Banded Cubes and Stars are modular designs made from irogami paper in which the white side of the paper is used to create the underlying form and the coloured side of the paper to create coloured bands. These bands run right around the form and appear to weave over and under the other bands.

The bands can be made in many different proportions to the remainder of the module but, in these diagrams, I have chosen to concentrate on modules in which the band is one third of the width of the module. This seems to me to give the most attractive result.

These diagrams first show you four different ways to fold a ‘C’ configuration banded module, six of which will make a Banded Cube, then how to reconfigure them to make the Diagonally Banded Cube, the Doubly Banded Cube, and finally, the Banded 8-point and 20-point Stars. One of the modules is symmetric, two asymmetric and one doubly asymmetric, one...
is from a 4x3 rectangle, one from a 2x3 rectangle and the other two are from squares. There are notes on the advantages / disadvantages of using each of these modules below.

It is also possible to make other banded forms, such as hexahedra, and, in theory, other, more complex, banded cubes and stars, but I have not yet found the time to do fold and assemble these forms to see if they are sufficiently stable in practice.

The symmetric banded module
This module is folded from a 4x3 rectangle. Its finished proportions are 2x1. The band is created by a central pleat, either side of which functions as a pocket. It is a relatively complex module to fold. Because of the shallowness of the pockets this module needs to be folded accurately. It will make all the forms explained in these diagrams. I designed this module in 2001.

Asymmetric banded module no 1.
This module is folded from a 2x3 rectangle. Its finished proportions are
Also 2x1. The band is created by making an asymmetric fold in the front layer. This fold also creates the second pocket. The pockets are of different depths, and both deeper than the pockets of the symmetric banded module. However, the tabs do not go all the way into these pockets so that there is no great gain in stability from this aspect of the design. The folding sequence is, however, simpler and far more forgiving. This module will also make all the forms explained in these diagrams and was also designed in 2001.

Asymmetric banded module no 2.
This module is folded from a square. Its finished proportions are 7x3. Somewhat unusually, the folding sequence depends on the division of two edges of the square into sevenths (though not all the divisions need be made). The module is easy to fold, though it requires the use of a template to help locate some of the folds. This module is very similar to asymmetric banded module No 1 except that the tabs go more deeply into the pockets, which results in a gain in stability. This module will make all the forms explained in these diagrams. It was designed in 2017.

The doubly asymmetric banded module
This module is also folded from a square but its finished proportions are 8x3. It is very simple to fold and possesses the most elegant folding sequence of all the four modules. In addition, the asymmetric tabs fill the asymmetric pockets completely so it is also the most stable. Because of this double asymmetry it will not, however, make the Banded 20-point Star. This module was designed in 2001.
Folding the Banded Cube from symmetric banded modules
You will need six squares of irogami, two in each of three contrasting but complementary colours. Begin with your first square arranged coloured side up.

1. Make a tiny crease to mark the centre of the bottom edge.

2. Fold both outside edges into the centre, then unfold, using the tiny crease you made in step 1 to locate the fold.

3. Make a second tiny crease to mark the centre of the right hand edge.

4. Fold the top edge downwards, then unfold, using the tiny crease you made in step 3 to locate the fold.

5. Cut along the crease you just made to divide the paper into two parts. Throw away the smaller part.
6. The remaining part is a 3x4 rectangle. Fold the right edge onto the left hand quarter way crease, then unfold.

7. Fold the left edge onto the right hand quarter way crease, then unfold.

8. Fold in half from top to bottom then unfold. If you don’t want your crease to show on the front of the finished module only crease in the area shown.

9. Turn over sideways.

10. Zigzag fold the crease you made in step 6 into the centre using the tiny crease made in step 1 to locate the fold.

11. Zigzag fold the crease you made in step 7 into the centre in a similar way.
12. Turn over sideways.

13. Fold both outside edges into the centre and tuck them underneath each side of the central front layers.

14. The basic symmetric banded module is finished. There are many other ways of making a module of a similar kind.

15. Fold the top and bottom edges into the centre, using the crease you made in step 8 as a guide, then unfold to right angles.

16. Turn over and around to look like picture 17.

17. The first symmetric banded module is finished. Make all six. The pockets behind the central pleat are marked with arrows in this picture.
18. The six modules go together like this.

19. The Banded Cube is finished.

Folding the Banded Cube from asymmetric banded module no 1
You will need three squares of irogami in each of three contrasting but complementary colours. Begin with your first square arranged white side up.

19. Fold in half sideways, then unfold.

20. Fold both outside edges into the centre, then unfold.
21. Fold in half downwards, then unfold.

22. Cut along the creases marked with thick black lines to separate your square into three parts. The left hand part is not required. The other two parts are 2x3 rectangles.

23. Make a tiny crease to mark the centre of the left edge.

24. Turn over sideways.

25. Fold the right edge inwards as shown using the existing crease.

26. Fold the left edge inwards as shown using the existing crease.
27. Fold the right edge of the front layer inwards to create a vertical stripe of colour down the centre of the module.

28. Adjust by eye until all three sections of white / colour look the same width. Turn over sideways.

29. Fold the top and bottom edges into the centre, using the crease you made in step 23 as a guide, then unfold to right angles.

30. Turn over and around to look like picture 31.

31. The first asymmetric banded module no 1 is finished. Make all six. The pockets are marked with arrows. Both tabs are the same size but one pocket is deeper than the other.

32. Although the modules are asymmetric they go together in exactly the same way as the symmetric modules to form a Banded Cube. Note however that the tabs do not go all the way into either of the pockets.
Folding the Banded Cube from asymmetric banded module no 2
You will need six squares of irogami, two in each of three contrasting but complementary colours, and an extra square of any kind of paper of the same size to use as a template. Begin with your template square arranged white side up.

33  
33. Fold in half sideways, then unfold.

34  
34. Fold both outside edges into the centre, then unfold.

35  
35. Fold each outside edge onto the furthest quarter way crease, then unfold.

36  
36. Fold each outside edge onto the nearest quarter way crease, then unfold.
37. The template is finished. Turn it over sideways and rotate it through 90 degrees.

38. Place your first square on the template so that the corners are aligned to the template in the way shown here.

39. Fold the sloping bottom edge of the square inwards, then unfold, using the point where the sloping right edge of your square intersects with the third crease from the top of the template to locate your fold. Make sure your square and the template do not slip out of alignment as you do this.

40. Repeat fold 30 on the top sloping edge of your square.

41. The result should look like this. Remove your square from the template, rotate it through 90 degrees and replace it on the template with the new top and right hand corners aligned in the same way as in step 38.
42. Fold the sloping bottom edge of the square inwards using the point where the sloping right edge of your square intersects with the first crease from the top of the template to locate your fold. Make sure your square and the template do not slip out of alignment as you do this.

43. Fold the top sloping edge of the front layer downwards using the point where the sloping right edge of your paper intersects with the third crease from the top of the template to locate your fold. Make sure your square and the template do not slip out of alignment as you do this.

44. Remove your square from the template. Fold the top sloping edge downwards to lie along the folded edge below it.

45. Fold both ends of the module backwards at right angles using the existing creases.

46. The first asymmetric banded module no 2 is finished. Make all six. The pockets are marked with arrows. Both tabs are the same size but one pocket is deeper than the other.
42. Although the modules are asymmetric they go together in exactly the same way as the symmetric modules to form a Banded Cube. You can insert either tab into either pocket. The deeper pocket, however, is not completely filled.

Folding the Banded Cube from doubly asymmetric modules
You will need six squares of irogami, two in each of three contrasting but complementary colours. Begin with your paper arranged white side up.

48. Make two tiny creases to mark the centres of the left and bottom edges.

49. Turn over sideways.

50. Fold the bottom edge upwards using the tiny crease in the centre of the right edge to locate the fold.

51. Fold the top edge onto the bottom edge.
52. Open out the last two folds.

53. Fold the right edge inwards using the tiny crease in the centre of the right edge to locate the fold.

54. Fold the left edge onto the right edge.

55. Fold the right edge of the front layer inwards to create a vertical stripe of colour down the centre of the module.

56. Adjust by eye until all three sections of white / colour look the same width. Fold the top and bottom edges backwards at right angles using the existing creases.

57. The first doubly asymmetric banded module is finished. Make all six. The module has one large pocket and one small pocket and one large tab and one small tab, both of which fit their respective pockets exactly.
59. The six modules go together like this.

60. The doubly asymmetric module version of the Banded Cube is finished.
Making a Diagonally Banded Cube
You will need twelve modules of any type, three in each of four contrasting but complementary colours. When making the modules omit the steps that create the configuring folds for the ‘C’ configuration module.

61. Configure the finished basic modules symmetrically, like this.

62. Or, in the case of the doubly asymmetric banded module, asymmetrically, like this.

63. The configured module will look something like this.

64. The modules will fit together, on the same pattern as a standard 12-part cube built from parallelogram modules, to create a finished Diagonally Banded Cube that looks like this. If you are using doubly asymmetric modules begin by forming one corner making sure that all three tabs surrounding the corner are of the same type, either large or small. It will then be obvious how the remainder of the assembly goes together.
Making a Doubly Banded Cube
You will need twenty four modules of any type in each of six contrasting but complementary colours. When making the modules omit one or other of the steps that create the configuring folds for the ‘C’ configuration module.

65. Configure the modules like this.

66. Or in the case of the doubly asymmetric banded module like this. Whether you end up with a small or large tab folded down will depend on which configuring fold you omit. Both versions will make a Doubly Banded Cube but, of course, all twenty four modules must be of the same type.

67. The configured module will look something like this. The pockets are indicated by arrows.

68. Four modules go together to form one face of the cube ...
69. ... like this.

70. A second face can be added to the first like this. Continue adding modules to create additional faces until the cube is complete.

71. The finished Doubly Banded Cube should look like this.

72. It is also possible to make a Doubly Banded Cube using four modules in each of six colours. Other interesting Banded Cubes can be made by combining larger numbers of modules.
Making Banded Stars

It is possible to make Banded 12-piece and 30-piece Stars based on the familiar modular origami forms, frequently made from Sonobe modules, that I call 8-point and 20-point Stubby Stars. The modules for each star are configured by adding additional creases to the ‘C’ configuration version of the module in the way shown below. All four types of module can be used to make a Banded 8-point Star but only the first three can be used to make a Banded 20-point Stubby Star.

73. Configure the modules like this. 74. Or in the case of the doubly asymmetric module like this.

75. The configured module will look something like this. The pockets are indicated by arrows. The Banded 8-point Star requires twelve modules, three in each of four colours, whereas the Banded 20-point Star requires thirty modules, five in each of six colours. Photos of the finished stars can be found on pages 2 and 3. It is possible to make doubly banded versions of both these stars, which would use forty eight and one hundred and twenty modules respectively. However, I have not made a finished version of either so remain unsure as to whether they would prove sufficiently stable when complete.

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