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Document in this file	Burroughs – Bulletin 1127A – Dated March 15, 1968
Display devices in this document	SD-12, BEZ-12-X, SD-12-W

B SPHERICULAR OPTIC DISPLAYS (and BEZEL ASSEMBLIES)

TYPE
SD-12
BEZ-12-X

SD-12

Burroughs Sphericular Optic Displays represent a significant advance in the development of message-display components. A unique process effectively displays messages consisting of numerals, letters, symbols, words, or combinations of these on a common viewing surface. The messages are stored in the viewing screen itself. An individual message is displayed by simply selecting and lighting the appropriate incandescent lamp.

ASSEMBLIES

Sphericular optic display assemblies present an attractive and effective means of displaying numerals, word messages, and/or symbols. These assemblies consist of any number of SD-12 sphericular optic displays mounted in a bezel with a strip of plexiglas to protect the viewing screen.

The new assembly retains all the features of the single SD-12, while saving both electrical and mechanical design time.



SD-12 DISPLAY



BEZEL ASSEMBLY

FEATURES

- Smallest incandescent display unit
- Compatible with transistor drivers
- Wide angle viewing — 120° under normal lighting
- Completely in focus throughout entire viewing area.
- Plug-in or front panel mounting
- Quick bulb replacement
- No projection lenses (message quality unaffected by age, shifting focus, or uneven illumination)

SPECIFICATIONS

Character height — numerals (0-9), letters and symbols . . . 0.700 inches.

Special messages — an area .750 inches by .750 inches is available for special messages.

These messages may constitute up to three lines of 5 characters. Each SD-12 can display up to 12 distinct messages.

Lamp characteristic curves - Figure 4

Standard messages — white on black background
black on white background

Color messages — red, green, blue, and amber (either background or character).

Input signal for lamps — Table 1

Outline — Figure 2

Basic circuit - Figure 1

Socket - Figure 3

PRODUCT DESCRIPTION AND ORDERING INFORMATION

Spherular optic displays are referred to generally as SD-12. They differ in the type of presentation (character and background color), the message content, and lamp voltage.

PRESENTATION

The standard SD-12 message presentation is black and white (black character on a white background or white character on a black background). Special units may be ordered with color. These special units may contain more than one color, but each individual message is limited to one color and black. (The color replaces white.) When ordering, a suffix letter is used to indicate the character color. These suffix letters are: A-amber, B-black, C-blue, G-green, R-red, W-white. For example, "SD-12-B" indicates a black character on a white background, "SD-12-W" indicates white character on black, "SD-12-R" indicates a red character on a black background.

MESSAGE

The message content is indicated by a four digit number. For standard units which contain the numerals 0-9 this number is 1000. For example the part number of an SD-12

which contains black numerals 0-9 on a white background would be: SD-12-B-1000. For units which contain special messages, this four digit number will be assigned by Burroughs Service Department upon receipt of an order. This number can then be used for all future orders.

LAMP

An additional suffix is added to designate the lamp type; e.g., SD-12-W-XXXX-L6, L14, or L28 for 6, 14, 28 volt lamps respectively.

BEZELS

Standard assemblies consist of 2 or more SD-12 displays mounted adjacently in a bezel with a plexiglas strip. These bezels are identified as BEZ-12-X, where X is the number of SD-12's. For example, a BEZ-12-5 would designate a 5 unit assembly. When ordering any modification of standard assemblies; i.e., SD-12 units not mounted, a detailed description of the desired modification is required. A special dash number, to be assigned by the Burroughs Service Department, will be added to the standard assembly number for each modification. Once this number has been assigned, it can be used for all reorders.

ELECTRICAL SPECIFICATIONS

LAMP	RATING	LIFE HOURS (See Fig. 4)	MEAN SPHERICAL CANDLE POWER
L6	6.3V - 200mA	10,000	.34
L14	14V - 80mA	50,000	.3
L28	28V - 40mA	15,000	.3

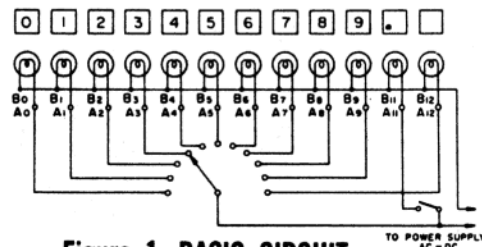


Figure 1. BASIC CIRCUIT

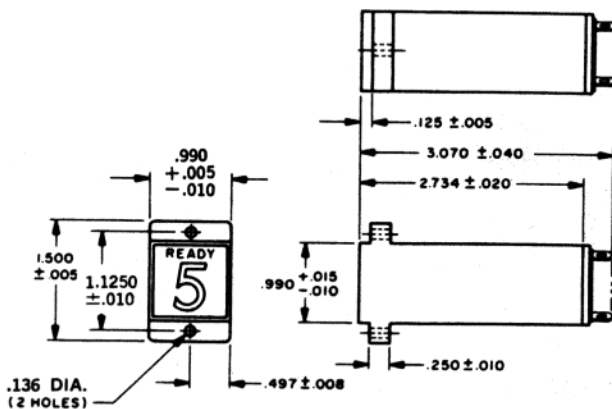
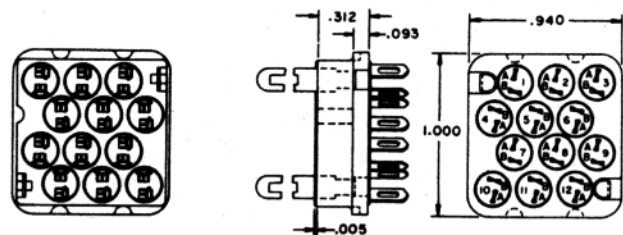


Figure 2. OUTLINE DRAWING TYPE SD-12



Dimensional tolerance $\pm .010$ unless otherwise noted.

Figure 3. LAMP ASSEMBLY

SD-12 MOUNTING INFORMATION

The SD-12 is mounted with screws through the flanges on the front of the case (See Figure 2) and can be mounted either from the front or rear of the panel. The lamps are mounted on a lamp assembly (See Figure 3) which is held

in place by two bayonet type phosphor bronze friction springs. This assembly is easily removed for lamp replacement.

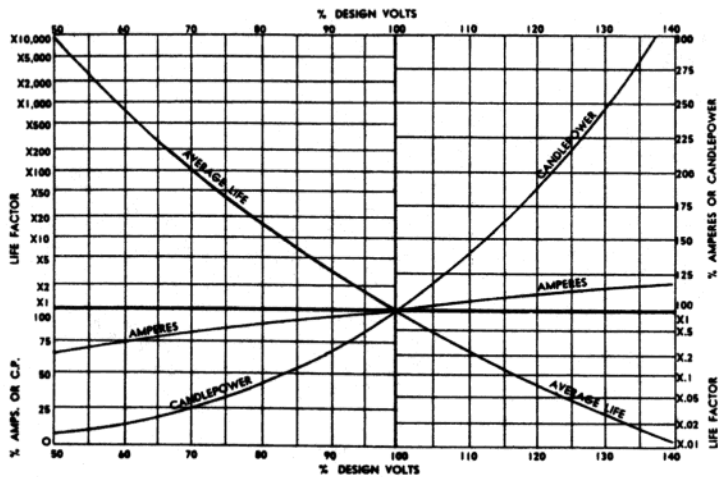


Figure 4. CHARACTERISTIC CURVES FOR MINIATURE LAMPS

Figure 4 shows derating curves which may be used to determine life and candlepower characteristics under varying voltage conditions.

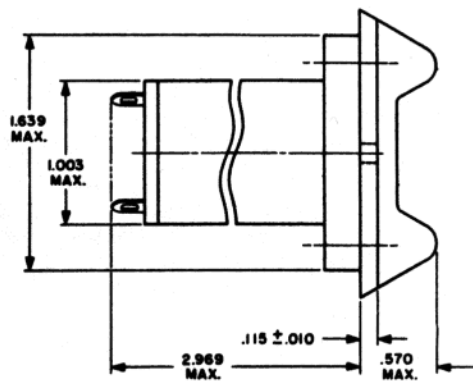


Figure 5. ASSEMBLY SIDE-VIEW WITH SD-12's MOUNTED

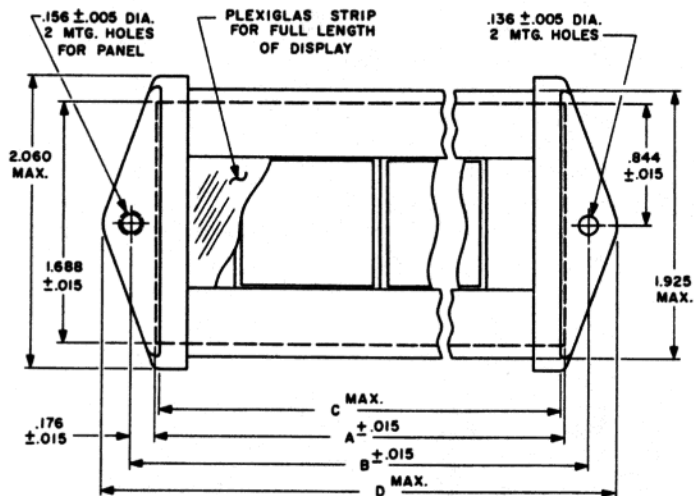


Figure 6. ASSEMBLY OUTLINE DRAWING — FRONT VIEW

OUTLINE DIMENSIONS				
UNITS	DIM. A	DIM. B	DIM. C	DIM. D
2	3.089	3.441	3.064	3.858
3	4.094	4.446	4.069	4.863
4	5.099	5.451	5.074	5.868
5	6.104	6.456	6.079	6.873
6	7.109	7.461	7.084	7.878
7	8.114	8.466	8.089	8.883
8	9.119	9.471	9.094	9.888
9	10.124	10.476	10.099	10.893
10	11.129	11.481	11.104	11.898

Table 2. CUTOUT & BEZEL DIMENSIONS

BEZEL MOUNTING INFORMATION

1. Make a panel cutout "A" in. long by 1.688 ± .015 high.
2. Place the assembly into the cutout and secure to panel with two No.4 hold down screws "B" in. apart.
3. Depth behind panel is 2.969" max. (less panel thickness).
4. Interference in front of panel is .570" max.
5. Bulbs are changed by removing the lamp assembly in the rear of each SD-12. This assembly is held in place by two friction type springs.

THEORY OF OPERATION

Burroughs Spherular Optic Displays employ a basic principle of geometric optics to produce easily changed messages on a convenient one plane viewing screen. The principle states that parallel light rays passing through a convex lens will be focused at a specific point on the focal plane corresponding to the angle the rays make with the lens axis.

The principle of operation, as applied to Spherular Optic Displays, is as follows:

The message area of a display unit is subdivided into many subminiature convex lenses, each of which handles a small part of the total light. There are 1600 lenses per square inch of message area. The focal plane of each individual lens can be thought of as being further subdivided into a number of spots, depending on the number of illuminating sources (lamps) in the display unit, i.e., 12 lamps = 12 focusing spots per lens. A precomposed image (message) is generated by transmitting light at only certain of these spots. The observer sees a message which is composed of a series of light spots similar to a halftone produced from a screened negative.

The message is changed by changing the angle of illumination, i.e., by lighting a lamp at a different position. When the lamp at the upper left corner of the lamp matrix is lighted, each lens images the lamp near the lower right of its focal plane.

If the lamp is extinguished and another turned on, an entirely new family of images is produced, none of which will focus at the points occupied by the first lamp or at those to be occupied by any other lamp. For each lamp

and message there is a corresponding pattern of light spots which produce the desired image on the viewing screen. A cutaway view of the Spherular Display is shown in Figure 7.

The principal elements of the display are the Lamp Assembly (A) and the Message Assembly (B) which consists of a Spherular Lens Plate (C), Message Screen (D), and Viewing Screen (E).

The lamp assembly (A) is a molded plastic header which holds the 12 miniature plug-in type bulbs in the SD-12 display unit. It fits behind a molded lamp honeycomb which serves to enclose and position the lamps accurately so that no misalignment is possible. It is held in place by two bayonet-type phosphor bronze springs. The lamp assembly can be easily removed for quick bulb replacement.

The Spherular Lens Plate (C) is a transparent plastic plate covered by an array of plano-convex lenses. The individual lenses are .025 inches square with a focal length of approximately .078 inch. As stated above, there are 1,600 lenses per square inch.

The message screen (D) consists of a piece of special film on which the message dot pattern has been photographically printed. It is positioned so that the spherular lens focal plane is at its surface. When illuminated, it forms the messages by selective transmission, i.e., light is only permitted to pass through the transparent position of the message screen.

The Viewing Screen (E) is made from a special light diffusing material and is designed for the optimum balance of wide viewing angle and brightness.

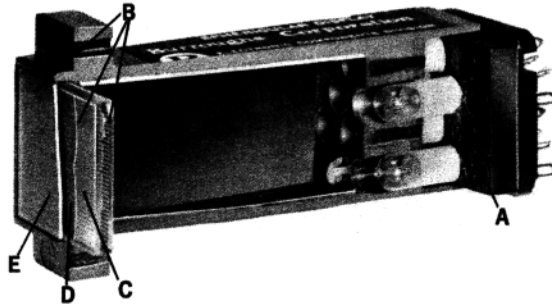


Figure 7. SECTIONAL VIEW OF OPTICAL COMPONENTS

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