

| i | Name | Duration | Tray | Fixture | Components | Component created | Putting | Mounting | Taking | Moving | Tool needed |
|----|--|----------|------|---------|------------|----------------------|---------|----------|--------|--------|----------------|
| 1 | Take top-button-ring from top-tray | 5 | 5 | | 8 | | | | 1 | | 1 |
| 2 | Fixate top-button-ring | 15 | | 1 | 8 | | | | | 1 | 1 |
| 3 | Mount top-button-ring on bottom-switch | 15 | | | 8,5 | 9 | | 1 | | | 1 |
| 4 | Mount button on top | 25 | | 1 | 3,4 | 7 | | 1 | | | 1 |
| 5 | Take ring | 10 | 1 | | 6 | | | | 1 | | 1 |
| 6 | Change to bottom-grabber tool | 60 | | | | | | | | | |
| 7 | Put bottom-switch on table | 5 | | | 5 | | 1 | | | | 2 |
| 8 | Take button | 5 | 3 | | 4 | | | | 1 | | 1 |
| 9 | Angle top-button | 5 | | 1 | 7 | | | | | 1 | 1 |
| 10 | Take bottom-switch | 0 | | 1 | 5 | | | | 1 | | 2 |
| 11 | Lift top-button, hold top-button | 5 | | | 7 | | | | | 1 | 1 |
| 12 | Lift top-button, support | 5 | | | 7 | | | | | 1 | |
| 13 | Take switch | 5 | 2 | | 2 | | | | 1 | | 2 |
| 14 | Turn top-button | 20 | | | 7 | | | | | 1 | 1 |
| 15 | Mount switch in bottom | 15 | | 1 | 1,2 | 5 | | 1 | | | 2 |
| 16 | Take top | 5 | 5 | | 3 | | | | 1 | | 1 |
| 17 | Take bottom | 5 | 4 | | 1 | | | | 1 | | 2 |
| 18 | Put top in fixture | 10 | | 1 | 3 | | 1 | | | | 1 |
| 19 | Put bottom in fixture | 10 | | 1 | 1 | | 1 | | | | 2 |
| 20 | Put top-button-ring in top-tray | 5 | 5 | | 8 | | 1 | | | | 1 |
| 21 | Mount ring on top-button, hold | 260 | | | 7 | 8 | | 1 | | | 1 |
| 22 | Take top-button from fixture | 5 | | 1 | 7 | | | | 1 | | 1 |
| 23 | Mount ring on top-button, mount | 260 | | | 6 | 8 | | 1 | | | 1 |

Trays

1. Ring tray
2. Switch tray
3. Button tray
4. Bottom tray
5. top-tray

Fixtures

1. Front fixture

Components

1. Bottom
2. Switch
3. Top
4. Button
5. Bottom-Switch
6. Ring
7. Top-Button
8. Top-Button-Ring
9. Complete

Tools

1. tool1
2. tool2

Time Matrix

| | Take top-button-ring from top-tray | Fixate top-button-ring | Mount top-button-ring on bottom-switch | Mount button on top | Take ring | Change to bottom-grabber tool | Put bottom-switch on table | Take button | Angle top-button | Take bottom-switch | Lift top-button, hold top-button | Lift top-button, support | Take switch | Turn top-button | Mount switch in bottom | Take top | Take bottom | Put top in fixture | Put bottom in fixture | Put top-button-ring in top-tray | Mount ring on top-button, hold | Take top-button from fixture | Mount ring on top-button, mount |
|--|------------------------------------|------------------------|--|---------------------|-----------|-------------------------------|----------------------------|-------------|------------------|--------------------|----------------------------------|--------------------------|-------------|-----------------|------------------------|----------|-------------|--------------------|-----------------------|---------------------------------|--------------------------------|------------------------------|---------------------------------|
| Start | 3 | 7 | 8 | 7 | 7 | 3 | 8 | 7 | 7 | 7 | 0 | 0 | 6 | 0 | 7 | 3 | 4 | 7 | 7 | 3 | 0 | 7 | 0 |
| Take top-button-ring from top-tray | 0 | 9 | 9 | 8 | 10 | 5 | 9 | 7 | 8 | 8 | 3 | 3 | 9 | 3 | 8 | 0 | 7 | 8 | 8 | 0 | 3 | 8 | 3 |
| Fixate top-button-ring | 9 | 0 | 1 | 1 | 9 | 10 | 1 | 4 | 1 | 1 | 7 | 7 | 4 | 7 | 1 | 9 | 7 | 1 | 1 | 9 | 7 | 1 | 7 |
| Mount top-button-ring on bottom-switch | 9 | 1 | 0 | 2 | 8 | 10 | 0 | 5 | 2 | 2 | 8 | 8 | 4 | 8 | 2 | 9 | 7 | 2 | 2 | 9 | 8 | 2 | 8 |
| Mount button on top | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Take ring | 10 | 9 | 8 | 9 | 0 | 7 | 8 | 11 | 9 | 9 | 7 | 7 | 4 | 7 | 9 | 10 | 3 | 9 | 9 | 10 | 7 | 9 | 7 |
| Change to bottom-grabber tool | 5 | 10 | 10 | 10 | 7 | 0 | 10 | 10 | 10 | 10 | 3 | 3 | 8 | 3 | 10 | 5 | 4 | 10 | 10 | 5 | 3 | 10 | 3 |
| Put bottom-switch on table | 9 | 1 | 0 | 2 | 8 | 10 | 0 | 5 | 2 | 2 | 8 | 8 | 4 | 8 | 2 | 9 | 7 | 2 | 2 | 9 | 8 | 2 | 8 |
| Take button | 7 | 4 | 5 | 3 | 11 | 10 | 5 | 0 | 3 | 3 | 7 | 7 | 8 | 7 | 3 | 7 | 9 | 3 | 3 | 7 | 7 | 3 | 7 |
| Angle top-button | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Take bottom-switch | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Lift top-button, hold top-button | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Lift top-button, support | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Take switch | 9 | 4 | 4 | 5 | 4 | 8 | 4 | 8 | 5 | 5 | 6 | 6 | 0 | 6 | 5 | 9 | 4 | 5 | 5 | 9 | 6 | 5 | 6 |
| Turn top-button | 3 | 7 | 8 | 7 | 7 | 3 | 8 | 7 | 7 | 7 | 0 | 0 | 6 | 0 | 7 | 3 | 4 | 7 | 7 | 3 | 0 | 7 | 0 |
| Mount switch in bottom | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Take top | 0 | 9 | 9 | 8 | 10 | 5 | 9 | 7 | 8 | 8 | 3 | 3 | 9 | 3 | 8 | 0 | 7 | 8 | 8 | 0 | 3 | 8 | 3 |
| Take bottom | 7 | 7 | 7 | 8 | 3 | 4 | 7 | 9 | 8 | 8 | 4 | 4 | 4 | 4 | 8 | 7 | 0 | 8 | 8 | 7 | 4 | 8 | 4 |
| Put top in fixture | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Put bottom in fixture | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Put top-button-ring in top-tray | 0 | 9 | 9 | 8 | 10 | 5 | 9 | 7 | 8 | 8 | 3 | 3 | 9 | 3 | 8 | 0 | 7 | 8 | 8 | 0 | 3 | 8 | 3 |
| Mount ring on top-button, hold | 3 | 7 | 8 | 7 | 7 | 3 | 8 | 7 | 7 | 7 | 0 | 0 | 6 | 0 | 7 | 3 | 4 | 7 | 7 | 3 | 0 | 7 | 0 |
| Take top-button from fixture | 8 | 1 | 2 | 0 | 9 | 10 | 2 | 3 | 0 | 0 | 7 | 7 | 5 | 7 | 0 | 8 | 8 | 0 | 0 | 8 | 7 | 0 | 7 |
| Mount ring on top-button, mount | 3 | 7 | 8 | 7 | 7 | 3 | 8 | 7 | 7 | 7 | 0 | 0 | 6 | 0 | 7 | 3 | 4 | 7 | 7 | 3 | 0 | 7 | 0 |

Tasks that needs to be performed in a certain order

- 22** Take top-button from fixture
 - 9** Angle top-button
 - 11** Lift top-button, hold top-button
 - 14** Turn top-button
 - 21** Mount ring on top-button, hold
 - 2** Fixate top-button-ring
 - 20** Put top-button-ring in top-tray
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Sets of concurrent tasks

- 11** Lift top-button, hold top-button
 - 12** Lift top-button, support
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- 21** Mount ring on top-button, hold
 - 23** Mount ring on top-button, mount
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Tools

Tool changes

| Task | Tool |
|------|------|
| 6 | 2 |

Default tool

| Machine | Tool |
|---------|------|
| 1 | 1 |
| 2 | 1 |