JAY-EL MARK 7 P/N 10800
ILLUMINATED PUSHBUTTON SWITCH
CONFORMS TO QPL MIL-S-22885/94
JAY-EL MARK 7
P/N 10800
ILLUMINATED PUSHBUTTON SWITCH

COMPACT SIZE

The Mark 7 is designed for maximum use of available panel space. Two types of mountings are available, both having .688 square chassis. The Type I switch has a standard bezel, mounting sleeve and self contained mounting hardware. It mounts on .750 centers. Type II is designed for dense matrix mounting to customer requirements. Mountings in this manner allows for centers of .689. Jay-El will Design and supply brackets or customer may specify.

SEVERAL PUSHBUTTON STYLES AVAILABLE

From standard with .53 square legend area to the largest with .64 X .89 legend area. Jay-El can provide P/N 10800 switches and indicators with NVIS compatible lightning.

DESIGN FEATURES

Designed to meet all of the requirements of Mil-S-22885. The Mark 7 is available with up to 2 pole, momentary switching and 4 lamp circuits as a single switch or supplied in a matrix assembly to customer specification. The minimum behind panel space used by the Mark 7 allows for the electronics to be packaged in the matrix itself.

ENVIRONMENTAL SEALING - MIL-STD-108

The Mark 7 can be supplied with an integral seal which has passed Splash Proof requirements to Mil-Std-108, High Shock to Mil-Std-901C and Mil-S22885. This is available for pushbutton styles B, C and D. See Page 7. Also available for the standard pushbutton only is a drip proof external area. See Page 5. The Mark 7 can be supplied with the rear switch modules and actuator sealed against all contaminants. This is important for low level dry circuit switching applications or applications where the switches are being used in a heavy salt atmosphere.

MOUNTING

Type I incorporates a mounting sleeve with rotating cams and a removable spacer to allow the switch bezel to be mounted flush with a .220 thick edge lighted panel. Type II contains no mounting hardware and is supplied with or without mounting brackets. These mounting brackets can be of practically any configuration and are to customer requirements. Both mounting methods afford secure shock and vibration proof mounting.

SUNLIGHT READABLE DISPLAYS

The Mark 7 P/N 10800 is available with a legend that is hidden before lighted and provides lighted characters readable in direct sunlight (10,000 FC). It is designated as Display Type 8. This display type utilizes maximum lighted contrast enhancing techniques. Available with T-1 or T-1½ based lamps. Most efficient Display Type 8 is with the "T" type pushbutton using T-1 lamps. This "T" type pushbutton eliminates high legend surface temperatures and can provide power saving up to 70% with no loss of luminance. Luminances far exceed requirements of MIL-STD-411 when using .15MSCP lamps. Details for legend information and viewing area on Page11.

*ALL INFORMATION PUBLISHED IN THIS CATALOGUE IS EFFECTIVE AT TIME OF PUBLICATION AND IS SUBJECTED TO CHANGE WITHOUT NOTICE.
ENHANCED SPECIFICATIONS

ELECTRICAL

Switch Contacts:
Silver Alloy contacts are standard. Gold contacts are recommended for reliable low level switching below 1.0 amperes.

Switch Ratings:

SILVER CONTACTS Maximum 2/

<table>
<thead>
<tr>
<th>Load</th>
<th>Sea Level</th>
<th>50,000 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28VDC</td>
<td>115VAC, 60Hz</td>
</tr>
<tr>
<td>Resistive</td>
<td>7.5 Amps</td>
<td>5.0 Amps</td>
</tr>
<tr>
<td>Inductive</td>
<td>5.0 Amps</td>
<td>3.5 Amps</td>
</tr>
<tr>
<td>Lamp 1/2</td>
<td>1.0 Amps</td>
<td>1.0 Amps</td>
</tr>
</tbody>
</table>

1/ Inrush: 10:1 for 20 milliseconds maximum.
2/ Minimum conditions are dependent on use and atmospheric conditions. Contact Jay-El for detailed application information.

GOLD CONTACTS

<table>
<thead>
<tr>
<th></th>
<th>Sea Level</th>
<th>Maximum Contact Res.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28VDC</td>
<td>.025</td>
</tr>
<tr>
<td>Max. Voltage</td>
<td>1 Amp, Res. .5 Amp, Ind.</td>
<td>.025</td>
</tr>
<tr>
<td>Max. Current</td>
<td>5 Microamps</td>
<td>50</td>
</tr>
<tr>
<td>Min. Current</td>
<td>15 Millivolts</td>
<td>50</td>
</tr>
</tbody>
</table>

Contact Resistance:
25 MilliOhms maximum in accordance with MIL-S-22885 for switch contacts and 1 OHM maximum in accordance with MIL-S-22885 for lamp contacts.

Electrical Life:
25,000 cycles at rated loads per Para. 3.33 of MIL-S-22885C.

Lamp Type:
T-1 3/4 midget flange base incandescent is standard.
Available on special order:
T1 3/4 Neon (External Ballast 10 K minimum)
T1 sub-midget flange base with special pushbutton modifications.
T-1 3/4 midget flange base LED (Recommended for back lighting only)

MECHANICAL

Actuation force: Unsealed 1.5 ± .5 pounds (standard)
Sealed 2.5 ± .7 pounds
Actuation travel: .062 ± .025 inches
Push button extraction force: 1 to 4 pounds
Mechanical life: 10,000,000 cycles minimum
Weight - 1.3 ounces maximum. (One pole switch with standard pushbutton.)

ENVIRONMENTAL

Temperature: High +85°C Low -55°C
Explosion: Per Mil-Std-810, Method 511, Procedure II
Humidity: Per Mil-Std-202 Method 106
Vibration: 10-2000Hz @ 0.6DA or 15G (Peak) whichever is less.
Shock: 75G's, 6 milliseconds, Half sine & MIL-STD-901C
EMI: Per Mil-Std-285
Basic switch contacts per Mil-S-8805/101

SWITCH CONTACT SCHEMATIC

Ref: 2 pole unit shown

LAMP TERMINATION

*Lamp schematics indicate lamp positions as viewed from front of unit.

For two color full face, all divided legends are supplied with lamps in all four positions.

MOMENTARY AND INDICATOR

SPLIT GROUND

Full face legend display is supplied with lamps in the upper left and lower right positions. Other positions supplied with reflectors.

Lamps in all four positions for Display Type 8.

Tolerances: Unless otherwise specified - Fraction ± 1/32", .XX± .01, XXX ± .005
### Major Outline Dimensions

#### Standard Indicator & One Pole Switch

- **Top Mounting Panel Cutout:** 53 sq. Legend Area, 0.22 sq.
- **0.95/100 sq.**
- **1.755 Max Indicator 1.885 Max One Pole Switch**
- **0.31 R Max**
- **Legend Area: 0.53 sq.**
- **0.62 sq.**

#### Two Pole Switch

- **Top Mounting Panel Cutout:** 688 sq. Max
- **0.22 sq.**
- **1.935 Max Two Pole Switch**
- **0.62 sq.**

#### Two Pole PC Termination

- **Top Mounting Panel Cutout:** 688 sq. Max
- **0.22 sq.**
- **1.840 Two Pole Switch**
- **0.62 sq.**

### Printed Circuit Terminations

#### Indicator & One Pole Switch

- **Top Mounting Panel Cutout:** 688 sq. Max
- **0.22 sq.**
- **1.810 Indicator and One Pole Switch**
- **0.62 sq.**

#### Two Pole Switch

- **Top Mounting Panel Cutout:** 688 sq. Max
- **0.22 sq.**
- **1.540 Two Pole Switch**
- **0.62 sq.**

### Pushbutton Height

- **Standard Pushbutton:** 0.95/100
- **Style A Pushbutton:** 0.375
- **Style B, C & D Pushbutton:** 0.430

### Rear View

#### One Pole

- **Top:** 2 (NC), 1 (NO), 3 (C)

#### Two Pole

- **Top:** 2 (NC), 1 (NO), 3 (C)

Terminal 5 used for split ground only.
MAJOR OUTLINE DIMENSIONS

PUSHBUTTON STYLES (UNSEALED)

Standard

Standard pushbutton style will be supplied unless otherwise specified.

ACCESSORIES

Standard Pushbutton Only

SWITCH GUARD P/N 51056

Spring loaded clear polycarbonate switch guard.

RUBBER BOOT KIT P/N 50682

- C-1 (Clear w/EMI)
- BLK-2 (w/o EMI)
- BLK-1 (w/EMI)

Flush mounted black silicone rubber boot with clear nylon window, for sand, dust and moisture protection. For standard pushbutton only.

RUBBER BOOT KIT P/N 50680

Available for edge lit panel mounting.

SWITCH GUARD P/N 50632

Spring loaded clear polycarbonate switch guard to use with P/N 50682 boot.

EMI SHIELDING

Welded 300 Series stainless steel grounding wipers provide chassis ground for EMI.

Tolerances: Unless otherwise specified - Fraction ± 1/32", XX ± .01, XXX ± .005
1. Extract pushbutton.
2. Rotate locking screws inside housing counter clockwise with small screw driver.
3. Slide mounting sleeve off of unit.
4. Install unit through front of panel with the word "TOP" to top of the panel.
5. Slide mounting sleeve onto back of unit.
6. Rotate locking screws clockwise to bring mounting cams to lock position. Mounting torque is 3/4 to 1.0 inch pounds.
7. Insert keyed pushbutton.
8. Panel spacer P/N 50399 is to be used with a Mil-P-7788 edge-lit panel. The spacer goes between the subpanel and the switch bezel. If an edge-lit panel is not used the spacer may be placed behind the mounting panel and in front of the mounting sleeve.

INSTALLATION PROCEDURE (Matrix Assemblies)

1. Matrix mounts to back of panel.
2. Mounting brackets to customer specification.
3. Units may be ordered as assembled matrixes or individual switches and brackets.
MAJOR OUTLINE DIMENSIONS INTEGRAL SEALED UNITS - Single station only

PUSHBUTTON STYLES (SEALED)

Splashproof per Mil-Std-108

**Pushbutton Styles**

- **B**
  - Splashproof per Mil-Std-108
  - Switch Guard for use with "B" pushbutton.
  - P/N 51034-1 (NO EMI) -2 (EMI)

- **C**
  - Switch Guard for use with "C" pushbutton.
  - P/N 51059-1 (NO EMI) -2 (EMI)

- **D**
  - Switch Guard for use with "D" pushbutton.
  - P/N 50937-1 (NO EMI) -2 (EMI)

**See page 13**

Mounting hole size (Single Unit)
- "B" Style Pushbutton: .927 ± .010 SQ.
- "C" Style Pushbutton: .990 ± .010 SQ.
- "D" Style Pushbutton: .927 ± .010 X 1.180 ± .010

Note: All mounting hole have to have .062 corner radius.

**Accessories**

Switch Guard for use with "B" pushbutton.
P/N 51034-1 (NO EMI) -2 (EMI)

Switch Guard for use with "C" pushbutton.
P/N 51059-1 (NO EMI) -2 (EMI)

Switch Guard for use with "D" pushbutton.
P/N 50937-1 (NO EMI) -2 (EMI)

**Tolerances:** Unless otherwise specified - Fraction ± 1/32", .XX ± .01, XXX ± .005
MAJOR OUTLINE DIMENSIONS, SEALED MATRIX

Matrix Mounting - Units will mount in panels of .031 to .250 thick.

Example: 2 x 2 "D" style, sealed pushbutton panel cutout dimension shown.
"C" style mounting center dimensions are 1.00 typical (2 places)
"B" style mounting center dimension is .94 typical (2 places)

Panel cutouts and mounting centers for single and matrix units.
Note: When ordering matrices, contact Jay-El for part numbers.

<table>
<thead>
<tr>
<th>Number of Positions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Hole Dim.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bezel Outline Dim.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Style P/B</td>
<td>1.300</td>
<td>2.300</td>
<td>3.300</td>
<td>4.300</td>
<td>5.300</td>
<td>6.300</td>
<td>7.300</td>
<td>8.300</td>
<td>9.300</td>
<td>10.300</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Positions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Hole Dim.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bezel Outline Dim.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Style P/B</td>
<td>1.300</td>
<td>2.300</td>
<td>3.300</td>
<td>4.300</td>
<td>5.300</td>
<td>6.300</td>
<td>7.300</td>
<td>8.300</td>
<td>9.300</td>
<td>10.300</td>
</tr>
<tr>
<td>D Style P/B</td>
<td>1.240</td>
<td>2.180</td>
<td>3.120</td>
<td>4.060</td>
<td>5.000</td>
<td>5.940</td>
<td>6.880</td>
<td>7.820</td>
<td>8.760</td>
<td>9.700</td>
</tr>
</tbody>
</table>
"E" PUSHBUTTON:

Meets Splash Proof requirements with close mounting centers.
Integral seal for closest mounting centers of .875.
Sealed pushbutton designed to mount flush with light plate.

Switch body showing "E" style pushbutton mounting configuration.

*Note: Panel thickness must be specified to determine mounting sleeve length.

Contact Jay-El for ordering information.

Tolerances: Unless otherwise specified - Fraction ± 1/32", .XX±.01, XXX ± .005
** To obtain more characters per line other type fonts are available. Contact Jay-El for further information.

### Legend Segments

<table>
<thead>
<tr>
<th>Pushbutton Style</th>
<th>Legend Segments</th>
<th>Characters per Line</th>
<th>Number of Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JAY-EL PRODUCTS INC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.53 SQ. LEGEND AREA</td>
<td>-1 .010 .072</td>
<td>8 8 3</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS INC.</td>
<td>-2 .012 .087</td>
<td>7 7 3</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS INC.</td>
<td>-3 .015 .109</td>
<td>6 6 3</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS</td>
<td>-4 .018 .125</td>
<td>5 5 2</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS</td>
<td>-5 .020 .145</td>
<td>4 4 2</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PROD</td>
<td>-6 .025 .175</td>
<td>4 4 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-7 .035 .222</td>
<td>3 0 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-8 .040 .290</td>
<td>2 0 0</td>
</tr>
</tbody>
</table>

### Futura Medium Condensed

<table>
<thead>
<tr>
<th>Pushbutton Style</th>
<th>Legend Segments</th>
<th>Characters per Line</th>
<th>Number of Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>JAY-EL PRODUCTS INC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.48 LEGEND AREA</td>
<td>-1 .012 .072</td>
<td>11 11 5</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS INC.</td>
<td>-2 .012 .087</td>
<td>9 9 4</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS INC.</td>
<td>-3 .012 .109</td>
<td>7 7 3</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS</td>
<td>-4 .012 .125</td>
<td>6 6 3</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PRODUCTS</td>
<td>-5 .012 .145</td>
<td>5 5 2</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PROD</td>
<td>-6 .012 .175</td>
<td>4 4 1</td>
</tr>
<tr>
<td></td>
<td>JAY-EL PROD</td>
<td>-7 .012 .222</td>
<td>3 3 0</td>
</tr>
</tbody>
</table>

* **Basic Information**

Legend area .480 square for full face on all push button styles.

.230 x .480 for 1/2 section (may be used with combination of other Display Types.)

Page 10
### Character Information (Continued)

<table>
<thead>
<tr>
<th>Pushbutton Style</th>
<th>Legend Segments</th>
<th>CHARACTERS PER LINE</th>
<th>NUMBER OF LINES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SEGMENT -1-2-3</td>
<td>SEGMENT -4-5-6</td>
</tr>
<tr>
<td>JAY-EL PRODUCTS</td>
<td>-1</td>
<td>0.10</td>
<td>0.072</td>
</tr>
<tr>
<td>JAY-EL PRODUCTS</td>
<td>-2</td>
<td>0.012</td>
<td>0.087</td>
</tr>
<tr>
<td>JAY-EL PRODUCTS</td>
<td>-3</td>
<td>0.015</td>
<td>0.109</td>
</tr>
<tr>
<td>JAY-EL PRODUCTS</td>
<td>-4</td>
<td>0.018</td>
<td>0.125</td>
</tr>
<tr>
<td>JAY-EL PRODUCTS</td>
<td>-5</td>
<td>0.020</td>
<td>0.145</td>
</tr>
<tr>
<td>JAY-EL PRODUCTS</td>
<td>-6</td>
<td>0.025</td>
<td>0.175</td>
</tr>
<tr>
<td>JAY-EL PRO</td>
<td>-7</td>
<td>0.035</td>
<td>0.222</td>
</tr>
<tr>
<td>JAY-EL P</td>
<td>-8</td>
<td>0.040</td>
<td>0.290</td>
</tr>
</tbody>
</table>