



Sinneslöschen

SYSTEMS CORPORATION

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TECHNICAL BULLETIN

Mixed SSB Configuration Requirements

SSB-1 / SSB-2 / SSB-2E / PCI-SSB Integration

Document Number: TB-98-011
Revision: A
Issue Date: March 24, 1998
Applies To: Supported mixed-generation SSB installations
Related Hardware: SL-9816 PCI / SSB Peripheral Bridge
Distribution: Customer / OEM / Authorized Service

This bulletin consolidates mandatory configuration requirements for installations that combine SSB hardware from more than one bus generation, or that connect established SSB equipment to a PCI host through the SL-9816 bridge. It supplements, but does not replace, the applicable compatibility guide, termination note, system manual or service record.

IMPORTANT

A mechanically compatible module is not proof of electrical or timing compatibility.
Do not alter an installed mixed-generation system without first recording its complete configuration.

Document Control and Revision Notice

TB-98-011 is issued as Revision A on March 24, 1998. It consolidates field and engineering guidance for mixed-generation SSB configurations that had previously been distributed through individual product manuals, service correspondence and installation notes.

Applicability

- SSB-2 modules installed in SSB-2E chassis.
- Selected SSB-1 modules retained in later SSB systems through approved adapter arrangements.
- SSB installations connected to PCI host systems through the SL-9816 PCI / SSB Peripheral Bridge.
- Systems in which timing, termination or slot-position restrictions are part of the approved configuration.

Related Documents

Document	Title	Use
RM-SSB2E-04	SSB-2E Compatibility Guide	Primary module and chassis compatibility reference
AN-SSB-17	SSB Termination Requirements	Electrical termination and waveform verification
TB-95-028	Legacy Timing Notes	Selected SSB-1 timing restrictions
DS-SL9816-01	SL-9816 Data Sheet	Bridge hardware requirements

Control requirement: This bulletin does not authorize a configuration that is identified as unsupported in the applicable compatibility guide or system-specific service documentation.

1. Purpose and Scope

Mixed-generation SSB systems exist primarily because Sinneslöschen equipment is maintained for long service life. In a qualified installation, older interface or acquisition modules may remain useful after the host processor, chassis or adjacent modules have been replaced. The resulting system can be reliable, but only when electrical loading, bus timing, address allocation and termination remain within documented limits.

This bulletin defines the minimum checks required before modifying such a system. It applies to customer maintenance, OEM integration, field service and migration projects. It is not a substitute for an approved system configuration record.

Configuration Elements That Must Be Recorded

- Chassis model and SSB generation.
- Every installed module type, revision and slot position.
- Address and interrupt assignments.
- Timing modules, compatibility adapters and bridge devices.
- Termination hardware and physical end points.
- System software, SSB Configuration Utility version and any OEM-specific driver set.
- External cables or expansion assemblies that form part of the SSB electrical path.

What This Bulletin Does Not Cover

- Mechanical repair of damaged backplanes.
- Component-level repair of SSB modules.
- Unapproved third-party modules.
- SSB systems whose original service documentation identifies the installation as customer-specific and non-field-configurable.

2. Configuration Classification

Use the following matrix to classify the installation before any hardware is moved. The classification determines which documentation must be consulted and whether additional timing or adapter hardware is expected.

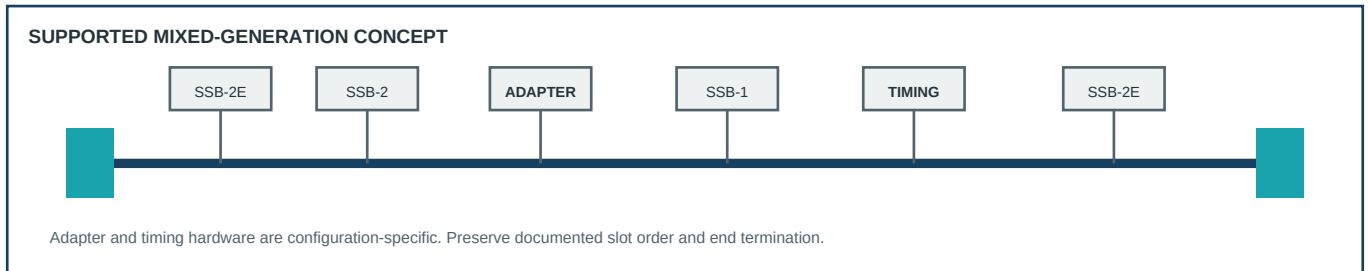
Class	Host / Chassis	Installed Hardware	Minimum Requirement
A	SSB-2E	SSB-2E only	Standard SSB-2E rules
B	SSB-2E	SSB-2 + SSB-2E	Compatibility Guide verification
C	SSB-2E	Selected SSB-1 + later modules	Approved adapter + timing/termination review
D	PCI host via SL-9816	SSB-2 / SSB-2E	Bridge configuration + SSB verification
E	PCI host via SL-9816	Includes SSB-1	Bridge + approved legacy adapter configuration
F	Any	Unknown / undocumented module revision	Do not modify until identified

Classification Notes

Class A is included for comparison only; this bulletin is principally concerned with Classes B through E. A system containing only SSB-2E hardware may still require termination and slot verification when a chassis, cable or module position is changed.

Class F: If an installed module cannot be identified by the configuration utility, inspect the physical label and hardware revision. Do not infer compatibility from connector fit or from a visually similar board.

3. Supported Mixed-Generation Arrangements



The preferred mixed-generation arrangement keeps later-generation modules on the standard SSB-2E electrical path and introduces legacy hardware only through the approved compatibility arrangement documented for that module revision.

General Requirements

- SSB-2E chassis must retain approved end termination.
- SSB-2 modules must be listed as compatible for the chassis and system timing mode in use.
- SSB-1 modules require explicit support documentation; no blanket SSB-1 compatibility is implied.
- Compatibility adapters must remain associated with the module or module group for which they were installed.
- Timing modules must remain in the documented slot or logical position unless a service bulletin specifically authorizes relocation.

Unsupported Practices

- Installing a legacy module in an electrically convenient empty slot without reviewing slot restrictions.
- Removing a timing module because diagnostics appear to pass at idle.
- Substituting a later terminator assembly for an SSB-1 termination network without documentation.
- Operating a mixed-generation system after module order has changed but before a complete diagnostic pass.

4. SSB-1 Modules in Later Systems

SSB-1 predates the revised timing, identification and bus-mastering behavior introduced with SSB-2. Selected SSB-1 modules can remain in later systems, but support is revision-specific. The presence of an SSB-1 compatibility adapter does not by itself make every SSB-1 module acceptable.

Mandatory Checks

Item	Requirement
Module revision	Must match a supported revision in RM-SSB2E-04 or system-specific documentation.
Adapter	Use the approved SSB-1 compatibility adapter arrangement.
Timing	Install the timing hardware identified for the configuration.
Slot	Observe restricted slot positions and adjacency rules.
Interrupts	Verify interrupt level and mapping; do not assume later defaults.
Identification	Record labels manually if electronic identification is incomplete.

Legacy Timing Behavior

Some SSB-1 modules acknowledge transfers later than current modules and may hold bus-control signals for longer intervals. In a mixed system, the approved timing module or bridge configuration provides the necessary margin. Removing that margin can produce failures that occur only under sustained traffic or at temperature extremes.

A system that boots successfully is not necessarily a qualified mixed-generation system. Complete the sustained-transfer and interrupt tests defined later in this bulletin.

5. SSB-2 Modules in SSB-2E Chassis

SSB-2 and SSB-2E are closely related, and many SSB-2 modules remain supported in SSB-2E installations. Compatibility is nevertheless determined by module revision, bus-master behavior and system timing requirements.

Commonly Supported Conditions

- Peripheral and interface modules that do not depend on SSB-2-only arbitration behavior.
- Modules whose interrupt and address ranges can be represented by the SSB-2E configuration utility.
- DMA-capable modules listed for the installed chassis revision.
- Modules operated within the transfer mode and loading limits specified in RM-SSB2E-04.

Conditions Requiring Review

- Multiple bus masters.
- High sustained DMA traffic.
- Long or expanded backplanes.
- Mixed SSB-2 and SSB-1 modules in the same chassis.
- Modules with early hardware revisions or incomplete electronic identification.

Recommended Practice

When replacing an SSB-2 host controller with a later host or PCI bridge, preserve the original peripheral slot order until the system has passed verification. Modernization should not be combined with unnecessary module relocation.

6. Timing Module Requirements

Timing modules are used in selected mixed-generation installations to preserve transfer timing for hardware whose response characteristics differ from the current SSB-2E baseline. They are part of the approved configuration and are not optional accessories.

Condition	Timing Review
SSB-2E only, standard chassis	Normally not required beyond standard chassis rules.
SSB-2 + SSB-2E	Required when listed for module revision or multiple bus-master configuration.
Any supported SSB-1 module	Required unless system documentation explicitly states otherwise.
SL-9816 + SSB-2E	Use bridge timing profile defined for the chassis.
SL-9816 + legacy modules	Bridge profile plus legacy timing requirements.

Installation Rules

- Do not move a timing module solely to free a preferred slot.
- Do not substitute a timing module from another system unless the part and revision are approved for the target configuration.
- If the timing module is removed during service, mark its original slot before removal.
- After replacement, verify sustained transfers and interrupt service under representative system load.

Field note: Intermittent mixed-generation faults are often caused by configuration drift - a system that has accumulated undocumented module moves, replacement revisions or termination changes over many years.

7. Termination Requirements

All mixed-generation configurations remain subject to the electrical termination rules in AN-SSB-17. The presence of an adapter, timing module or PCI bridge does not eliminate the requirement to terminate the SSB electrical path at the correct physical ends.

Minimum Verification

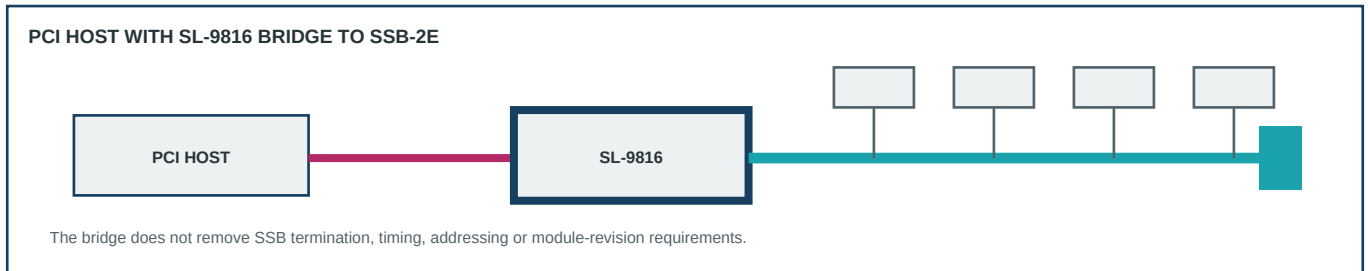
- Identify both physical ends of the complete SSB path.
- Confirm approved terminator assemblies or legacy networks are present at those ends.
- Check that no additional terminator has been installed on an interior slot or branch.
- If an expansion interconnect is present, treat both chassis sections as one electrical path unless the system manual identifies isolated segments.
- After a chassis or cable change, inspect signal quality at the most distant loaded receiver where practical.

Symptoms of Incorrect Termination

Symptom	Possible Result
Intermittent module enumeration	Reflections or receiver threshold errors during configuration reads.
Errors only under DMA load	Ringing becomes significant during sustained edge activity.
Failure changes with slot position	Electrical path or stub length is influencing margin.
Cold-start fault that clears after retry	Borderline timing/threshold behavior; investigate before returning to service.

For waveform examples and chassis-specific termination procedures, refer to AN-SSB-17.

8. SL-9816 PCI / SSB Bridge Configurations



The SL-9816 permits supported SSB equipment to remain in service when the original host architecture is replaced by a PCI-based system. It translates addressing and interrupts and provides DMA and diagnostic access, but it does not make legacy modules independent of SSB electrical requirements.

Bridge Configuration Checklist

- Verify SL-9816 hardware revision.
- Select the documented SSB timing profile for the attached chassis.
- Record SSB generation and module inventory before installing the bridge driver.
- Verify address translation windows and interrupt mapping.
- Use approved adapters for selected SSB-1 hardware.
- Run the bridge diagnostic before loading the customer application.

Software Requirement

Use the current SL-9816 Windows NT support files for new installations unless an established validated system specifically requires an earlier release. Existing production systems should not be updated solely to obtain newer utilities.

A successful PCI device enumeration confirms only the host-side bridge connection. It does not verify the attached SSB module set.

9. Module Placement and Slot Restrictions

Slot position can affect timing, termination, address configuration and cooling. The following rules apply unless superseded by a system-specific configuration record.

Rule	Requirement
End slots	Do not use a termination position for an ordinary module unless the chassis documentation explicitly permits it.
Legacy modules	Keep selected SSB-1 modules within approved slot ranges.
Timing hardware	Retain documented slot position.
High-current modules	Observe chassis loading and spacing requirements.
Bus masters	Follow adjacency and slot restrictions in the compatibility guide.
Empty slots	Do not assume an empty slot is electrically equivalent to the source slot of a relocated module.

Relocation Procedure

- Print or save the current SSB configuration report.
- Label module, revision and original slot.
- Confirm the destination slot is approved.
- Move only one module at a time.
- Power up and run enumeration, interrupt and transfer diagnostics.
- Update the service record after successful verification.

If the system fails after relocation, return the module to its original documented position before making additional timing or termination changes.

10. Power, Loading and Environmental Considerations

Electrical compatibility does not guarantee adequate power or thermal margin. Long-lived systems may contain later replacement modules with different current consumption, airflow or temperature characteristics than the original configuration.

Power Review

- Verify chassis supply ratings against the complete installed module set.
- Confirm the service record after replacing a power supply with a later revision.
- Inspect connector heating or discoloration in high-current systems.
- Do not use an otherwise compatible module if the chassis power budget is exceeded.

Thermal Review

- Maintain required blank panels and airflow paths.
- Observe module spacing requirements where specified.
- Check fan and filter condition before interpreting temperature-related bus errors.
- For extended-temperature installations, perform verification after the system reaches representative operating temperature.

Long-Service Installations

A mixed-generation system may have accumulated power-supply, fan, backplane or module replacements over many years. Qualification is based on the present physical configuration, not solely on the original system model number.

11. Configuration Software and Firmware

Use software tools as a verification aid, not as a substitute for the physical configuration record. Earlier hardware may not identify itself completely, and customer-specific modules may report only generic information.

Tool / Component	Requirement
SSB Configuration Utility 2.6	Preferred for supported SSB-2 and SSB-2E systems.
SSB Diagnostic Toolkit 2.4	Authorized service / OEM use for low-level bus tests.
SL-9816 support files	Required for PCI bridge configuration under Windows NT 4.0.
Legacy OEM drivers	Retain where validated; do not replace without compatibility review.

Configuration Reports

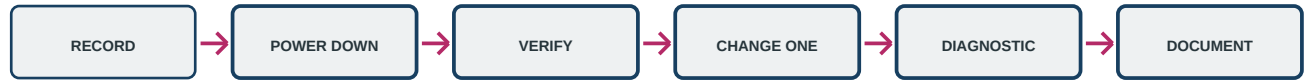
A configuration report should be generated before and after a hardware change. Compare module identification, slot number, address, interrupt assignment and reported timing mode. Any unexpected difference must be resolved before the equipment is returned to service.

Unknown Modules

If a module is displayed as unknown or generic, record the physical label and hardware revision manually. Do not assign a substitute identity in the software merely to clear a warning.

12. Installation and Verification Procedure

CHANGE CONTROL / VERIFICATION SEQUENCE



Do not combine module relocation, termination changes and timing changes in a single troubleshooting step.

Pre-Service

- Obtain the current system configuration and applicable documentation.
- Record all modules, revisions, slot positions and termination hardware.
- Confirm the proposed change is supported.
- Create or retain a copy of the existing software configuration report.

Hardware Change

- Remove power using the system service procedure.
- Make one planned configuration change.
- Verify adapters, timing hardware and terminators before power is restored.
- Inspect seating, connectors and cable routing.

Post-Service Verification

- Run module enumeration.
- Verify addresses and interrupts.
- Run sustained transfer testing appropriate to the changed module.
- Exercise DMA and bus-master functions where applicable.
- Check application startup and representative operating load.
- Update the service record and configuration report

If the system fails verification, restore the last documented configuration before attempting a second independent change.

13. Troubleshooting Mixed-Generation Faults

The following symptoms are frequently associated with configuration errors rather than failed modules. Troubleshoot against the documented baseline and change only one variable at a time.

Symptom	Check First	Then
Module missing after warm start	Seating / identification	Address conflict, timing margin
DMA errors under load	Timing profile	Termination, bridge configuration
Interrupt storms	Interrupt mapping	Legacy module revision / adapter
Fault changes when module is moved	Slot restriction	Termination / stub effects
Bridge visible, SSB devices absent	SL-9816 SSB-side config	Termination and chassis power
Intermittent errors at temperature	Airflow / supply	Timing margin and termination

Do Not Diagnose by Substitution Alone

Replacing a legacy module with another revision can change timing or loading enough to hide the original problem. A temporary improvement after substitution does not establish that the removed module was defective.

When to Contact Technical Support

- The required configuration is not listed in RM-SSB2E-04.
- A customer-specific module has no surviving compatibility record.
- Multiple bus masters are involved and timing mode is uncertain.
- The system cannot be restored to a known documented baseline.

14. Compliance Checklist and References

Before returning a modified mixed-generation SSB system to service, confirm each applicable item below.

Check	Complete
System model, chassis generation and current configuration recorded	[]
Every module type, revision and slot position recorded	[]
Compatibility verified in RM-SSB2E-04 or system-specific record	[]
Required SSB-1 adapter installed and documented	[]
Required timing hardware installed in approved position	[]
Termination verified per AN-SSB-17	[]
SL-9816 profile / driver verified where applicable	[]
Addresses and interrupts verified	[]
Sustained transfer / DMA test completed where applicable	[]
Application-level operation checked under representative load	[]
Updated configuration report retained with service record	[]

Reference Documents

Document	Title
RM-SSB2E-04	SSB-2E Compatibility Guide
AN-SSB-17	SSB Termination Requirements
TB-95-028	Legacy Timing Notes
DS-SL9816-01	SL-9816 PCI / SSB Peripheral Bridge Data Sheet
RM-SL9816-01	SL-9816 Reference Manual

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