Today's Smaller Cables Require Automated Processing
By Pete Doyon, VP Product Management, Schleuniger

The trends in mobile electronics today are smaller, thinner and lighter. Yet, mobile electronic devices, such as cell phones, tablets, portable GPS devices, etc. are more powerful than ever. Applications, like wireless internet connections, RFID and Bluetooth, that have become essential in today's devices, require more complex transmission mechanisms, increasing the requirements for the antenna components mounted inside of the device. In order to meet the need to manufacture smaller devices, while also meeting a growing demand for more powerful next generation wireless devices, smaller cable assemblies and connectors are being developed.

As a result, ultra miniature RF cable assemblies are now quite common. Ultra-miniature RF cable assemblies are used to connect tiny antennas to the circuit board inside mobile electronic devices. The connectors of these RF cable assemblies need to not only have a very low mating height, as to not increase the thickness of the device, but they also need to easily mate and unmate so the device is serviceable.

One of the smallest connector systems currently in use has a mating height of only 1.2 mm! These tiny RF connectors are typically interfaced with a 36 AWG micro-coaxial cable with an outer diameter of 0.81 mm (0.032"). Smaller connector systems with even smaller micro-coaxial cables are already in development and will likely become the new standard soon.

Manufacturers find themselves faced with the challenge of working with and processing these tiny wires and components with the accuracy needed to maintain device reliability and the speed needed to keep up with a growing market.

One of the major challenges for manufacturers working with ultra-miniature cable assemblies is overcoming human error and maintaining consistent precision. The tiny cables need be measured and cut to length within very tight tolerances. Then one or both ends of the micro-coaxial cable must be stripped with up to 3 steps (jacket, shield and center conductor). All of this needs to be accomplished in a high-production environment. Due to the small size of the cable, it has become practically impossible to achieve the required length tolerances with manual work or with semi-automatic tools.

Another challenge manufacturers face is quality control. In many cases, strip lengths and diameters must be viewed, measured and recorded to make sure they are within the required tolerances before terminating. With micro-coaxial cable, this would be extremely complicated and time consuming to accomplish manually. In addition, the use of microscopes or magnifying glasses is not only inefficient, but the quality of such measurements is subject to human error. Instead, a powerful camera with a 360 degree view that automatically measures

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and records the dimensional data is needed to not only guarantee quality, but ensure traceability of the data as well.

Achieving flexibility while maintaining speed also presents a challenge for manufacturers. The end of the micro-coaxial cable must be terminated using an automatic crimping press designed for the specific connector and cable combination being processed. Manufacturers need an automatic machine that can accommodate a wide range of cable sizes and connector types and also allow quick changeover between jobs. The automation platform must be flexible and have space to integrate additional processing steps, such as tinning, window stripping, stacking, etc because transporting the cables between the individual processing steps is also problematic. Even the smallest touch to the cable end can bend and render it unusable. In the worst case scenario this can even result in failure of the end product. Therefore, it is important to have a fully automatic cable assembly system automation system that incorporates all assembly and quality control process steps.

As the need for smaller cable assemblies continues, speed, precision and quality control will be hot topics among manufacturers dealing with ultra-miniature RF cable assemblies. Manual hand tools are no longer sufficient for manufacturing mobile electronic devices, but a fully automatic machine can help overcome the challenges manufacturers face and will save time, money and waste in the long run. Precision, flexibility, high production output and quality monitoring with traceability of data are things that should be considered as manufacturers working with ultra-miniature RF cable assemblies consider future equipment purchases.

After all, the demands on these manufacturers are only expected to grow bigger as devices get smaller.

To Be Precise.

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