Performance
Range, availability, and reliability are determined by the capabilities of the communication network. Operating at gigabit speed over the Internet, corporate network or other Ethernet-based network, TapComm provides full functionality of IEEE 1149.1 and related boundary-scan specifications, including the enhanced capabilities of Standards 1149.4, 1149.6, and 1532.

All applications supported by boundary-scan, test-in-system programming, and system-level operation, are fully realized. Furthermore, all of the features of the JTAG Technologies solutions, such as AutoWrite and gang programming, are available. Use of TapComm in a gang programming application is illustrated in Figure 3.

Specifications
For the JTAG TapCommunicator JT 2162 Uplink and JT 2164 Downlink:
1) TAP Interface: See QuadPod electrical specs in the QUADPOD SYSTEM brochure (available from JTAG Technologies sales offices, or downloadable from www.jtag.com).
2) Ethernet interface: compliant with Gigabit or 1000-Mb Ethernet as specified in IEEE Standard 802.3z (1998).

JTAG TapCommunicator Benefits
- Supports use of the existing Ethernet communication channel to a system for remote operation of boundary-scan applications.
- Allows unlimited distance between target and boundary-scan controller without need for range extenders.
- Overcomes harsh environments and other situations where human access to the target would not otherwise be possible.
- Enables sharing of a single boundary-scan controller or a pool of controllers among multiple production platforms.
- Overcomes range limitations of adaptive clocking techniques.
- Supports all brands of boundary-scan controllers.

INTELLIGENT LONG-DISTANCE TAP CONNECTION
Breakthrough in long-distance IEEE 1149.1 applications
Breakthrough in long-distance IEEE 1149.1 applications
INTELLIGENT LONG-DISTANCE TAP CONNECTION

Product Highlights

- Gigabit or 1000-Mb Ethernet (IEEE Std. 802.3z - 1998) communication channel between boundary-scan controller and target.
- Ethernet link provides unlimited connectivity and range for boundary-scan execution (no distance limitation between controller and target).
- Full boundary-scan functionality.
- Supports entire range of TCK frequencies.
- Compatible with all types and brands of IEEE 1149.1-compliant boundary-scan controllers.
- Other communication protocols, such as wireless, can be supported upon request.

Boundary-scan, based on IEEE standard 1149.1, consists of a four- or five-wire electrical interface and control protocol used to communicate between a test system and target. The technique greatly improves testability of complex, high-density printed circuit boards and systems and has been widely incorporated into test strategies throughout the electronics industry.

Until now, the system used to run boundary-scan applications in production or service has had to be located in close proximity to the target. For example, to support far-flung corporate test topologies, it has been necessary to co-locate the boundary-scan controller(s) and targets. Techniques such as manipulation of test clock phase or frequency or the use of repeaters have been offered to overcome the distance limitation, but these approaches often introduce other constraints and are only usable within a limited range.

Now, a breakthrough combination of boundary-scan with a new communications technology, TagSpacer™, delivers unlimited range between controller and target. With TagSpacer, the boundary-scan interface signals are transported over any long-distance communication link, such as the Internet, a wireless telecommunications network, or even a custom network. At each end of the link, protocol conversion takes place between that of the communication link and standard IEEE 1149.1. The target can be as remote from the boundary-scan controller as the communication link allows. In fact, a wide range of new applications can be realized. For instance, it becomes feasible to communicate with a target that cannot be physically accessed, such as a system deployed in a remote area, even one in orbit around the earth.

JTAG TapCommunicator, the first product realization of TagSpacer technology, utilizes the Gigabit or 1000-Mb Ethernet (IEEE Std. 802.3z - 1998) as the communication interface. TagComm™ can be used wherever an Ethernet-based network, such as the Internet or corporate intranet, is available to provide a long-distance, intelligent TAP connection.

Product Overview

JTAG TapCommunicator facilitates remote execution and diagnostics of boundary-scan applications, regardless of distance or intervening environmental difficulties. The system is based on a one-gigabit per second Ethernet connection (IEEE Std 802.3z) providing virtually unlimited range between the controller and target. However, the TagSpacer technology upon which TagComm is based allows any communication link to be used. For solutions using communication links other than Ethernet, contact JTAG Technologies or your sales representative.

As shown in Figure 1, the system consists of an “uplink” or primary module (JT 2143), located in proximity to the boundary-scan controller, and one or more “downlink” or secondary (JT 2144) modules at the target. Within the uplink, protocol conversion translates data transmissions between IEEE Std. 1149.1 for boundary-scan and the Ethernet communication format in use between the locations.

At the end of the channel near the target board or system, the reverse conversion takes place, resulting in a standard boundary-scan input to the target. Although a single uplink can connect to multiple downlinks, only one such connection at a time is supported. Signal integrity is as robust as that of the network itself, typically including fault detection and re-transmission.

Applications

All applications that require access to the boundary-scan chains without physical proximity (e.g. application execution where human access is not possible) can be supported by TagSpacer technology. Examples of the range of new applications made possible by the Ethernet-based TapComm are:

Remote system control: Test or Service departments may wish to test or re-configure target systems after deployment. In many cases, access to such systems may be difficult or impossible due to the distance or environmental conditions involved or logistical benefits may be the driving factor. TagComm, with the primary uplink at the test system communicating with the secondary downlink at the target via any communication link (e.g. corporate network), provides full remote boundary-scan access for test and diagnostic purposes and re-configuration.

Environmental testing: Boundary-scan is a very effective screen for faults in a target board or system, which may be manifested under environmental stress conditions, as in HALT and HASS testing. Use of TapComm permits the boundary-scan controller to be located at any distance from the test chamber and target, allowing testing to be controlled and monitored externally and even remote from the test chamber.

Factory with multiple production lines: Often a manufacturing facility will have multiple production lines, each with a dedicated in-circuit test (ICT) system. Using JTAG Technologies’ integration solutions such as Symphony, boundary-scan can easily and efficiently be combined with the ICTs for enhanced test coverage. In such cases, it may be economically and logistically beneficial to run boundary-scan applications on the production testers from a single boundary-scan system or a small number of systems by means of TapComm. This application is illustrated in Figure 2.

Contract manufacturer with different brands of boundary-scan controllers: Contract manufacturers often have legacy test systems consisting of a variety of boundary-scan controllers. CMs can now attain commonality on the production floor using TagComm to establish Ethernet connectivity from every controller, regardless of brand, to any of the secondary downlink modules co-located with the production testers. The manufacturer gains flexibility in optimizing the configuration of boundary-scan test systems and production lines. For example, all brands of boundary-scan systems (controllers) can be made available on all ICT systems with only one controller of each brand.

Repair depot applications: A single boundary-scan controller at a central location connected by TapComm to multiple remote service facilities around the world will reduce drastically maintenance costs.

Figure 1. Remote operation via various communication links including Ethernet