



# Product Brief

## Firmware Foundry™

**Accelerate development of your storage devices and subsystems**

Firmware Foundry™ provides storage OEMs bringing to market both hardware and software offerings with a dramatically faster time to market option for the firmware portion of their product while at the same time reducing schedule risk and ensuring product quality and stability. The embedded firmware in any storage device must carefully comply with all SCSI based standards, making firmware an almost impossible way to differentiate your product in the marketplace – unless you do it wrong. The resultant quality lapses and delayed time to market will certainly differentiate their products.

Much like operating systems, compilers and BIOS represent the most fundamental layers of software in a PC, the embedded firmware generated with the Firmware Foundry™ provides the most fundamental software layer of any storage related product. Embedded storage firmware has joined many other component categories like BIOS, operating systems and compilers as system components that are consistently bought, not built from scratch each time.

Get your disk storage subsystems, tape products, and media changers to market faster using Breakthrough Systems' Firmware Foundry™. Leveraging the Firmware Foundry™, you eliminate man years of costly development time so you can deliver your products to customers faster and more cost effectively than your competition. Breakthrough Systems uses the Firmware Foundry™ based on your system specifications to provide you with pre-tested firmware for a complete working prototype SCSI-3 target.

The Firmware Foundry™ supports custom embedded hardware controllers as well as commodity hardware.

Firmware Foundry™ is comprised of object based feature sets and architected interfaces around such features as:

- Transport protocol
- SCSI command processing
- Operating system primitives
- Hardware component interfaces
- SCSI IO task management
- Device emulation and virtualization

### Reduce costs, development time and risk

- Reduce your time to market for storage products by accelerating your development and test schedule
- Reduce your firmware development and test costs for storage products
- Reduce troubleshooting time and expense: SCSI high-level protocols are pre-tested for conformance to standards
- Reduce your risk of misinterpreting SCSI standards requirements – avoid schedule delays and additional costs
- Reduce your maintenance costs over your product's lifetime

### Features

- Choice of SCSI, FC SCSI, iSCSI, SAS and SATA Target Mode Drivers for QLogic ASIC and HBA interface products – See [www.breakthroughsys.com/Interoperability Matrix/](http://www.breakthroughsys.com/InteroperabilityMatrix/) for full listing.
- Most CPUs supported (x86, ARM, PowerPC, i960, 68xxx, MIPS, SPARC, etc.)
- Most Embedded Operating Systems supported (VxWorks, Linux, etc.)
- SCSI device-type-specific command set included (e.g. tape, disk, medium changer)
- Full standards-compliant implementation of most SCSI commands - Mode Sense/Mode Select, Inquiry VPD pages, etc.

- Full-featured DMA memory management and data transfer API's
- Includes installation and testing on your hardware controller
- Includes basic interface verification and plug and play testing
- Full ANSI C source code available

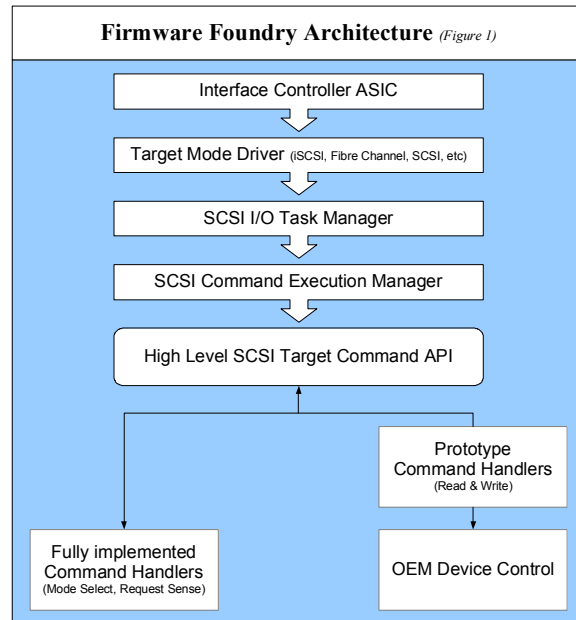
## Options

- Advanced multi-port, multi-target, multi-LUN multi-logical unit, multi-unification support
- SCSI virtual device manager, API, and GUI
- Device configuration parameter manager (with Mode Select and NVRAM interface)
- High-performance SCSI I/O accelerator provides maximum data transfer throughput for disk and tape devices
- Fibre Channel SANmark certification testing
- Full plug and play testing: OS level, application level
- Interoperability testing: Windows, Solaris, Linux

## Product Description

The Firmware Foundry™ includes code for the processing required by the SCSI high-level transport. It also implements the requirements of SCSI-3 I/O task management and the portions of the SCSI-3 commands that are independent of the actual device-control hardware.

The Firmware Foundry™ makes available C source code for all required SCSI data structures and data types, as well as device-type-independent command handlers and device-type specific command handlers. With the Firmware Foundry™, your total SCSI target firmware development effort is reduced to the implementation of the OEM product specific

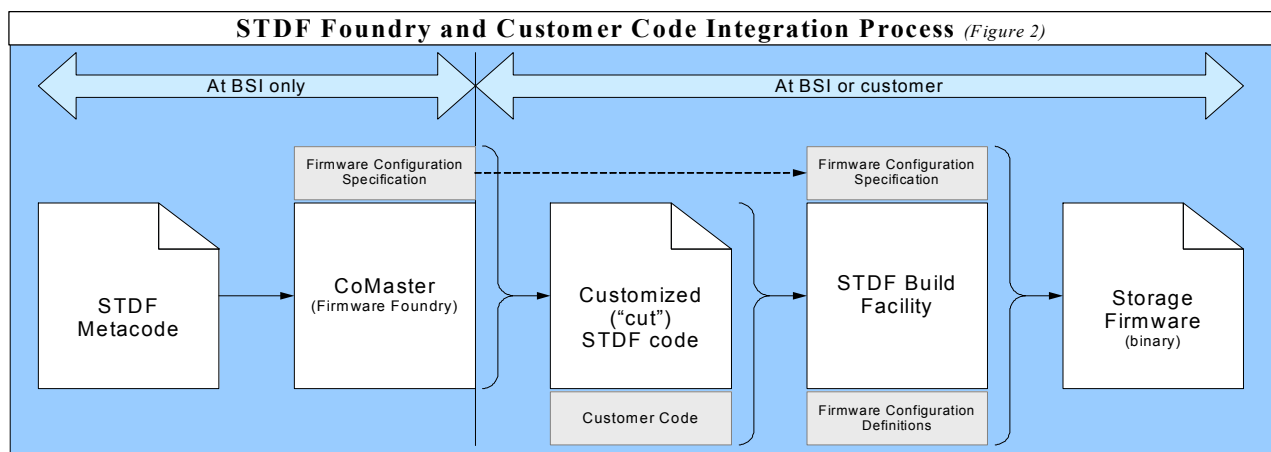


portions of the SCSI command handlers and the hardware-specific control modules. (see Figure 1)

## OEM Embedded Controller Development

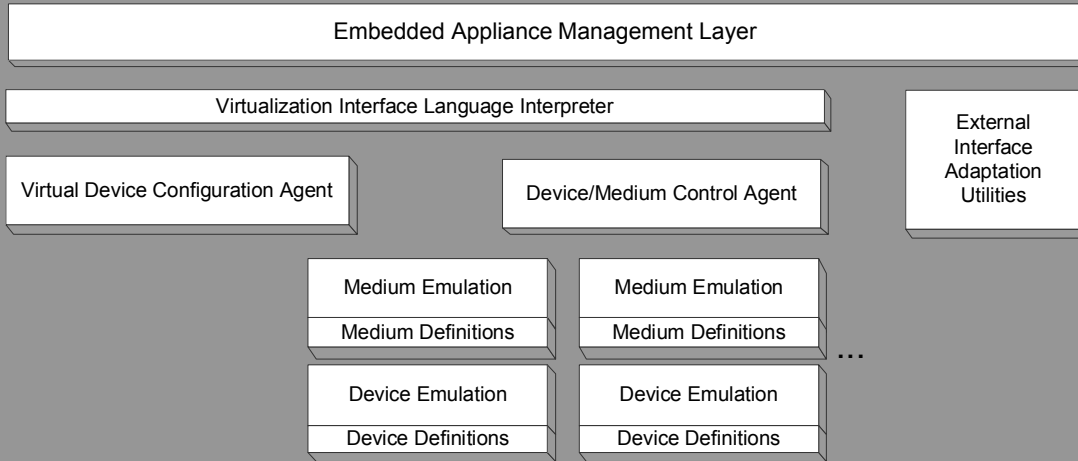
After we receive your order, BSI delivers the SCSI device-specific Firmware Foundry™ OEM Target Workbench installed on the controller prototype you supply. The Workbench provides all the architecture, prototype command handlers, and simulated SCSI interface so your firmware team can begin immediate design, implementation and testing of the SCSI command handlers and device control code – months before the actual hardware controller with interface ASIC is completed.

Your team then simply links in the Breakthrough Systems interface ASIC-specific SCSI target mode driver (instead of or in addition to the Workbench code) combined with your custom device code to form the full SCSI target firmware for your custom controller. (see Figure 2)

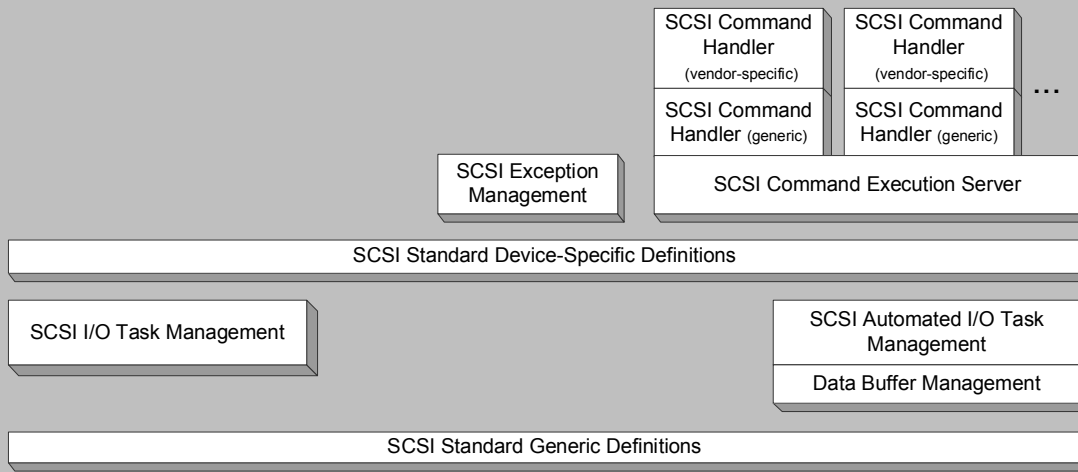


# Firmware Foundry Meta Code Tiers

**Tier 3**  
products  
Storage  
Appliances



**Tier 2**  
products  
Storage  
Devices



**Tier 1**  
products  
Target  
Mode  
Drivers

