








Contents

1 Patterns

- **Checkerboard:** $M^2 y M^2 z M^2$
- **God's Eye:** $M (z M)^3$
- **Superflip:** $((M U)^4 y x)^3$
- **Cube Within a Cube:** $F L F U' R U F^2 L^2 U' L' B D' B' L^2 U$
- **Cube Within a Cube Within a Cube:** $U' L' U' F' R^2 B' R F U B^2 U B' L U' F U R F'$

2 Ortega (2x2)

2.1 OLL

- **Cross Symmetric:**  $R^2 U^2 R U^2 R^2$
- **Cross Not Symmetric:**  $F (R U R' U')^2 F'$
- **Sune:**  $(R U R' U) R U^2 R'$
- **Anti-Sune:**  $(R' U' R U') R' U^2 R$
- **Headlights:**  $F (R U R' U') F'$
- **Chameleon:**  $(R U R' U') (R' F R F')$
- **Cross:**  $F (R U') (R' U' R U) (R F)$

2.2 PBL

On the top and bottom face when at this step, 2 corners will be solved (with some AUF) or all 4 will be. "Edges" is when the 2 that are solved are adjacent to each other. "Corners" is when the 2 that are solved are not next to each other and so are on opposite corners.

- **Corners Up, Solved Down:** Y-perm (see 3x3 1L PLL)
- **Edges Up, Solved Down:** T-perm (see 3x3 1L PLL)
- **Edges Up, Edges Down:** $R^2 U' B^2 U^2 R^2 U' R^2$
Edges in front
- **Corners Up, Corners Down:** $R^2 B^2 R^2$
- **Corners Up, Edges Down:** $(R^2 U' R^2 U)^2 R^2$
Edges on left or right

3 Cuboids

- **Top Layer Corner Swap:** $R\ U\ (R\ U')^2\ D\ (R\ U')\ (R\ U\ R)$
Swaps the FRU and BRU corners
- **Opposite Center Swap:** $(R\ U^2)^2\ R$
Swaps FU and BU centers
- **Adjacent Center Swap:** $(R\ U)^2\ (R\ U^2)^2\ R\ U\ R\ U'\ R$
Swaps FU and RU centers
- **3x3x4 Parity:** $Uu^2\ R^2\ F^2\ u^2\ F^2\ R^2\ F^2$

4 3x3

4.1 3x3 BLD

4.1.1 M2 Edges

- **UB (A):** M2
- **BU (Q):** (B' R B U R2 U') M2 (U R2 U' B' R' B)
- **UF (C):** (U2 M')x2
- **FU (I):** D (M' [U R2 U'] M [U R2 U']) D' M2
- **DB (W):** (M U2)x2
- **BD (S):** M2 D ([U R2 U'] M' [U R2 U'] M) D'
- **Parity Fix:** (D' L2 D) M2 (D' L2 D)

4.2 1L PLL

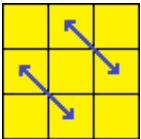
4.2.1 Permutations Edges Only

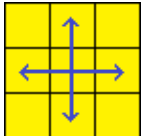
- **Ub:**

OH:

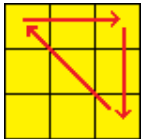
- **Ua:**

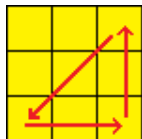
OH:

- **Z:**  (M2 U')x2 M' U2 M2 U2 M'
Solves FL/BR switch with U2 AUF
OH: R U R' U R' U' R' U R U' R' U' R2 U R
Solves FR/BL switch with U2 AUF

- **H:**  M2 U' M2 U2' M2 U' M2
OH: R2 U2 R U2 R2 U2 R2 U2 R U2 R2

4.2.2 Permutations Corners Only

- **Aa:**  x R' U R' D2 R U' R' D2 R2
Trio of correct pieces in ULB corner
OH: x R' U R' z' R2 U z U' R' z' R2 U2
Same alg as TH but with rotations

- **Ab:**  x' R U' R D2 R' U R D2 R2
Trio of correct pieces in ULB corner
OH: x' R U' R z' R2 U' z U R z' R2 U2
Same alg as TH but with rotations

- **E:**

OH:

4.2.3 Swap Adjacent Corners

– **Ra:**

OH:

– **Rb:**

OH:

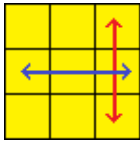
– **Ja:**

OH:

– **Jb:**

OH:

– **T:**



$R\ U\ R'\ U'\ l'\ U\ R^2\ x'\ U'\ R'\ U'\ R\ U\ R'\ F'$

T "top" on L side

OH: $R\ U\ R'\ U'\ R'\ F\ R^2\ U'\ R'\ U'\ R\ U\ R'\ F'$

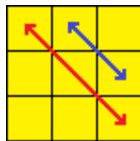
Same positioning and alg but without rotations as TH

– **F:**

OH:

4.2.4 Swap Diagonal Corners

– **V:**



$R'\ U\ R'\ U'\ y\ l'\ U'\ R^2\ x'\ U'\ R'\ U\ l'\ U\ R\ U$

Trio of correct pieces in ULF corner

OH: $R'\ U^2\ R\ U^2\ z\ U\ z'\ U'\ R'\ U\ z\ U'\ R\ U\ R'\ z'\ R\ U\ z\ U'$

Trio of correct pieces in ULF corner

– **Y:**

OH:

– **Na:**

OH:

– **Nb:**

OH:

4.2.5 Double Cycles

– **Ga:**

OH:

– Gb:

OH:

– Gc:

OH:

– Gd:

OH:

5 4x4

- **OLL Parity:** $Rw2\ B2\ Rw'\ U2\ Rw'\ U2'\ x'\ U2\ Rw'\ U2'\ Rw\ U2\ Rw'\ U2'\ Rw2\ U2'\ y$
- **PLL Parity:** $r2\ U2\ r2\ Uw2\ r2\ u2$