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(NASA-CR-150624) HOLOGRAPHIC ANALYZER AND IMAGE SCANNER Final Report (North Alabama Scientific and Engineering) 7 p HC A02/MF A01 CSCL 14E

N78-20480

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HOLOGRAPHIC ANALYZER

and

IMAGE SCANNER

NAS8 - 32593

FINAL REPORT

February 28, 1978

prepared

National Aeronautics and Space Adminstration
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INTRODUCTION

A real time holographic analyzer and scanner needs to perform in a versatile and straight-forward mannner if both horizontal and vertical scans are required with all correct perspectives being maintained. The prototype Image Scanner and Display Unit fabricated for Contract NAS8-32593 fulfills these requirements. Also since in the overall objective, a feasibility for developing an instrument compatible for subsequent upgrading to multiple types of automated raster scan patterns was desired; this system provides the basic mechanical prototyping for upward compatibility.

STATEMENT OF WORK

An analytical instrumentation-oriented special design study and hardware execution development program entitled "Holographic Camera Real Images Projection Displayer and Scanner Unit" has been performed. The present state of the components available in the electro-optics hardware has led to the components assembled into the system developed herein. The detailed characteristics and operating procedures are described within this report.

TECHNICAL CONSIDERATIONS

The design finally incorporated into the prototype Holographic Analyzer and Image Scanner System provides a simple optical path while always providing a versatility for real time applications for viewing holographic images. This simplicity in design was provided with the following approaches:

a. one dimensional vertical adjustment of the laser beam.

b. three dimensional adjustment of the holographic plate in the linear movements, x and y; and a rotation about the angle 0 about the center of the holographic plate.

An explanation of these movements is shown in Figure 1.

Since the images are observed on a screen, the operator can at all times manipulate the scanning controls for optimal viewing positions. In this way any number of different holographic images contained in a single plate can be individually observed. The operating instructions for the the system are given in Appendix A.

APPENDIX A.

OPERATING INSTRUCTIONS

The following switches are located on the control module:

POWER - "ON" connects line power to translation and rotation motor. POWER light glows red.

ADVANCE-RECEDE - ADVANCE position causes hologram to move toward screen. RECEDE causes hologram to move toward direction of laser beam.

CW-CCW - CW position causes hologram to rotate in a clockwise motion looking down from above. CCW causes hologram to rotate in a counter-clockwise direction from above. This motion is called the 0 direction.

L-R - L position causes hologram to move to the left (looking toward screen front front of instrument) while R causes hologram to move to the right, again as the observer looks from the front of the instrument. This motion is called the y direction.

UP - DOWN - The UP position causes mirror M3 to move vertically up and thereby scanning up the hologram. DOWN likewise scans down the hologram. This motion is called the z direction.

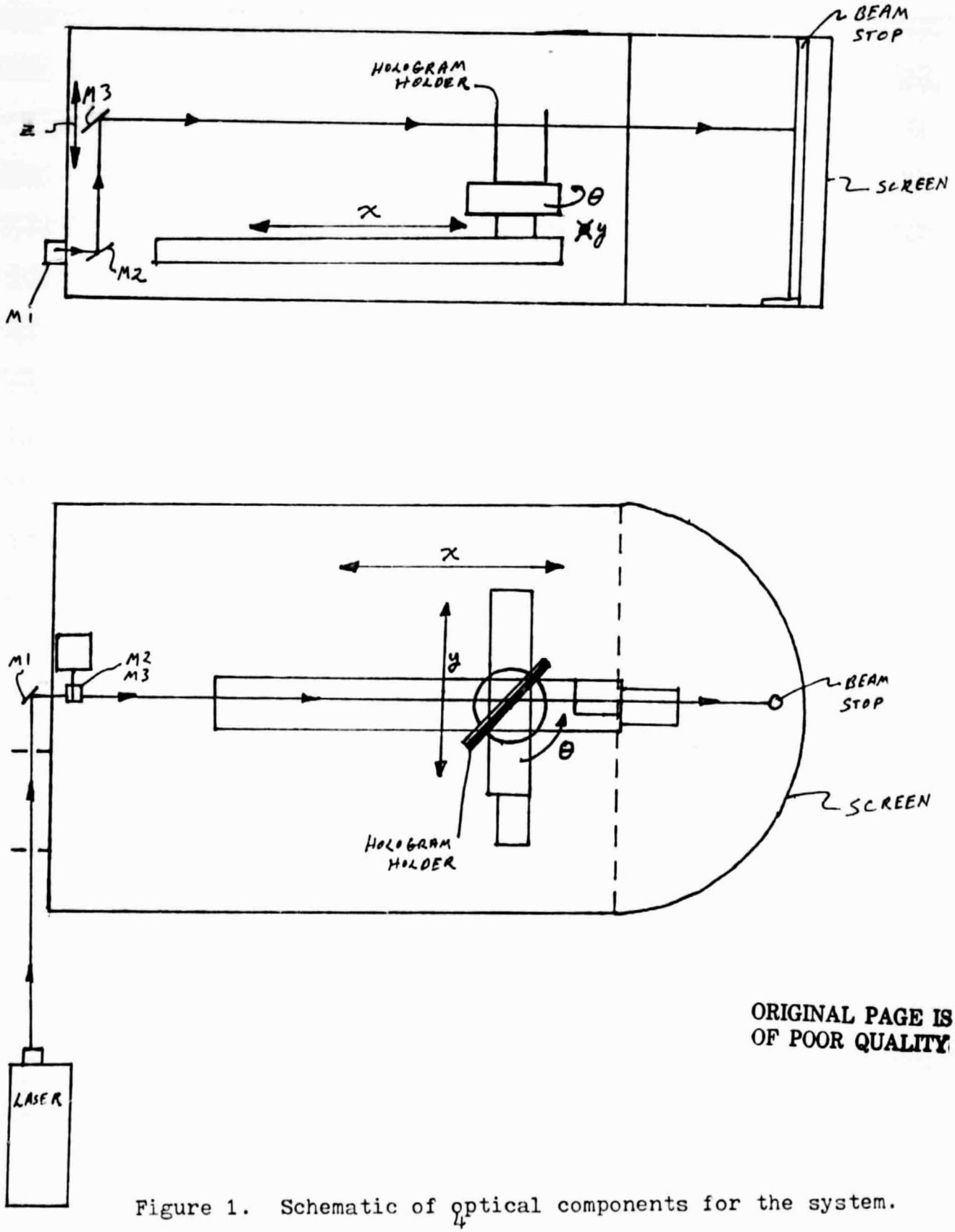

Figure 1. Schematic of optical components for the system.

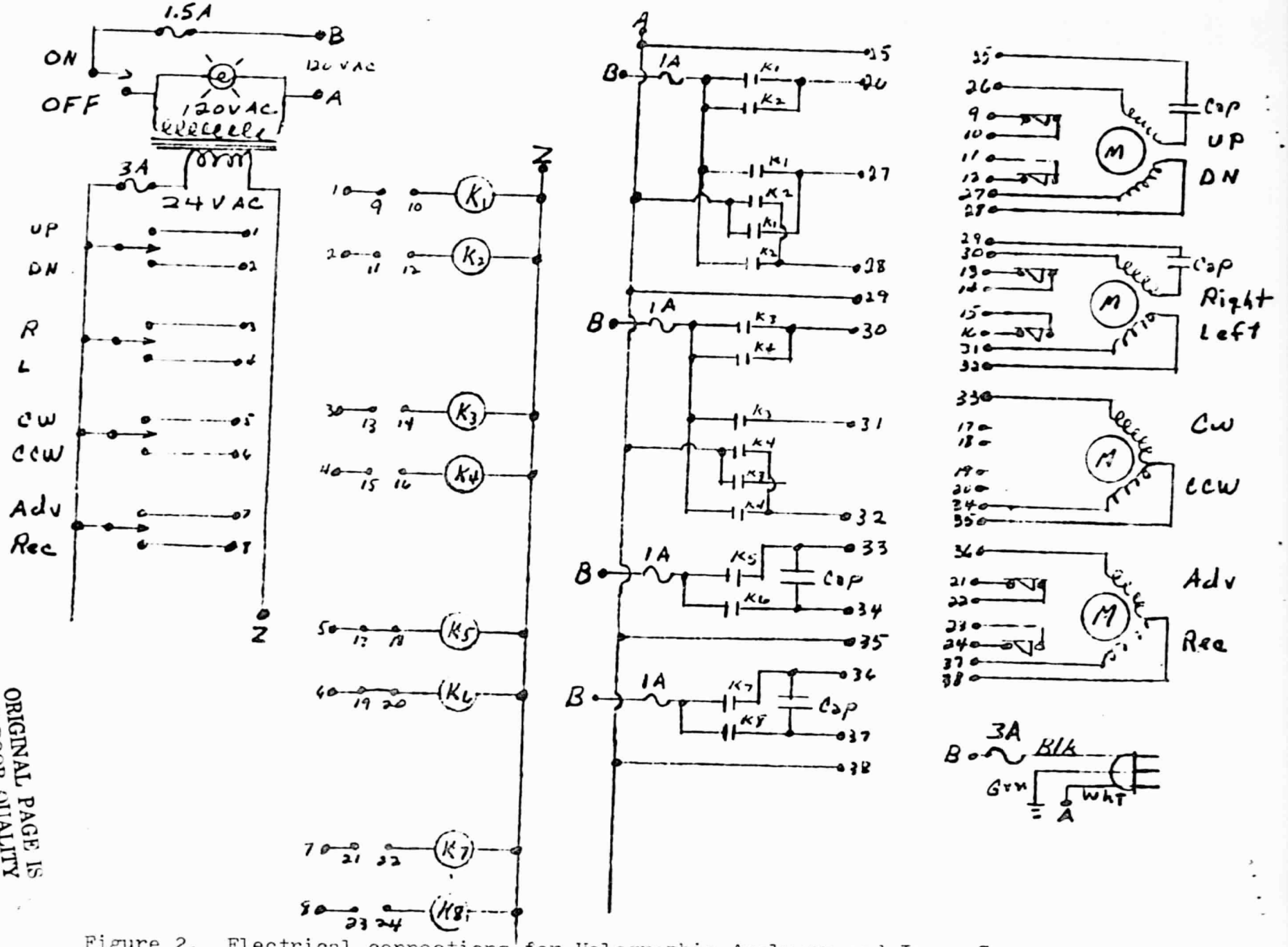

Figure 2. Electrical connections for Holographic Analyzer and Image Scanner.