



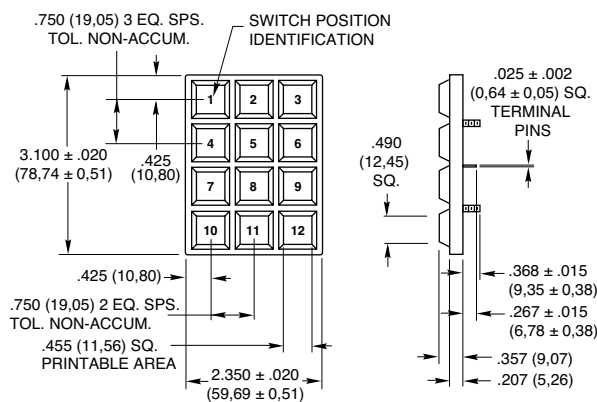
## Sealed, Low Profile

- Waterproof Silicone Rubber
- Easily Customized Legends
- Audible, Tactile Contacts
- Low Contact Resistance
- Optional RFI/EMI Shielding
- 3,000,000 Operations per Button

The Series 84LS is the low profile version of Grayhill's popular Series 84S sealed keypads. These keypads are legended by epoxy ink printing the rubber key tops. Custom legends and colors are available at a nominal cost. The Series 84LS is offered with a choice of matrix or single pole/common bus circuitries and EMI shielding.



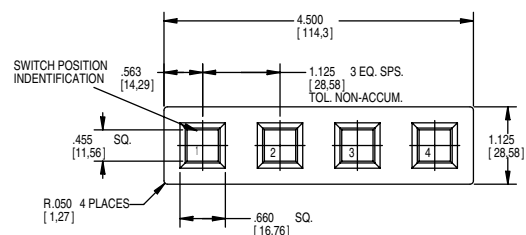
### 3x4 Keyboard



TERMINAL PINS  
PULLED IN THESE  
LOCATIONS

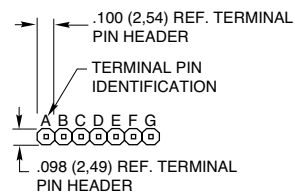
E D C B A

(ORIENTATED PER BOTTOM VIEW)



Technical drawing of the front view of a rectangular metal plate. The drawing includes the following dimensions and features:

- Overall width: 1.650 (41,91)
- Overall height: 1.500 (38,1)
- Top edge hole spacing: .100 (2,54) TYP. (between first and second holes), .525 (13,34) (between second and third holes).
- Bottom edge hole spacing: .350 (8,89) (between first and second holes), .800 (20,32) (between second and third holes).
- Internal hole spacing: .750 (19,05) (between first and second holes).
- Mounting holes: #6-32 MTG STUD 4 PLACES (indicated by arrows pointing to the four corner holes).
- Label area: A rectangular area at the bottom center, labeled "LABEL" with an arrow pointing to it.
- Internal features: A horizontal slot with a series of small circles (possibly a screw slot or a decorative element) is located in the upper center.



Technical drawing of the front view of the 'C' type terminal block. The drawing shows a rectangular component with four mounting holes (two on the left, two on the right) and a central terminal strip. Dimensions are provided in inches and millimeters. Key dimensions include: overall width of 1.650 (41,91), overall height of .800 (20,32), and a central height of .750 (19,05). Spacing between mounting holes is .100 (2,54) TYP. and .225 (5,72). A label is indicated on the left side. The terminal strip is labeled '#6-32 MTG STUD 4 PLACES'.

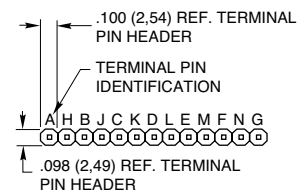
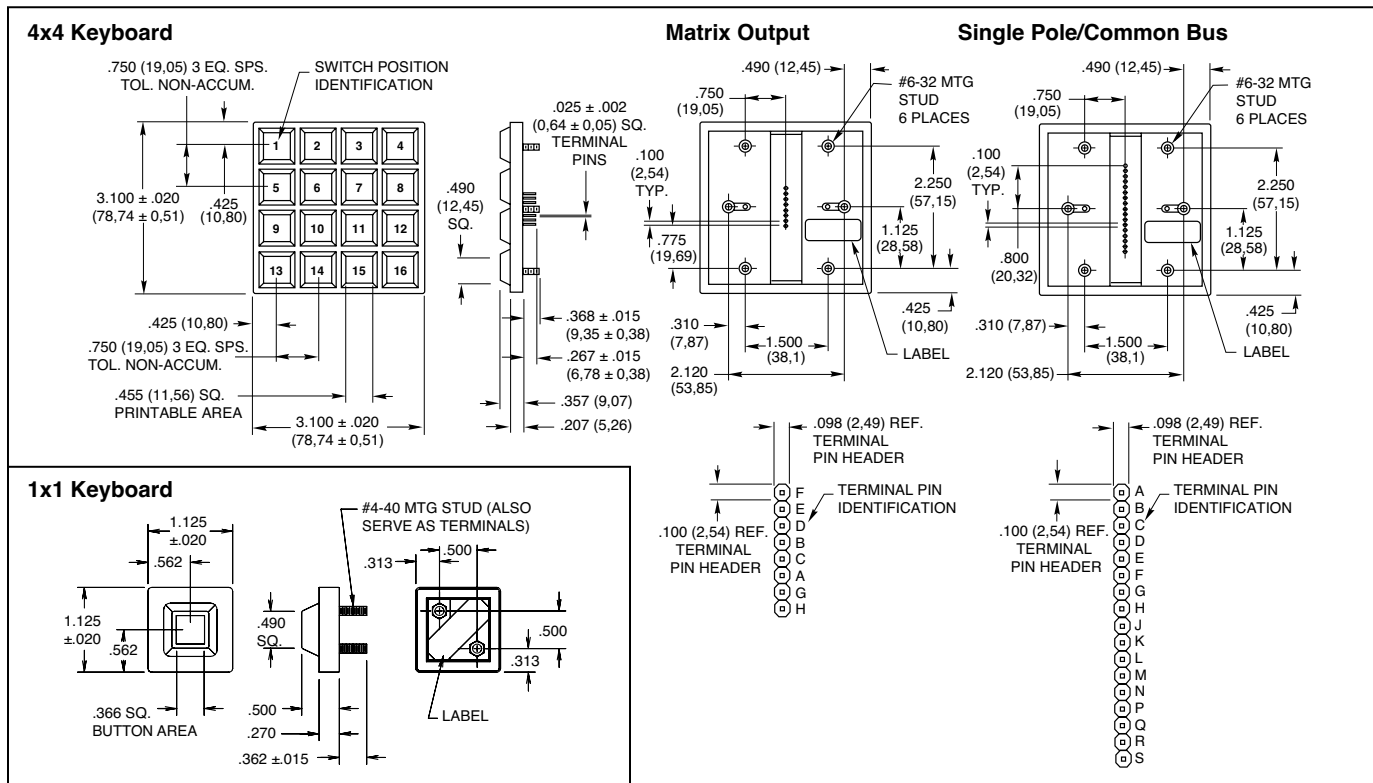


Figure 1: Dimensions of the 10-pin connector. The diagram shows a rectangular connector with various dimensions and features labeled. Dimensions include: overall length 3.875 [98.43], overall width .500 [12.7] (3 PLACES), distance from left edge to first pin .500 [12.7], distance from left edge to label .313 [7.94], distance from label to last pin .125 [28.58] (3 PLACES SPS.), distance from last pin to right edge .100 [2.54] REF. (TERMINAL PIN HEADER), and distance between pins .125 [28.58] (3 PLACES SPS.). Features include 4-40 MTG STUD (8 PLACES) and a LABEL.



## DIMENSIONS in inches (and millimeters)



## CODE AND TRUTH TABLES

The chart indicates the relationship of the terminal pins to each key switch. The dot indicates a closed switch. Terminals are identified on the keyboard.

### 4 Button Keypads

BUTTON LOCATION	CODES			
	PINS			
1	•			•
2		•		
3			•	
4				•
	A	B	C	D
	TERMINAL LOCATION			

### 12 Button Keypads

BUTTON LOCATION	CODES											
	Matrix											
1	•											•
2		•										•
3			•									•
4				•								•
5					•							•
6						•						•
7							•					•
8								•				•
9									•			•
10										•		•
11											•	•
12												•
	C	B	A	G	F	E	D	E	C	B	F	D
	TERMINAL LOCATION											

### 16 Button Keypads

BUTTON LOCATION	CODES															
	Matrix															
1	•															•
2		•														•
3			•													•
4				•												•
5					•											•
6						•										•
7							•									•
8								•								•
9									•							•
10										•						•
11											•					•
12												•				•
13													•			•
14														•		•
15															•	•
16																•
	A	B	C	D	E	F	G	H	D	B	A	C	H	F	E	G
	TERMINAL LOCATION															

## SPECIFICATIONS

### Rating Criteria

Rating at 24 Vdc: ≤ 10 milliamps resistive

Contact Bounce: 4 milliseconds maximum at make; 10 milliseconds, at break

Contact Resistance: MOS, TTL, and DTL compatible. (10 ohms maximum)

Operating Temperature: -55°C to 85°C

Life Expectancy: 3 million operations/button

Insulation Resistance: 1,000 megohms

### Operating Features

Pre-Travel: .030 inches minimum

Operating Force: 20 ± 4 ounces

Humidity: 0 to 98% (no condensation)

Minimum Push Out Force Per Pin: 5 pounds

### Materials and Finishes

Terminal Pins: Copper alloy CDA 725

PC Board: FR-4 glass cloth epoxy

Dome Retainer/Rear Seal Sheet: Polyester

Mounting Studs: Phosphor bronze

Optional Hex Nut: Stainless steel, passivated

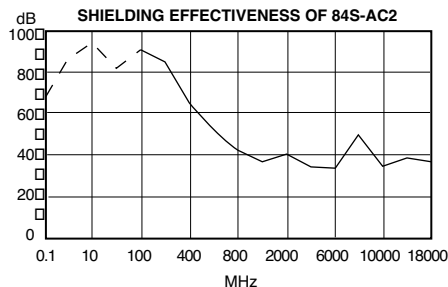
Optional EMI Shield: Aluminum foil

Keypad: Silicone rubber



## Shielding Effectiveness

Results shown are typical for a standard Grayhill Series 84LS Keyboard. A conductive gasket will generally increase the shielding, depending on the size and shape of the gasket and its material. Data derived for E-Field Radiation.



— — Represents shielding effectiveness  $\square$  greater than or equal to line.

Frequency MHz	Rating in dB
0.1	66.2
10	94.8
100	89.0
400	70.6
800	42.5
2,000	39.5
6,000	32.6
10,000	45.2
18,000	42.2

### Test Method:

Measurements were made with the keyboard mounted to a brass plate, which in turn was mounted to a shielded enclosure containing the receiving equipment. A signal generator provided

the frequency source that was radiated from the transmitting antenna to the enclosed receiving antenna. The spacing between antennas was maintained constant throughout the frequency range. The effectiveness rating is determined by establishing a reference reading without obstruction between the two antennas and determining the difference between that reading and the test setup reading.

### Note:

When measured in actual equipment, shielding effectiveness is determined by many factors. This method accurately represents the shielding effectiveness of the Grayhill Series 84LS under ideal test conditions.

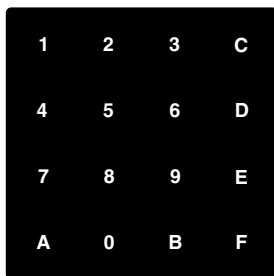
## STANDARD LEGENDS

Available through Grayhill Distributors

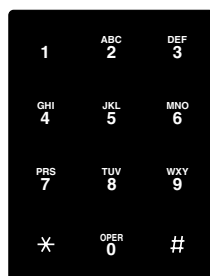
To order one of the configurations below, use the dash number shown here; select the keypad size and code, and order the part number with the appropriate legend dash number.



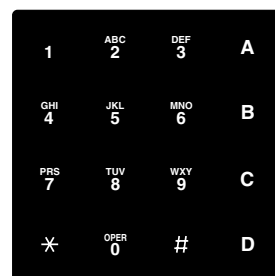
-112



-014



-113



-016



-301



-302



-201

## CUSTOM LEGENDS

Any reasonable legend can be printed in the key area. Fax a sketch of your requirements to Grayhill. Printing and symbols will be coordinated in keeping with concepts of good design. Or, if required, the details of your submitted artwork

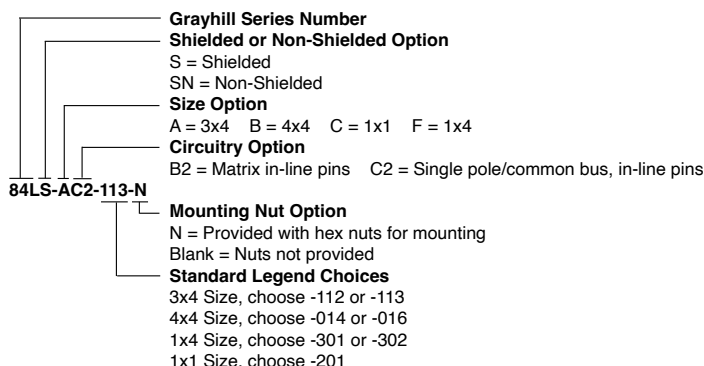
will be matched as closely as possible. Allow 3 to 4 weeks for custom legend delivery. A nominal charge, depending on the total quantity of keypads ordered and the complexity of the legend, will be assessed.

## HEADER CONNECTORS

Compatible with:

**Samtec, Inc.** Header Series BCS, BSW, CES, ESW, ESQ, SLW, SSW, SSQ, IDSS and IDSD or equivalent.

## ORDERING INFORMATION



Available from your local Grayhill Distributor.

For prices and discounts, contact a local Sales Office, an authorized local distributor or Grayhill.