

Just-in-Time Device Programming for the Automotive Industry

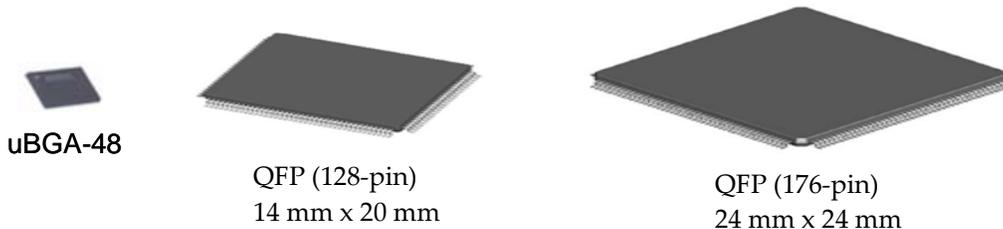
Application Brief / Best Practices

ProLINE-RoadRunner XLF is a new RoadRunner available now for the Automotive industry that programs extra large format microchip devices—up to 32 mm square.

Just-in-Time Device Programming for the Automotive Industry

ProLINE-RoadRunner XLF (eXtra Large Format) is the world's only automated production programming system capable of handling the large geometry devices used by the automotive industry. This high-speed, inline programming system can program Flash memory and microcontroller packages as large as 32 mm square, packaged in 44 mm tape, enabling automotive companies to realize the quality improvements and cost savings available through automated, just-in-time device programming. And because the RoadRunner mounts directly onto Siemens SIPLACE assembly machines, it requires no floor space nor any alterations to the production line—so you can start experiencing the benefits of automated device programming immediately.

geometries. For example, Data I/O's standard ProLINE-RoadRunner can handle devices up to 14 x 20 mm. That's fine for consumer electronics, whose devices typically have limited features and functionality. But the automotive industry requires more sophisticated devices, with broader performance capabilities and more flexibility—and that means larger format devices with space for more input/output connections. For example, the 32-bit CAN microcontrollers used for automotive power train, safety, and body systems (such as electronically controlled windows, door locks, and sun roofs) may need additional pins to detect whether a switch contact is open or closed, provide an analog value to a buffered output, provide switched power to a low-current sensor, or drive a light-emitting diode or the gate of a field-effect transistor. As a result, these devices typically use quad flat packs (QFPs) with 160 pins, or programmable ball grid arrays (BGAs) with 225 solder bumps—as opposed



Automotive Manufacturers Often Require Specialty Programming Solution

Standard inline programming systems can handle only small to medium device

to the typical 48-pin devices used in wireless applications.

Until now, without an inline programming solution capable of handling these extra-large-format devices, automotive manufacturers would either outsource the task to a

programming center or program the devices offline. But these approaches can be expensive, with additional costs to mark and store devices until they are used. Plus the manufacturer's control of valuable intellectual property may be vulnerable. Also, when there are last-minute changes to the code, the device needs to be taken out of inventory, erased, reprogrammed, and returned to inventory — steps that are both time-consuming and costly. Programming at test is an approach occasionally used to minimize impact on inventory, but it can create bottlenecks that slow the production line. And, although buying more automated test equipment can alleviate the bottlenecks, it's very expensive and requires additional floor space that may not be available.

ProLINE-RoadRunner XLF is the Large-Format Solution

When installed on your feeder table, ProLINE-RoadRunner XLF programs your large-format devices immediately prior to placement on the board, enabling you to realize the cost savings available through lean manufacturing. With this inline programming solution, you lower inventory costs, you save the time otherwise spent marking and storing programmed devices, and if the code changes at the last minute, you can quickly and easily input the new code. Plus you retain control over both the programming process and your intellectual property.

How it works. ProLINE-RoadRunner XLF removes programmable devices from a reel, places them in sockets, and programs them with your data. It then places only 100% program verified devices on a conveyor belt and delivers them to the pick point of the placement machine.

Networked operations. ProLINE-RoadRunner XLF has its own IP address, allowing operation through a network

interface as well as locally, and downloading design changes from a PC directly to RoadRunner. Job statistics, saved on a PC card, can be viewed and analyzed remotely as well as enabling you to analyze post-production yields and throughput.

How You Benefit

ProLINE-RoadRunner XLF offers the highest programming quality at the lowest cost per device — and it helps you get your products to market faster. With RoadRunner, you get:

- **Huge savings in inventory management costs**, because devices are programmed on the assembly line and immediately placed on boards, so there is no need to mark and store programmed devices.
- **More streamlined operations**, because there is no need to mark, store, and reprogram devices — and no need to transport them to and from programming centers.
- **Ability to easily make last-minute code and job changes**, because the programming is taking place in your plant, not offsite. The system's intuitive user interface makes it easy to make changes.
- **Floor space savings**, because this RoadRunner mounts directly onto a Siemens SIPLACE assembly machine.
- **Faster throughput** than with programming-at-test. You have no bottlenecks, no need to reduce the number of tests performed in order to keep up with the beat rate of the production line, and no need to purchase additional automated test equipment.

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- **Reduced board scrap costs**, because you are placing only verified devices.

The ProLINE–RoadRunner XLF complements your lean manufacturing strategy—and it supports both small and large device geometries.

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