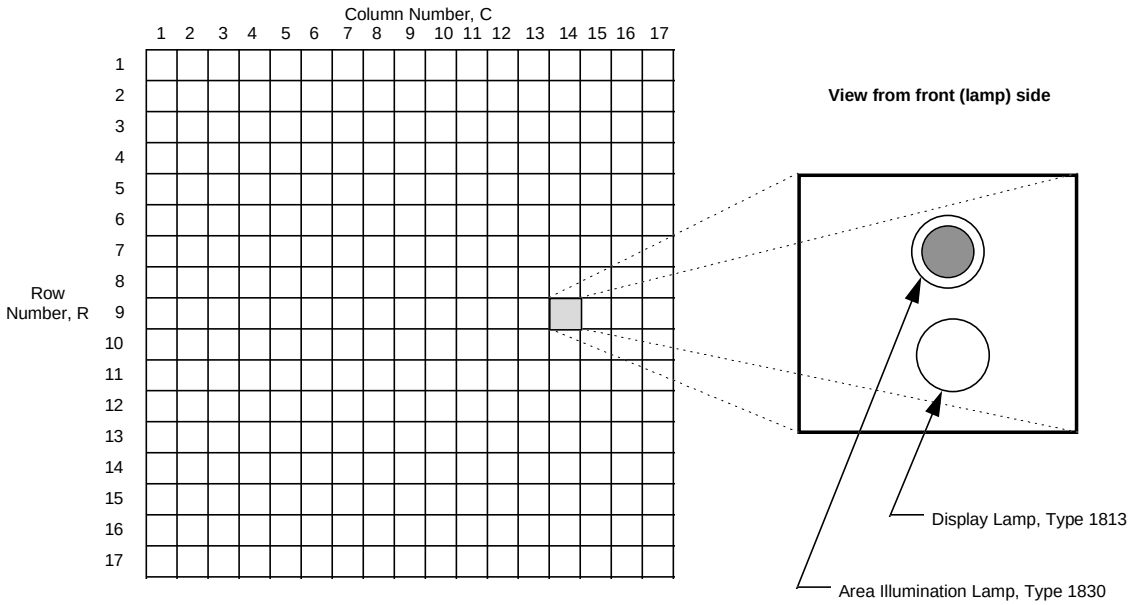
Power for the display lamps is provided by two driver modules, one for the rows and the other for the columns. The row driver module serves to switch the center terminal of all display lamps within a selected row to system ground. The column driver serves to provide power to the outside terminal of all display lamps within a selected column. When signals are passed to the drivers specifying the row and column of a cell, the display lamp in only that cell is lit.

Signals to the row and column drivers are provided by a separate computer (Kidron). Separately constructed data files that describe the complete 17 x 17 light pattern may be maintained on the computer’s hard drive. Software is provided to call up a specified data file and display it on the matrix.

The display software instructs the computer to load the specified data file into memory to determine which lamps are to be lit. It then loops through all the rows, and for each row it signals the row driver to activate that row. It then loops through all the columns, and for each column for which one or more lamps are to be lit it signals the column driver to activate that column. Only one row is lit at a time, and the column lamps are turned off when the next row is activated. When all rows (and columns) have been scanned, the desired light pattern is achieved. The computer then continues to cycle through the same set of instructions, thus “refreshing” the display lamps, until a new pattern is specified.

Power for the display lamps is provided by a DC power supply with an output of about 30 VDC and a current of several amperes. The power is input to the column driver module via the yellow (+) and blue (common) leads.

Power for the row and column drivers must be provided separately by a DC power supply with an output of 5 VDC at about 100 milliamperes. The power is input to the column driver module via the green (+) and brown (common) leads. The light matrix, both driver modules, and the power supply share a common chassis ground. No power is taken from the computer.



Display lamps are individually addressable. The row driver completes the ground circuit for all lamps in a specified row. The column driver supplies power to all lamps in a specified column.

Area illumination lamps are addressable in quadrants of the matrix. The quadrants are R1C1-R8C9, R1C10-R8C17, R9C1-R17C9, and R9C10-R17C17.

Figure III-7. Light Matrix Layout