CLAIMS

What is claimed is:

1. An apparatus for generating downhole fluid pressure pulses, comprising:

a tubular housing defining an internal fluid flow passage and providing a housing wall having an internal surface and an external surface; and

a device for selectively generating a fluid pressure pulse, the device being mounted in an aperture defined in the housing wall and being movable between a retracted position, where the device is seated within the aperture, and a radially extended position, where the device extends at least partially beyond the external surface.

2. The apparatus of claim 1, wherein the aperture extends between the internal and external surfaces of the housing wall.

3. The apparatus of claim 1, wherein, when in the retracted position, the device extends at least partially into the internal fluid flow passage and beyond the internal surface.

4. The apparatus of claim 1, further comprising a mounting block movably disposed within the aperture, wherein the device is mounted to the mounting block and the mounting block moves between the retracted and radially extended positions.

5. The apparatus of claim 4, wherein the mounting block is secured in the retracted position using one or more latch elements.

6. The apparatus of claim 4, wherein the mounting block is secured in the radially extended position using one or more latch elements.

7. The apparatus of claim 6, wherein the one or more latch elements are shearable to permit release of the mounting block for movement from the radially extended position back to the retracted position.

8. The apparatus of claim 1, wherein the device is movable from the retracted position to the radially extended position by imparting an expansion force on the tubular housing at or adjacent the aperture.

9. The apparatus of claim 8, wherein the tubular housing comprises at least one deformation zone configured to deform so that the device can move from the retracted position to the radially extended position.

10. The apparatus of claim 9, wherein the at least one deformation zone defines at least one corrugation arranged to be at least partially extended upon assuming the expansion force.

11. The apparatus of claim 1, wherein the device is movable from the retracted position to the radially extended position via at least one of a pressure differential between the internal fluid flow passage and external to the tubular housing, and application of a mechanical force that serves to move the device.

12. The apparatus of claim 1, further comprising at least one sensor communicably coupled to the device for measuring a downhole parameter, wherein data relating to the downhole parameter measured by the at least one sensor is transmitted to a surface location via fluid pressure pulses generated by the device.

13. The apparatus of claim 12, wherein the downhole parameter is selected from the group consisting of pressure, temperature, a geological feature, density, weight on bit, torque on bit, strain, stress, acceleration, and a wellbore geometry feature.

14. A method, comprising:

introducing a downhole assembly into a wellbore, the downhole assembly including a tubular housing defining an internal fluid flow passage and providing a housing wall having an internal surface and an external surface, and a device mounted in an aperture defined in the housing wall;

conveying the downhole assembly within the wellbore on a tubing string with the device being in a retracted position, where the device is seated within the aperture;

locating the device at a desired position in the wellbore;

operating the device to generate fluid pressure pulses to transmit data relating to at least one downhole parameter to a surface location; and

moving the device from the retracted position to a radially extended position, where the device extends at least partially beyond the external surface.

15. The method of claim 14, wherein moving the device from the retracted position to the radially extended position precedes operating the device to generate fluid pressure pulses to transmit data relating to at least one downhole parameter to a surface location.

16. The method of claim 14, wherein the device is arranged within a mounting block movably disposed within the aperture, and wherein moving the device from the retracted position to the radially extended position comprises moving the mounting block from the retracted position to the radially extended position.

17. The method of claim 16, further comprising securing the mounting block in the retracted position using one or more latch elements.

18. The method of claim 16, further comprising securing the mounting block in radially extended position using one or more latch elements.

19. The method of claim 14, wherein moving the device from the retracted position to the radially extended position comprises:

imparting an expansion force on the tubular housing at or adjacent the aperture; and

deforming at least one deformation zone in the tubular housing in response to the expansion force and thereby moving the device from the retracted position to the radially extended position.

20. The method of claim 14, wherein moving the device from the retracted position to the radially extended position comprises introducing a pressure differential between the internal fluid flow passage and external to the tubular housing.

21. The method of claim 14, wherein moving the device from the retracted position to the radially extended position comprises applying a mechanical force to the device.

22. The method of claim 21, wherein the device is arranged within a mounting block movably disposed within the aperture, and wherein applying the

mechanical force to the device comprises applying the mechanical force on the mounting block.

23. The method of claim 14, further comprising measuring the at least one downhole parameter with at least one sensor arranged in the downhole assembly and communicably coupled to the device, the downhole parameter being is selected from the group consisting of pressure, temperature, a geological feature, density, weight on bit, torque on bit, strain, stress, acceleration, and a wellbore geometry feature.

CLAIMS

What is claimed is:

1. An apparatus for generating downhole fluid pressure pulses, comprising:

a tubular housing defining an internal fluid flow passage and providing a housing wall having an internal surface and an external surface; and

a device for selectively generating a fluid pressure pulse, the device being mounted in an aperture defined in the housing wall and being movable between a retracted position, where the device is seated within the aperture, and a radially extended position, where the device extends at least partially beyond the external surface;

wherein the aperture extends between the internal and external surfaces of the housing wall, and opens on to the internal fluid flow passage.

2. The apparatus of claim 1, wherein, when in the retracted position, the device extends at least partially into the internal fluid flow passage and beyond the internal surface.

3. The apparatus of claim 1, further comprising a mounting block movably disposed within the aperture, wherein the device is mounted to the mounting block and the mounting block moves between the retracted and radially extended positions.

4. The apparatus of claim 3, wherein the mounting block is secured in the retracted position using one or more latch elements.

5. The apparatus of claim 3, wherein the mounting block is secured in the radially extended position using one or more latch elements.

6. The apparatus of claim 5, wherein the one or more latch elements are shearable to permit release of the mounting block for movement from the radially extended position back to the retracted position.

7. The apparatus of claim 1, wherein the device is movable from the retracted position to the radially extended position by imparting an expansion force on the tubular housing at or adjacent the aperture.

8. The apparatus of claim 7, wherein the tubular housing comprises at least one deformation zone configured to deform so that the device can move from the retracted position to the radially extended position.

9. The apparatus of claim 8, wherein the at least one deformation zone defines at least one corrugation arranged to be at least partially extended upon assuming the expansion force.

10. The apparatus of claim 1, wherein the device is movable from the retracted position to the radially extended position via at least one of a pressure differential between the internal fluid flow passage and external to the tubular housing, and application of a mechanical force that serves to move the device.

11. The apparatus of claim 1, further comprising at least one sensor communicably coupled to the device for measuring a downhole parameter, wherein data relating to the downhole parameter measured by the at least one sensor is transmitted to a surface location via fluid pressure pulses generated by the device.

12. The apparatus of claim 11, wherein the downhole parameter is selected from the group consisting of pressure, temperature, a geological feature, density, weight on bit, torque on bit, strain, stress, acceleration, and a wellbore geometry feature.

13. A method, comprising:

introducing a downhole assembly into a wellbore, the downhole assembly including a tubular housing defining an internal fluid flow passage and providing a housing wall having an internal surface and an external surface, and a device mounted in an aperture defined in the housing wall, the aperture extends between the internal and external surfaces of the housing wall and opens on to the internal fluid flow passage;

conveying the downhole assembly within the wellbore on a tubing string with the device being in a retracted position, where the device is seated within the aperture;

locating the device at a desired position in the wellbore;

operating the device to generate fluid pressure pulses to transmit data relating to at least one downhole parameter to a surface location; and moving the device from the retracted position to a radially extended position, where the device extends at least partially beyond the external surface.

14. The method of claim 13, wherein moving the device from the retracted position to the radially extended position precedes operating the device to generate fluid pressure pulses to transmit data relating to at least one downhole parameter to a surface location.

15. The method of claim 13, wherein the device is arranged within a mounting block movably disposed within the aperture, and wherein moving the device from the retracted position to the radially extended position comprises moving the mounting block from the retracted position to the radially extended position.

16. The method of claim 15, further comprising securing the mounting block in the retracted position using one or more latch elements.

17. The method of claim 15, further comprising securing the mounting block in radially extended position using one or more latch elements.

18. The method of claim 13, wherein moving the device from the retracted position to the radially extended position comprises:

imparting an expansion force on the tubular housing at or adjacent the aperture; and

deforming at least one deformation zone in the tubular housing in response to the expansion force and thereby moving the device from the retracted position to the radially extended position.

19. The method of claim 13, wherein moving the device from the retracted position to the radially extended position comprises introducing a pressure differential between the internal fluid flow passage and external to the tubular housing.

20. The method of claim 13, wherein moving the device from the retracted position to the radially extended position comprises applying a mechanical force to the device.

21. The method of claim 20, wherein the device is arranged within a mounting block movably disposed within the aperture, and wherein applying the mechanical force to the device comprises applying the mechanical force on the mounting block.

22. The method of claim 13, further comprising measuring the at least one downhole parameter with at least one sensor arranged in the downhole assembly and communicably coupled to the device, the downhole parameter being is selected from the group consisting of pressure, temperature, a geological feature, density, weight on bit, torque on bit, strain, stress, acceleration, and a wellbore geometry feature.