

Intel® Boot Agent for Gigabit

Version 1.3.72

Release Notes

03/07/2011

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1. Intel Boot Agent release 1.3.72 Release Notes

1.1.1 *Gigabit release –Build date 10/26/2010*

1.1.2 General

This release corrects some issues with the 82579 and 82580 related to detection of a bad cable and automatically reducing link speed to compensate, as well as resolving an issue with the 82571 SPI access during a BMC reset.

This release of the Intel Boot Agent is written to the PCI Firmware Specification Revision 3.0 (referred to as PCI 3.0 BIOS in this document). This provides the following advantages;

- Better memory management. It is possible to load the Boot Agent into low memory (below 640K) at initialization time (POST).
- Support for more than one PCI ID. The Boot Agent image supports multiple PCI device ID's via the PCI Data Structure Device List Pointer, allowing for more flexibility by allowing one BIOS option ROM image to be shared between multiple device IDs.

Even though written to the PCI 3.0 BIOS specification, the Intel Boot Agent image can still be used in PCI 2.X BIOS implementations, although the advantages of PCI 3.0 will not be available in the PCI 2.X environment.

This release is backwards compatible with the 82580, 82577, 82578, 82579, 82574L, 82576, 82567LM, 82567LF, 82575, 82566DC, 82566DM, 82573 E, 82573 V, 82573 L, 82571EB and 82571EI, 82541GI lead-free, 82541PI, 82541GI, 82547GI, 82546GB, 82545GM, 82541EI & 82547EI, 82540EM, 82545EM & 82546EB and the 82544 Gigabit Ethernet Controller families. It provides only PXE capabilities; RPL is no longer supported as a boot protocol. Please see the Incremental Change Document for changes in this version. This image cannot be used for Intel Fast Ethernet LAN controllers or 10 gigabit controllers – please use Intel Boot Agent for Fast Ethernet version 4.2.03 or above for 10/100 devices, and the Intel Boot Agent for 10 Gigabit PCIe controllers version 2.1.71 or above for 10 gigabit PCIe controllers.

The BootUtil Utility is used to program adapters and is distributed as part of the Intel PRO Networking software releases, **but for LOM implementations, the IBABuild utility must be used to generate the Gigabit Intel Boot Agent image of type and device ID to match the device ID programmed into the EEPROM. See section 1.1.5 for details.**

1.1.3 Known Issues

- Upgrading Microsoft Windows 2000 Remote Installation Service (RIS) to include new drivers requires additional updates to the RIS server. There is information on setting up a RIS server on the Intel support web site - <http://www.intel.com/support/network/sb/CS-028856.htm>.

- Customers may notice the link light turning on and off during the PC boot cycle. The link light turns off at (approximately) PXE initialization. This is normal behavior. The link light then turns back on when the drivers are loaded for it. This driver can be the driver loaded by the Intel Boot Agent, or the network driver loaded by an operating system.

- Legacy free PCs: Intel has investigated a boot failure with platforms that do not have a floppy disk drive installed. In some scenarios, the diskette image fails to load from the PXE server when using a Windows 98 or Windows 95 boot image. Intel has not seen any failures booting with a DOS 6.22 boot image. The issue has been traced to the Network Bootstrap Program downloaded from the Intel PXE server included in the Intel IAL PXE PDK. This issue would likely affect other PXE servers based on that same toolkit. To work around this, either use DOS 6.22 formatted floppy images, or contact your commercial PXE vendor for an updated Network Bootstrap Program.

- When using a shared flash, such as used with the ICH8, ICH9, ICH10 or PCH, the entire EEPROM image area, including the boot agent configuration words, must be duplicated to allow for both an active and an inactive copy of the EEPROM image. This is to allow the EEPROM image update code to erase and then program the inactive area, mark it active, and mark the previously active copy as inactive. If there are not enough blocks of flash memory available to maintain both copies, when the boot agent or software tools write to the flash it may cause the EEPROM image to become corrupt and render the LAN device unusable. Note that each area must be at least 4KB in size and at least as large as the flash device sector erase size. For example, if the flash has a 64KB erase size, you will have to allocate at least 128KB since when the update process erases the inactive area, that's the smallest size it can erase.

1.1.4 Fixed Issues

-1.3.72 fixed an issue with excessive time delays in detection of bad or missing wire pairs and automatic link speed reduction on the 82579 and 82580. The excessive time delays could cause PXE to time out before completion. It also fixed an issue with the SPI flash access on the 82571 that could potentially happen during a reset issued by a BMC.

-1.3.71 corrected a display issue with BootUtil, added support for i350 silicon, and corrected a problem where APITEST could not get an IP address over DHCP.

-1.3.65 added support for a new format for the NIC PBA number stored in the EEPROM.

-1.3.64 corrected a problem with custom LED's on the 82579, and fixed an issue that, under rare conditions, could cause an 82575 or 82576 controller to hang in an endless loop.

-1.3.63 Added support for the 82579 PHY.

-1.3.53 Added support for PCI ID 0x1525 for the combination of the ICH10D south bridge and the 82567V PHY.

-1.3.52 Corrected problems with the 82577 and 82578 where the Windows driver, when shutting down, might leave the PHY in a state improper for PXE operation, and fixed a problem with 82576 SERDES operation.

- 1.3.51 corrected a problem where the base code could not properly handle multiple copies of option 43, which is required in the case of very large PXE boot menus. This issue was inadvertently introduced in version 1.3.36 when a change was made to resolve an earlier issue (PXE boot fails if DHCP option 43 is present but option 60 is not).
- 1.3.50 added support for the 82580 family of network controllers. This family features up to 4 ports per controller, and PXE can operate on these devices without I/O ports, whereas all previous generations of controllers require I/O mode to be enabled.
- 1.3.40 Added code to detect cable presence and, if cable is attached, allow extra time for the PHY to downshift if a bad wire pair is detected.
- 1.3.39 Assembly shared code was not reading wakeup register during HW reset on 82577 due to porting error from C shared code. Removed PHY type check and always read the register for 82577.
- 1.3.38 Last minute PHY tuning changes for 82567/81568 NVM changes conflict with other workarounds in assembly shared code, but only at speeds below gigabit. Removed the PHY tuning code and reordered the K1 disable to occur after the PHY is reset.
- 1.3.37 Improvements for the 82577 and 82578 from were imported to the general driver base code into the UNDI driver. Also, SERDES interface support for the 82576NS controller was added.
- 1.3.36 Fixed an issue that would cause PXE to fail and report no DHCP offers if GP-129 WoL was enabled on the Piketon platform, and a “PXE-E61: Media test failure” seen on the Piketon platform with some versions of AMT. A code path affecting all devices that would cause PXE to fail if option 43 was present was corrected, and a link issue affecting the PRO/1000 MF server adapter only was fixed.
- 1.3.35 added support for the Calpella and Piketon PCH based systems, featuring the 82577 and 82578 networking interface. It also fixed an issue that would cause the 82576 SERDES designs to fail by adding additional delays to insure the device had time to complete autonegotiation.
- 1.3.31 Fixed a problem with the 82575 controller that could result in a malformed TLP packet being sent, and a problem with ICH9 –based systems that could cause spurious NVM checksum failures. Also, support for new versions of the 82576 controller were added.
- 1.3.27 Fixed a problem where ECC protection was not on by default on 82571EB controller.
- 1.3.24 Fixed a slow performance issue that resulted from excessive TFTP retries. This issue was seen primarily on Montevina platforms, but could potentially happen on other platforms.
- 1.3.21 Fixed an issue that could cause speed and duplex settings port map to be swapped on an 82575-based adapter
- 1.3.20 Added support for the 82576 controller, and for the ICH10D southbridge when used with any member of the 82567 LAN PHY component.
- 1.3.10 added support for the ICH10 and ICH10R southbridge when used with any member of the 82567 LAN PHY component.
- 1.3.00 added support for the PCI 3.0 BIOS environment, and added support for the ICH9m Southbridge when used with any member of the 82567 LAN PHY component family. Also added the ability to force speed and duplex via NVM settings for ICH8 and ICH9 systems.

- 1.2.70 added support for the Intel® Gigabit VT Quad Port Server Adapter and the Intel® Gigabit PT Quad Port Server ExpressModule
- 1.2.60 added support for the 82575 network controller.
- 1.2.50 added support for the ICH9 desktop platform (Bearlake), and the ICH9-specific ID's for 82566DM, 82566DC and 82562V LAN PHY components.
- 1.2.45 added support for the ICH8 mobile platform (Santa Rosa) as well as the rest of the 82562 10/100 LCD components used in conjunction with ICH8 and the Bolton and Kingsport LP quad-port adapters; also addressed was an issue with possible incorrect routing of DHCP packets when certain DHCP relay agents were configured in the network and the addition of more diagnostic information on the CTRL-S setup menu screen. Also, support for the RPL remote boot protocol was removed.
- 1.2.42 added support for the PRO/1000 PT Quad Port Server Adapter, and changed the number of DMA transfer transactions that can be performed sequentially on the ICH8 South Bridge from 4 to 3 to avoid a potential timing issue that could cause a packet to be sent with a CRC error.
- 1.2.40 added ICH8 IDs for 82566DC, 82566DM and 82562V, and added a fix for an issue that could cause an ICH8 system to hang during POST if previously powered off by an unexpected loss of AC power, or by pressing and holding the power button until the system power is forced off.
- 1.2.31 added Gigabit device IDs.
- 1.2.26, 1.2.22, 1.2.19 and 1.2.17 include several changes, documented in the Incremental Change Document.
- 1.2.16 includes changes to the RPL module, which was previously larger than it needed to be, and requested more memory at boot time that it needed.
- 1.2.15 implements an improvement for the transmit amplitude for 82541EI. This change is only needed for production 82541EI manufactured before WW20'03. Some minor changes have also been included to improve the general robustness of the Boot Agent – see Incremental Change Document for full details.
- 1.2.11 addresses a minor omission in the Option ROM loader code that meant that the 1018h device ID would not work correctly.
- 1.2.10 fixes an issue where the link light was not blinking to indicate network activity for the 82541EI & 82547EI.
- 1.2.07 provides support for new device IDs
- 1.2.05 provides improved handling of DHCP in spanning tree environments. If link is detected, but no packets of any type are received during the initial DHCP cycle, then the DHCP cycle will be extended as it is assumed that the spanning tree protocol is in operation. This change will have no impact in a normally active non-spanning tree environment.
- 1.2.03 provides the ability to automatically downshift to 10/100mbps operation if only 2 pairs of wire are detected in the cable instead of 4. It also eliminates a force speed/duplex link issue, and a couple of memory exhaustion corner cases.
- 1.1.15 fixes a rare condition where valid UDP packets might be discarded erroneously. This only happened when:-
 - an application program is listening for UDP packets addressed to a specific port, but not to a specific IP address;

- the application provides a buffer for the UDP code to store the destination IP in when a packet is successfully received;
 - on entry to the UDP read code, multiple UDP packets are queued in the UNDI driver, including the packet the application wants to read;
 - the application's packet is not at the head of the queue;
 - at least one of these UDP packets before the application's has a destination IP address that is not the client's IP address (such as a broadcast address) and whose port is not the port the application is listening for.
- Additionally 1.1.15 reduces memory size for the UNDI driver at runtime, by reducing the size and number of receive buffers from 32KB (16x2KB) to 12KB (8x1.5KB), fixes an EEPROM timing issue and preserves keystrokes in the keyboard buffer when scanning for 'control-s' used to enter the setup screen.
- Boot Agent versions earlier than 1.1.12 incorrectly calculated the MAC address of the second port of an 82546 based adapter or LOM implementation if the MAC address of the first port was odd. This has been fixed.
- Improved EEPROM robustness. EEPROM algorithms matched to 10/100 Boot Agent. Ensured system interrupts are disabled during EEPROM loading to prevent critical timing from being disrupted. Also increased the loop values for REQ/GRANT to allow for longer TCO windows.
- Boot Agent versions earlier than 1.1.09 incorrectly reported media failure on some slow networking connections. Version 1.1.09 of the Gigabit Boot Agent will wait for valid link detection for up to 6 seconds now (up from 2 seconds).
- Extra validation code added to check that Microsoft Simple Boot Flag ACPI table is valid before use. Also a minor formatting change was made to the GUID display, to align with Microsoft's wire format description of the GUID.
- The code in release 1.1.06 has been improved to make the handling of fragmented UDP packets more robust. Under certain circumstances, Windows 2000 RIS would fail to complete when connected at 10Mbps. Additionally, DHCP timeouts have been increased to cope with non-optimized networks, and the Boot Agent now has better handling of referrals between PXE servers.
- In release 1.1.04 the Flash address scan code wasn't correctly adjusting for a LOM image. If the Flash address returned all 0's, the 1.1.04 code would default to a basic 'safe' configuration with poorer performance. This was only an issue for LOMs, not a problem for the NIC image, and has been addressed in release 1.1.06.
- Certain types of DHCP servers may supply boot file names that are not terminated in a null character. Intel Boot Agent 1.0.15 included code from Intel Architecture Labs PXE 2.1 build 83. Build 83 was updated to address these non-terminated boot file names, but fails to work correctly if the DHCP boot file size option is not present. The boot file name is received, a pointer placed on the stack to point to this string to allow the null character to be appended. An extra TFTP request is made to retrieve the file size of the boot file. Unfortunately, the pointer is then destroyed before the boot file can be retrieved using TFTP. This issue has been corrected in Intel Boot Agent 1.1.04 and later. This scenario can be avoided entirely by running a PXE server or by using the boot file field rather than the DHCP boot file field. Customers using IBA 1.0.15 and running into this issue can also work around it by setting DHCP boot file size tag 13 as a non-zero value (ideally the size of the boot file).

Important – IBABuild tool must be used before code can be integrated.

Rather than continuing to supply an ever-increasing number of images, a new tool has been developed to allow BIOS writers to generate the specific image that they require. This IBABuild tool is a command line tool (DOS or Command box under Windows 2000 or XP) that takes a set of parameters that describe the type of image and device IDs, and generates the image, including changing the PCI Header to the correct device ID. See IBABuild.txt for usage details.

Device ID's supported in this version

Device ID	Product
1008	Intel® PRO/1000 XT Server Adapter
1008	Intel® 82544EI Based Network Connection
1009	Intel® PRO/1000 XF Server Adapter
100C	Intel® PRO/1000 T Desktop Adapter
100D	Intel® 82544GC Based Network Connection
100E	Intel® 82540EM Based Network Connection
100F	Intel® 82545EM Based Network Connection
1010	Intel® 82546EB Based Network Connection
1011	Intel® PRO/1000 MF Server Adapter
1012	Intel® PRO/1000 MF Dual Port Server Adapter
1013	Intel® PRO/1000 MT Network Connection (82541EI)
1015	Intel® PRO/1000 MT Mobile Connection (82540EM)
1016	Intel® PRO/1000 MT Mobile Connection (82540EP)
1017	Intel® PRO/1000 MT Mobile Connection (82541EI)
1018	Intel® PRO/1000 MT Mobile Connection (82541EI)
1019	Intel® PRO/1000 CT Network Connection (82547EI)
101A	Intel® PRO/1000 CT Mobile Connection (82547EI)
101D	Intel® PRO/1000 MT Quad Port Network Connection (Dual 82546EB)
101E	Intel® PRO/1000 MT Mobile Connection (82540EP)
1026	Intel® PRO/1000 MT Server Connection (82545GM based)
1027	Intel® PRO/1000 MF Server Connection (82545GM based)
1028	Intel® PRO/1000 MB Server Connection (82545GM based)
1049	Intel® 82566MM Gigabit Network Connection
104A	Intel® 82566DM Gigabit Network Connection
104B	Intel® 82566DC Gigabit Network Connection
104C	Intel® 82562V 10/100 Network Connection
104D	Intel® 82566MC Gigabit Network Connection
105E	Intel® PRO/1000 PT Dual Port Server Adapter
105F	Intel® PRO/1000 PF Dual Port Server Adapter
1060	Intel® PRO/1000 PB Dual Port Server Connection
1075	Intel® PRO/1000 CT Network Connection (82547GI)
1076	Intel® PRO/1000 MT Network Connection (82541GI and 82541PI)
1077	Intel® PRO/1000 MT Mobile Connection (82541GI)
1079	Intel® PRO/1000 GT and MT Dual Port Network Connection (82546GB)
107A	Intel® PRO/1000 MF Dual Port Network Connection (82546GB)
107B	Intel® PRO/1000 MB Dual Port Server Connection (82546GB)
107C	Intel® PRO/1000 GT Network Connection (82541GI lead free)
107D	Intel® PRO/1000 PT Server Adapter
107E	Intel® PRO/1000 PF Dual Port Network Connection
107F	Intel® PRO/1000 PT Dual Port Network Connection
108A	Intel® PRO/1000 P Dual Port Server Adapter
108B	Intel® PRO/1000 PM Dual Port Network Connection

108C	Intel® PRO/1000 PM Network Connection
1096	Intel® PRO/1000 EB Network Connection with I/O Acceleration
1098	Intel® PRO/1000 EB Backplane Connection with I/O Acceleration
109A	Intel® PRO/1000 PL Dual Port Network Connection
10A4	Intel® PRO/1000 PT Quad Port Server Adapter
10A5	Intel® PRO/1000 PF Quad Port Server Adapter
10A7	Intel® 82575EB Gigabit Network Connection
10A9	Intel® 82575EB Gigabit Backplane Connection
10B5	Intel® PRO/1000 GT Quad Port Server Adapter
10B9	Intel® PRO/1000 PT Desktop Adapter
10BA	Intel® PRO/1000 EB1 Network Connection with I/O Acceleration
10BB	Intel® PRO/1000 EB1 Backplane Connection with I/O Acceleration
10BC	Intel® PRO/1000 PT Quad Port LP Server Adapter
10BD	Intel® 82566DM-2 Gigabit Network Connection
10BF	Intel® 82567LF Gigabit Network Connection
10C0	Intel® 82562V-2 10/100 Network Connection
10C2	Intel® 82562G-2 10/100 Network Connection
10C3	Intel® 82562GT-2 10/100 Network Connection
10C4	Intel® 82562GT 10/100 Network Connection
10C5	Intel® 82562G 10/100 Network Connection
10C9	Intel® 82576 Gigabit Dual Port Network Connection
10CB	Intel® 82567V Gigabit Network Connection
10CC	Intel® 82567LM-2 Gigabit Network Connection
10CD	Intel® 82567LF-2 Gigabit Network Connection
10CE	Intel® 82567V-2 Gigabit Network Connection
10D3	Intel® 82574L Gigabit Network Connection
10D6	Intel® Gigabit VT Quad Port Server Adapter
10DE	Intel® 82567LM-3 Gigabit Network Connection
10DF	Intel® 82567LF-3 Gigabit Network Connection
10E2	Intel® Gigabit VT Quad Port Server Adapter
10E5	Intel® 82567LM-4 Gigabit Network Connection
10E6	Intel® 82576 Gigabit Dual Port Network Connection
10E7	Intel® 82576 Gigabit Dual Port Server Network Connection
10E8	Intel® Gigabit ET Quad Port Server Adapter
10EA	Intel® 82577LM Gigabit Network Connection
10EB	Intel® 82577LC Gigabit Network Connection
10EF	Intel® 82578DM Gigabit Network Connection
10F0	Intel® 82578DC Gigabit Network Connection
10F5	Intel® 82567LM Gigabit Network Connection
10F6	Intel® 82574L Gigabit Network Connection
150A	Intel® 82576NS Gigabit Ethernet Controller
1501	Intel® 82567V-3 Gigabit Network Connection
1502	Intel® 82579LM Gigabit Network Connection
1503	Intel® 82579V Gigabit Network Connection
150C	Intel® 82583V Gigabit Network Connection
150D	Intel® Gigabit ET Quad Port Mezzanine Card
150E	Intel® 82580 Gigabit Network Connection
150F	Intel® 82580 Gigabit Fiber Network Connection
1510	Intel® 82580 Gigabit Backplane Connection
1511	Intel® 82580 Gigabit SFP Connection
1516	Intel® Ethernet Server Adapter I340-T2
1521	Intel® I350 Gigabit Network Connection
1522	Intel® I350 Gigabit Fiber Network Connection

1523	Intel® I350 Gigabit Backplane Connection
1524	Intel® I350 Gigabit Network Connection
1525	Intel® 82567V-4 Gigabit Network Connection
1526	Intel® Gigabit ET2 Quad Port Server Adapter
1527	Intel® Ethernet Server Adapter I340-F4
294C	Intel® 82566DC-2 Gigabit Network Connection

1.1.5 Split ROM

Intel Boot Agent is available for split ROM implementations for BIOS integration. OEMs should work with their BIOS vendors to ensure that their BIOS implementations support Split ROM architecture. Monolithic implementations will continue to be supported as well. OEMs with specific implementation requirements should contact their technical representatives to discuss possible support options.

1.1.6 EEPROM Contents

1.1.6.1 Gigabit Main Setup Options (Word 30h)

The configuration of the software is controlled by EEPROM on the adapter. The main setup options are stored in word 30h. These options are those that can be changed by the user via the Control-S setup menu or by using the BootUtil.exe utility. Word 30h has the following format:

BIT(S)	Name	Function
15	RFU	Reserved. Must be 0.
14	RFU	Reserved. Must be 0.
13	RFU	Reserved. Must be 0.
12-10	FSD	Bits 12-10 control forcing speed and duplex during driver operation. Valid values are: 000b – Autonegotiate 001b – 10Mbps Half Duplex 010b – 100Mbps Half Duplex 011b – Not valid (treated as 000b) 100b – Not valid (treated as 000b) 101b – 10Mbps Full Duplex 110b – 100Mbps Full Duplex 111b – 1000Mbps Full Duplex Only applicable for twisted-pair copper adapters. Default value is 000b.
9	LWS	Legacy OS Wakeup Support. (For 82559-based adapters only) If set to 1, the agent will enable PME in the adapter's PCI configuration space during initialization. This allows remote wakeup under legacy operating systems that don't normally support it. Note that enabling this makes the adapter technically non-compliant with the ACPI specification, which is why the default is disabled. 0 = Disabled (Default Value) 1 = Enabled
8	DSM	Display Setup Message. If the bit is set to 1, the "Press Control-S" message is displayed after the title message. Default value is 1.

7-6	PT	<p>Prompt Time. These bits control how long the “Press Control-S” setup prompt message is displayed, if enabled by DIM.</p> <p>00 = 2 seconds (default)</p> <p>01 = 3 seconds</p> <p>10 = 5 seconds</p> <p>11 = 0 seconds</p> <p>Note: The Ctrl-S message is not displayed if 0 seconds prompt time is selected.</p>
5	LBS	<p>Local Boot Selection. OBSOLETE. In previous versions of the agent, this bit enables or disables local boot, if the DBS bit selects it. Default value is 1 to enable local booting. The boot agent does not use this bit any more.</p>
4-3	DBS	<p>Default Boot Selection. These bits select which device is the default boot device. These bits are only used if the agent detects that the BIOS does not support boot order selection or if the MODE field of word 31h is set to MODE_LEGACY.</p> <p>00 = Network boot, then local boot</p> <p>01 = Local boot, then network boot</p> <p>10 = Network boot only</p> <p>11 = Local boot only</p>
2-0	PS	<p>Protocol Select. These bits select the boot protocol.</p> <p>000 = PXE enabled on this port</p> <p>001 = This port disabled for PXE, iSCSI boot and FCoE</p> <p>010 = This port is the iSCSI Boot primary port</p> <p>011 = This port is the iSCSI Boot secondary port</p> <p>100 = This port enabled for FCoE</p> <p>101 = Invalid</p> <p>110 = Invalid</p> <p>111 = Invalid</p>

1.1.6.2 Gigabit Configuration Customization Options (Word 31h)

Word 31h of the EEPROM contains settings that can be programmed by an OEM or network administrator to customize the operation of the software. These settings cannot be changed from within the Control-S setup menu. The lower byte contains settings that would typically be configured by a network administrator using the BootUtil.exe utility; these settings generally control which setup menu options are changeable. The upper byte is generally settings that would be used by an OEM to control the operation of the agent in a LOM environment, although there is nothing in the agent to prevent their use on a NIC implementation. Word 31h has the following format:

BIT(S)	Name	Function
15 - 14	SIG	Signature. Must be set to 01 to indicate that the agent or other configuration software has programmed this word.
13	RFU	Reserved. Must be 0.
12	RFU	Reserved. Must be 0.
11	RFU	Reserved. Must be 0.
10- 8	MODE	Selects the agent's boot order setup mode. This field changes the agent's default behavior in order to make it compatible with systems that do not completely support the BBS and PnP Expansion ROM standards. Valid values and their meanings are:
		000b Normal behavior. The agent will attempt to detect BBS and PnP Expansion ROM support as it normally does.
		001b Force Legacy mode. The agent will not attempt to detect BBS or PnP Expansion ROM support in the BIOS and will assume the BIOS is not compliant. The user can change the BIOS boot order in the Setup Menu.
		010b Force BBS mode. The agent will assume the BIOS is BBS-compliant, even though it may not be detected as such by the agent's detection code. The user can NOT change the BIOS boot order in the Setup Menu.
		011b Force PnP Int18 mode. The agent will assume the BIOS allows boot order setup for PnP Expansion ROMs and will hook interrupt 18h (to inform the BIOS that the agent is a bootable device) in addition to registering as a BBS IPL device. The user can NOT change the BIOS boot order in the Setup Menu.
		100b Force PnP Int19 mode. The agent will assume the BIOS allows boot order setup for PnP Expansion ROMs and will hook interrupt 19h (to inform the BIOS that the agent is a bootable device) in addition to registering as a BBS IPL device. The user can NOT change the BIOS boot order in the Setup Menu.
		101b Reserved for future use. If specified, is treated as a value of 000b.
		110b Reserved for future use. If specified, is treated as a value of 000b.
		111b Reserved for future use. If specified, is treated as a value of 000b.

7	RFU	Reserved. Must be 0.
6	RFU	Reserved. Must be 0.
5	DFU	Disable Flash Update. If this bit is set to 1, the user is not allowed to update the flash image using Intel PROSet for Windows* Device Manager. Default value is 0.
4	DLWS	Disable Legacy Wakeup Support. If this bit is set to 1, the user is not allowed to change the Legacy OS Wakeup Support menu option. Default value is 0.
3	DBS	Disable Boot Selection. If this bit is set to 1, the user is not allowed to change the boot order menu option. Default value is 0.
2	DPS	Disable Protocol Select. If set to 1, the user is not allowed to change the boot protocol. Default value is 0.
1	DTM	Disable Title Message. If this bit is set to 1, the title message displaying the version of the Boot Agent is suppressed; the Control-S message is also suppressed. This is for OEMs who do not wish the boot agent to display any messages at system boot. Default value is 0.
0	DSM	Disable Setup Menu. If this bit is set to 1, the user is not allowed to invoke the setup menu by pressing Control-S. In this case, the EEPROM may only be changed via an external program. Default value is 0.

1.1.6.3 Gigabit Configuration Customization Options (Word 32h)

Word 32h of the EEPROM is used to store the version of the boot agent that is stored in the flash image. When the Boot Agent loads, it can check this value to determine if any first-time configuration needs to be performed. The agent then updates this word with its version. Some diagnostic tools to report the version of the Boot Agent in the flash also read this word. The format of this word is:

BIT(S)	Name	Function
15 - 12	MAJ	PXE Boot Agent Major Version. Default value is 0
11 - 8	MIN	PXE Boot Agent Minor Version. Default value is 0
7 - 0	BLD	PXE Boot Agent Build Number. Default value is 0

1.1.6.4 Gigabit IBA Capabilities (Word 33h)

Word 33h of the EEPROM is used to enumerate the boot technologies that have been programmed into the flash. This is updated by IBA configuration tools and is not updated or read by IBA.

BIT(S)	Name	Function
15 - 14	SIG	Signature. Must be set to 01 to indicate that this word has been programmed by the agent or other configuration software.
13 - 5	RFU	Reserved. Must be 0.
4	iSCSI	iSCSI boot capability is present in flash if set to a 1.
3	EFI	EFI UNDI capability is present in flash if set to a 1.
2	RPL	No longer used.
1	UNDI	PXE/UNDI capability is present in flash if set to a 1.
0	BC	PXE Base Code is present in flash if set to a 1.

1.1.6.5 Gigabit IBA Secondary Port Configuration (Words 34h & 35h)

Words 34h & 35h are used to provide unique configuration for the second port of dual MAC devices such as the 82546. The format is the same as that used in words 30h & 31h for the first port.

1.1.6.6 Gigabit IBA Port Three Configuration (Words 38h & 39h)

Words 38h & 39h are used to provide unique configuration for the third port of quad MAC devices such as the 82580. The format is the same as that used in words 30h & 31h for the first port.

1.1.6.7 Gigabit IBA Port Four Configuration (Words 3Ah & 3Bh)

Words 3Ah & 3Bh are used to provide unique configuration for the fourth port of quad MAC devices such as the 82580. The format is the same as that used in words 30h & 31h for the first port.