CLAIMS

WHAT IS CLAIMED IS:

1. A resistivity logging tool module, comprising:

a mandrel with connector sections at each end and a ring support section between the connector sections;

a composite layer disposed around the ring support section;

a set of ring electrodes disposed along the ring support section around the composite layer, wherein the composite layer electrically isolates the set of ring electrodes from the ring support section and wherein at least one of the ring electrodes includes an electrode pin slot aligned with an aperture that extends to an interior of the mandrel; and

an adapter in an isolation joint configuration with one of the connector sections.

2. The resistivity logging tool module of claim 1, wherein the mandrel comprises a male connector section at one end and a female connector section at the other end, and wherein an outer diameter of the ring support section and the male connector section is smaller than an outer diameter of the female connector section.

3. The resistivity logging tool module of claim 1, wherein the set of ring electrodes comprises at least one electrode transmitter ring and at least two electrode receiver rings.

4. The resistivity logging tool module of claim 3, wherein the electrode transmitter ring is wider than the electrode receiver rings.

5. The resistivity logging tool module of claim 1, wherein the set of ring electrodes comprises a plurality of electrode rings and wherein a plurality of bonding rubber rings ~~that~~ separate the plurality of electrode rings from each other.

6. The resistivity logging tool module of claim 45, ~~wherein the set of ring electrodes~~ further ~~comprises~~ comprising a composite ring positioned between two of the bonding rubber rings.

7. The resistivity logging tool module of claim 1, further comprising a plurality of outer layer wraps to provide ~~placed over~~ insulating sections between electrodes of the set of ring electrodes.

8. The resistivity logging tool module of claim 1, wherein the isolation joint configuration comprises:

a dielectric layer between threads of the adapter and threads of a selected one of the connector sections;

a first washer to separate an end of the selected connector section from the adapter; and

a second washer to separate an end of the adapter from the selected connector section.

9. The resistivity logging tool module of claim 8, further comprising a composite layer and a ~~fiber-glass~~fiberglass wrap disposed around the isolation joint configuration.

10. A logging string, comprising:

a multi-module resistivity logging tool having a plurality of modules, each of the modules having:

a mandrel with a connector section at each end and a ring support section between the connector sections;

a set of ring electrodes disposed around its ring support section, wherein at least one of the ring electrodes includes an electrode pin slot aligned with an aperture that extends to an interior of the mandrel; and

a composite layer disposed around its ring support section, wherein the composite layer electrically isolates its set of ring electrodes from its mandrel,

wherein one of the modules of the multi-module resistivity logging tool includes an adaptor in an isolation joint configuration with one of its connector sections.

11. The logging string of claim 10, wherein two of the modules of the multi-module resistivity logging tool are directly coupled to each other without an adaptor.

12: The logging string of claim 10, wherein the adaptor couples its corresponding module to another module of the multi-module resistivity logging tool.

13. The logging string of claim 10, wherein the adaptor couples its corresponding module to a logging string section that is not part of the multi-module resistivity logging tool.

14. The logging string of claim 11, wherein two modules of the multi-module resistivity logging tool are separated from each other by a logging string section that is not part of the multi-module resistivity logging tool.

15. The logging string of claim 11, wherein the different modules of the multi-module resistivity logging tool are configured to perform resistivity logging operations at different frequencies.

16. The logging string of claim 11, wherein resistivity logging operations for the logging string are dynamically configurable based on a map for the multi-module resistivity logging tool.

17. A resistivity logging tool module assembly method, comprising:

obtaining a mandrel with connector sections at each end and a ring support section between the connector sections;

disposing a composite layer around the ring support section; and

moving a set of ring electrodes to a position along the ring support section, wherein the composite layer electrically isolates the set of ring electrodes from the ring support section and wherein at least one of the ring electrodes includes an electrode pin slot aligned with an aperture that extends to an interior of the mandrel.

wherein one of the modules of the multi-module resistivity logging tool includes an adaptor in an isolation joint configuration with one of its connector sections.

18. The method of claim 17, further comprising attaching an adapter to one of the connector sections in an isolation joint configuration and disposing a composite layer around the isolation joint configuration after said attaching.

19. The method of claim 18, further comprising applying a protective wrap around the isolation joint configuration and around insulating ring sections ~~of~~ between electrodes of the set of ring electrodes.

20. The method of claim 17, wherein moving the set of ring electrodes to a position along the ring support section comprises moving two electrode rings and a spacer ring between the two electrode rings, wherein the spacer ring ~~set~~ comprises a composite ring that is positioned between two bonding rubber rings.