

Intel® Boot Agent for Gigabit

Version 1.2.42

Release Notes

08/21/06

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1. Intel Boot Agent release 1.2.42 Release Notes

1.1 Gigabit release – Build V11.1C0520 TIC 126184, Build date 08/16/06

1.1.1 General

This release adds support for device IDs for the Intel® PRO/1000 PT Quad Port Server Adapter.

This release is backwards compatible with the 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 both PXE and RPL capabilities. Please see the Incremental Change Document for changes in this version. This image cannot be used for Intel Fast Ethernet LAN controllers – please use Intel Boot Agent for Fast Ethernet version 4.1.20 or above.

The IBAutil Utility is used to program adapters and is distributed as part of the Intel PRO Networking software releases, **but for LOM 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 1.1.4 for details.**

1.1.2 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://support.intel.com/support/network/adapters/pro100/bootagent/sb/cs-008216.htm> and <http://support.intel.com/support/network/adapters/pro100/bootagent/sb/cs-008217.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.

1.1.3 Fixed Issues

-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 than 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).

1.1.4 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	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)
104A	Intel® 82566DM Gigabit Network Connection
104B	Intel® 82566DC Gigabit Network Connection
104C	Intel® 82562V 10/100 Network 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)
105E	Intel® PRO/1000 PT Dual Port Server Adapter
105F	Intel® PRO/1000 PF Dual Port Server Adapter
107F	Intel® PRO/1000 PT Dual Port Network Connection
107E	Intel® PRO/1000 PF Dual Port Network Connection
108B	Intel® PRO/1000 PM Dual Port 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
10B5	Intel® PRO/1000 GT Quad Port Server Adapter
10BA	Intel® PRO/1000 EB1 Network Connection with I/O Acceleration
10BB	Intel® PRO/1000 EB1 Backplane Connection with I/O Acceleration

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 supplied for adapter implementations. OEMs with specific implementation requirements should contact their technical representatives to discuss possible support options.

1.1.6 Decoder Ring

File name	Description
BA12 bb M2.NIC	The PRO/1000 adapter monolithic boot agent image (with PXE and RPL support and setup screen) for programming into adapter flash memory. ' bb ' is the build number.
BA12 bb M2.FLB	The PRO/1000 boot agent flash image (with PXE and RPL support and setup screen) in the FLB format for updating the flash using Intel PROSet for Windows* Device Manager. ' bb ' is the build number.
BA12 bb M2.LOM	The PRO/1000 adapter monolithic boot agent image

	(with PXE and RPL support and setup screen) for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb L2.LOM	The PRO/1000 adapter monolithic boot agent image (with PXE only support and setup screen) for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb N2.LOM	The PRO/1000 adapter monolithic boot agent image (with PXE and RPL support, no setup screen) for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb Q2.LOM	The PRO/1000 adapter monolithic boot agent image (with PXE only support, no setup screen) for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb S2.LOM	The PRO/1000 split boot agent image (UNDI only) with RPL support and setup screen for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb T2.LOM	The PRO/1000 split boot agent image (with UNDI support only, includes setup screen) for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb X2.LOM	The PRO/1000 split boot agent image (with UNDI support only, no setup screen) for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb BC.LOM	The split boot agent Base Code image for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb R2.LOM	The RPL only (including setup screen) image for programming into BIOS flash memory. ' bb ' is the build number.
BA12 bb U2.LOM	The RPL image (no setup screen) for programming into BIOS flash memory. ' bb ' is the build number.

1.1.7 EEPROM Contents

1.1.7.1 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 IBAUtil.exe utility. Word 30h has the following format:

BIT(S)	Name	Function
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15	PPB	PXE Presence Bit – 0 Indicates that the image in the flash contains a PXE image. 1 indicates that no PXE image is contained. Default is 0 in order to be backwards compatible with units already in the field. If this bit is set to 0, EEPROM word 32h (PXE Version) is valid. When EPB is set to 1 and this bit is set to 0, it means both images are present in the flash.
14	EPB	EFI Presence Bit – 1 Indicates that the image in the flash contains an EFI image. 0 indicates that no EFI image is contained. Default is 0 in order to be backwards compatible with units already in the field. . If this bit is set to 1, EEPROM word 33h (EFI Version) is valid. When PPB is set to 0 and this bit is set to 1, it means both images (PXE and EFI) images are present in the flash.
13	RFU	Reserved. Must be 0.
12-10	FSD	<p>Bits 12-10 control forcing speed and duplex during driver operation. Valid values are:</p> <p>000b – Autonegotiate 001b – 10Mbps Half Duplex 010b – 100Mbps Half Duplex 011b – Not valid (treated as 000b) 100b – 10Mbps Full Duplex 101b – 100Mbps Full Duplex 111b – 1000Mbps Full Duplex</p> <p>Only applicable for twisted-pair adapters, not for fiber optic-based. Default value is 000b.</p>
9	LWS	<p>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.</p> <p>0 = Disabled (Default Value) 1 = Enabled</p>
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) 01 = 3 seconds 10 = 5 seconds 11 = 0 seconds</p> <p>Note: The Ctrl-S message is not displayed if 0 seconds prompt time is selected.</p>
5	LBS	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 at runtime does not use this bit any more.

4-3	DBS	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. 00 = Network boot, then local boot 01 = Local boot, then network boot 10 = Network boot only 11 = Local boot only
2	BBS	BIOS Boot Specification. OBSOLETE . In previous versions of the agent, this bit enables or disables use of the BBS to determine boot order. If set to 1, the BIOS boot order is used, and the DBS bits are ignored. The boot agent at runtime does not use this bit any more. The runtime checks for BBS/PnP and the setting in the MODE field of word 31h is used instead...
1-0	PS	Protocol Select. These bits select the boot protocol. 00 = PXE (default value) 01 = RPL protocol. Other values are undefined

1.1.7.2 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 IBAUtil.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:
		000 Normal behavior. The agent will attempt to detect BBS and PnP b Expansion ROM support as it normally does.
		001 Force Legacy mode. The agent will not attempt to detect BBS or b 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.

		010 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. 011 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. 100 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. 101 Reserved for future use. If specified, is treated as a value of 000b. 110 Reserved for future use. If specified, is treated as a value of 000b. 111 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.

1.1.7.3 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. This word is only valid if the PPB is set to 0. Otherwise the contents may be undefined. The format of this word is:

BIT(S)	Name	Function
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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

1.1.7.4 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	SAN	SAN capability is present in flash.
3	EFI	EFI UNDI capability is present in flash.
2	RPL	RPL capability is present in flash.
1	UNDI	PXE/UNDI capability is present in flash.
0	BC	PXE Base Code is present in flash.

1.1.7.5 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.