Airborne Enterprise Class Embedded Wireless Device Servers & Ethernet Bridge Modules
DP500 ("Veyron") Series
Firmware Release Notes

Release 1.61 (September 2011)

Changes to Veyron Firmware since V1.60:

- (new) The CLI command "**modelname**" now displays the manufacturing u-Boot environment variable "uboot_modelname", or a default value based on the Device Type if that environment variable is not configured. The modelname is also saved as a comment in the module's User Configuration File during a "commit".
- (new) The CLI command "**put-web**" transfers a user-defined web page to the module via XMODEM, where it is saved with the specified filename. No path information should be included. A "save" command must be issued for the file to be saved in flash.
- (new) The CLI command "**get-web**" uses FTP to get a user-defined web page from an FTP server. It uses the "ftp-server-address", "ftp-server-path", "ftp-user", and "ftp-password" to get the specified file. The filename should not include any path information. A "save" command must be issued for the file to be saved in flash.
- (new) Module web pages have been enhanced to "gray-out" options which are limited by other aspects of the module's configuration.
- (usability) When "**wl-tunnel-mode{-p2} sds**" is configured, the web interface no longer displays the CLI Default, Bit Rate, Parity, Stop Bits, Flow Control, Serial Assert, Input Buffer Size, Serial Escape Mode, Network Escape Mode, or Escape String, since those are controlled by the workstation which manages the SDS virtual serial port.
- (bugfix) Added watchdog which automatically re-initializes the Second Serial Port CLI handler process if it is detected to have faulted. This watchdog inspects the liveness of the Second Serial Port once per second.
- (bugfix) The command "**wl-telnet-timeout**" now functions as specified. Previously, this configuration parameter had no effect.
- (reliability) Once a second, the radio is explicitly checked for host-communications liveness (i.e. direct module-to-radio). If this fails, the radio is fully restarted. If the restart fails to restore communication with the radio, the entire module is restarted.
- (reliability) If any restart of the radio (such as from a sequence of "radio-off" then "radio-on" CLI commands) fails twice in a row to restore communications with the radio, the entire module is restarted.
- (bugfix) For static IP configurations, the module will not attempt to set a (mis)configured gateway address (either "eth-gateway" or "wl-gateway") if it is incompatible with the IP address of either network interface.
- (bugfix) Additional error checking has been added to the firmware update process.
- (bugfix) The CLI "**sh**" and "**spawn-shell**" commands now function when invoked from TELNET or SSH, and when the Debug Port is disabled.
- (bugfix) File upload over the web server is now much more reliable when the Veyron or Enzo is short on memory. This affects firmware, configuration file, and certificate upload operations.
- (bugfix) When changing the module's personality via the web interface, do not utterly disable future use of the Debug Port whenever it is deselected in the current configuration (i.e. only turn it off in hwcapuser, not hwcap).
- (bugfix) Correct parsing of the current radio bit rate when in Adhoc mode.
- (bugfix) The built-in DHCP server no longer responds with a DHCP NAK if it receives a packet destined for a different server. This could potentially cause problems for networks with multiple DHCP servers enabled.

- (compatibility) Delay enabling CLI echo as late as possible in order to avoid echoing "trash" characters on the serial port if a customer's application sends data before the POST LED is asserted.

Known issues for Firmware build 1.61:

- None.

Release 1.60 (May 2011)

Changes to Veyron Firmware since V1.50:

- (change) Text referring to "DirectEthernet" has, in most places, been replaced with text referring to "Ethernet Router".
- (enhancement) The "wl-dhcp-rel" and "eth-dhcp-rel" commands now release Auto-IP addresses as well as DHCP addresses. Previously, if a module "fell back" to Auto-IP, it would have to be "restart"ed switch back into DHCP.
- (bugfix) The "Device Type:" text in the top blue menu bar of the web interface now "floats" with the width of the browser window.
- (bugfix) The correct "telnet-echo" setting is now applied when the "telnet-port" is not the default value of 23.
- (bugfix) The maximum displayed edit-field length on the web interface has been limited (generally) to 32 characters. Longer strings will scroll within the text box. This prevents the browser window from being excessively wide on many pages.
- (bugfix) The SSH server no longer unnecessarily ties up the primary serial port. This could have blocked PPP use on that port.
- (enhancement-manufacturing) All modules are now configured with a u-Boot environment variable, "modelname", which contains the official name of the product for which they have been manufactured. This variable should be invariant to any subsequent "personality" (i.e. device type) changes made by the customer.
- (new-debug) A kernel-configurable Netfilter module is available which can be used to "sniff" and intercept UDAP packets. This is enabled via "CONFIG_NF_CONNTRACK_UDAP_DISCOVERY".

Known issues for Firmware build 1.60:

- None.

Release 1.50, with new u-boot 1.31 (February 2011)

(IMPORTANT) Release 1.50 is the minimum firmware version required for Enzo (DP551) based products.

Changes to Firmware since V1.40 and Uboot since V1.30:

- (new) Added an **"Express Setup"** web page. This page lists the most-critical parameters for establishing device connectivity, all on one page. It is concerned with IP-level connectivity for the purpose of further device configuration, not with COM-port-level configuration. This page is the module's "home" page out-of-box (instead of the "wl-info" display), and is always available as the first option on the web interface's "Configuration" tab. Unused and fixed-value (due to some other configuration option) fields on this page are automatically hidden so as to provide a much easier-to-read and use out-of-box setup, due to the far less cluttered page.
- (new) Like the "Express Setup" page, all other web-interface pages (especially the "WLAN Security Settings" page) now hide unused and fixed-value (due to some other configuration option) fields in order to simplify configuration and de-clutter the web pages.
- (new) Added Ethernet DHCP commands "**eth-dhcp-rel**" and "**eth-dhcp-renew**" for consistency with the "wl-dhcp-*" command set. Behavior is identical with the corresponding "wl-dhcp-*" commands.
- (new) When running in **AutoIP** mode (i.e. when DHCP is enabled, there is no server, and fallback is enabled), the assigned AutoIP address is automatically assigned to be the default gateway. The result of this action is that packets to *any* address are actually sent over the local LAN segment (physical subnet), thus allowing communication with an "incompatible" IP address even when no true gateway is available. The critical use for this feature is when the module must be directly configured from a workstation which is assigned an incompatible IP address. Now, the module can be configured via TELNET or its web interface before its IP address is even "properly" configured for a site -- web directly launched from Locator out-of-box!
- (new/improved/bugfix) The Veyron and Enzo modules now respond to the Airborne Discovery protocol (utilized by the standard Ubicom "Locator" and other management tools) over (potentially) both network interfaces, no matter how they are presently configured. Standard Ubicom "Locator" can now be used to change the configuration of either the Ethernet or Wireless network interface, even if they are currently both on an "incompatible" IP subnet, so long as such configuration would not violate security on the module. If a network interface is already configured for an IP subnet which is compatible with the workstation running the Locator protocol, only that network interface will respond to Locator (in case both are compatible, the Wireless interface has priority to respond). If neither network interface is configured for a compatible IP subnet, both interfaces will respond to Locator. This practice allows the the administrator the choice of which of the module's interfaces to configure (or both, if desired).
- (new) The CLI command "**eth-udap**" has been added to provide control over support of the Airborne / Ubicom Discovery (UDAP) protocol over the Ethernet interface. If "1", UDAP is enabled (default for all device types); if "0", the module will not respond to UDAP over the Ethernet. This command is also available over the web interface.
- (new) All CLI "wl-*" commands are now supported for the **Atheros radio** on Enzo modules. Runtime change of the radio MAC address ("wl-mac"), regulatory domain ("wl-region"), or WEP keys ("wl-key-*") requires a radio restart which is not necessary for the Veyron's Marvell radio (this does not affect the radio if no change is made after boot).
- (new) The "**wl-ant**" command actually works as specified for the Enzo's Atheros radio. The default is "Ant2" for both transmit and receive, and can specify "Ant1" for both transmit and receive, or "d" for receive diversity. The Veyron's Marvell radio still ignores this command.
- (new) The CLI command "**spi-mode**" has been implemented in order to control the polarity and phase of the module's SPI interface. SPI modes 0-3 are supported. This command is also available from the web interface.
- (new) The CLI command "**wl-wpa-proto**" has been implemented to facilitate faster roaming with the Enzo's Atheros radio, and tighter security with all radios. Formerly (and still with the default "auto"), when configured for advanced security modes, the module searches for a WPA2 ("rsn", AES/CCMP)

network first, then, if not available, searches for a WPA1 ("wpa", TKIP) network as a fallback. When "wl-wpa-proto" is explicitly set for "rsn" or "wpa", fallback is disabled and the module will only associate to a network with the specified security protocol. As an added bonus, with an Atheros radio, this explicit specification (i.e not "auto") enables the radio to control roaming instead of always involving wpa_supplicant. This results in significantly faster wireless roaming. This command is also available from the web interface.

- (new) Added the "**ttcp**" TCP performance-testing utility to all builds. This is only available from the Linux shell.
- (improved) "**wl-gateway**" now has priority over "**eth-gateway**" whenever it is configured. Specifically, if DHCP is enabled on either interface, DHCP controls the gateway. If neither interface has DHCP enabled and they both have a gateway configured and they both are "live", the gateway is set up when the radio is configured. If the radio isn't live, "wl-gateway", if configured, is set up on the Ethernet even if "eth-gateway" is configured. If the Ethernet isn't live and "wl-gateway" isn't configured, "eth-gateway", if configured, is set up on the radio. All such configurations are verified for subnet compatibility before being applied.
- (improved) The **default configuration for the Industrial Serial products** has been improved for out-of-box configuration. The radio starts "off", Ethernet has DHCP enabled with acquisition limit 30 seconds (after which AutoIP is initiated), and the serial ports all start in "cli" mode.
- (improved) **Radio-startup mode is now configurable** as the first item under "Configuration | WLAN Settings", as well as under "Configuration | Advanced Settings".
- (improved) If a module's newly-"commit"ed configuration is incompatible with its saved "user hardware capabilities", upon the next "restart", the hardware capabilities will be updated and the module automatically "restart"ed a second time to automatically apply the potential device-driver changes.
- (improved) If a module's wireless interface is disabled (now the out-of-box default for Industrial Serial products), the module's "nickname" shown in its web-browser title bar will be taken from its Ethernet interface, instead (specifically, from "eth-dhcp-client" instead of from "wl-dhcp-client").
- (improved) The module's firmware version, device type, and hardware capabilities now appear as comments in the header of its configuration files. This places critical information for Quatech technical support into every "cfg-dump" provided to Support.
- (improved) The order of the configuration parameters on the web interface Advanced Configuration page has been re-ordered to be more intuitive.
- (improved) RAMDisk space utilization in "/tmp" has been improved so that larger module configurations can be stored.
- (improved) CLI power-on startup time has been improved.
- (cosmetic) All web-interface instances of "Reboot" have been changed to "Restart".
- (improved) Many {x}HTML warnings have been resolved in the web interface in order to improve compatibility with the numerous "embedded" browsers now in use (i.e. cell phone, tablet, etc. browsers).
- (improved) Formatting of the web interface "popup help text" has been improved for Firefox users.
- (update) Update of the Linux kernel from 2.6.31.12 to 2.6.32.25. Even though the "latest and greatest" Linux kernel is 2.6.37, the 2.6.32 series of kernels is the series on which Android 2.2 (Google's latest Production release) is based, and is the latest kernel series on which a Production release of Enzo's Atheros radio driver is available. Our goal with this update was Production-level stability, not "bleeding edge".
- (bugfix) A CRITICAL authentication issue with the CLI has been resolved. In firmware version 1.40 (only), the default authentication level for an un-auth'ed user on the serial port CLI was "manuf" instead of "console". This has been corrected.

- (bugfix) The **CLI input-buffer size** has been increased from 256 to the 1460 (the same size as with the Ubicom modules).
- (bugfix) The **CLI input-buffer's behavior** has been modified to not auto-backspace any characters over its maximum size, but rather to allow manual backspacing (if desired) to remove any such characters. This behavior is much more compatible with the programmed CLI handlers used by some customers.
- (bugfix) Some **XON / XOFF behavior** on the CLI console has been corrected.
- (bugfix) If DHCP is enabled on the Ethernet and the cable is unplugged then re-plugged to a second jack, DHCP (then AutoIP, if no DHCP server is found) is re-issued. Previously, this was only initiated once, which could result in a loss of connectivity if the "second" jack was not on the same subnet as the first.
- (bugfix) "**eth-mode 10auto**" now works as documented.
- (bugfix) Removed acceptance of unsupported "**serial-default loop**" option and mention of it in the "help" text.
- (bugfix) The "**eth-info**" command now works properly over an SSH CLI connection. Previously, numerous warnings were displayed.
- (bugfix) It is no longer the case that some invocations of "commit"ing a set of new parameters resulted in alteration of the set a module's enabled ports.
- (bugfix) Early-boot use of LEDs now correctly follows the configuration saved in the "user hardware capabilities".
- (bugfix) CLI source-buffer alignment presumptions which were legal with the older Linux kernel were found to be illegal with the new Linux kernel. This fatal issue has been corrected.
- (bugfix) The "**device-type**" CLI command now properly recognizes "**industr-ethernet**" and "**industr-serial**" products, and distinguishes Veyron from Enzo modules. This bug could result in immediate failure of personality changes initiated from the CLI and "next-restart" failures of personality changes initiated from the web interface.
- (bugfix) The CLI no longer recognizes the never-implemented "**eapfast-pac-filename**" command (it turned out to not be necessary).
- (bugfix) Warnings about the "**radio not being recognized**" no longer appear on TELNET nor SSH whenever the radio driver is not loaded (i.e. "radio-off") or the radio driver is loaded but not configured (i.e. "radio-startup off"). Warnings appearing over the Debug port are also substantially reduced. This bug affected Hobart.
- (bugfix) A concurrency error has been resolved which could prevent correct module initialization when a very long User or OEM configuration file is present. This bug affected Crown.
- (bugfix) A PowerSave Protocol error has been corrected which could result in effective loss of Veyron radio connectivity (up to a couple of minutes) after roaming while in "**pm-mode doze**". Specifically, the radio re-entered 802.11 PSP immediately after a roam was completed, which could be too fast for 802.1x Authentication or DHCP to complete without lengthy retries.
- (bugfix) A PowerSave Protocol error has been corrected which could result in excessive power consumption of the Enzo radio after roaming while in "**pm-mode doze**". Specifically, the Atheros radio's "fast roam" capability was so fast that the module's radio-status monitor could miss detection of the roam and therefore never place the radio back into 802.11 PSP after the roam was completed.
- (bugfix) An Ethernet-side TELNET or SSH CLI session would not always be able to issue "radio-on" successfully if the radio was disabled prior to establishing the TELNET or SSH CLI session (either through "radio-off" or "radio-startup off").
- (bugfix) The "wl-info" command no longer displays "Link Status: Connected" when the radio driver is loaded but not configured (i.e. during "radio-off").
- (bugfix) The "**pw-wpa-psk**" command now accepts spaces within the WPA passphrase.

- (bugfix) The "**device-type**" command is now readable by a UDP-level authenticated user, but is only writable by a CFG-level authenticated user.
- (bugfix) The "**reset**" command would incorrectly "apply-cfg" immediately, potentially resulting in a loss of administrator connectivity. Now, the "apply-cfg" must be explicitly issued by the administrator.
- (bugfix) The Enzo radio would not associate to an Access Point when any LEAP-based "wl-security" option was selected.
- (bugfix) Diagnostic messages for a TELNET or SSH CLI session now appear on the Debug port instead of mixed within the CLI dialog.
- (bugfix) The web interface "**Upload Certificate**" and "**Upload Configuration File**" dialogs now recognize the "Content-Type:application/base64" sometimes inserted by Microsoft IE8. This affected some users of Encrypted Configuration Files.
- (bugfix) The module is now insensitive, when using an Encrypted Configuration file, to extra spaces and empty lines inserted by some browsers when uploading that configuration to the module. Specifically, Chrome and IE8 insert leading blank lines into the file.
- (bugfix) Restarting a module from the web interface is now much more reliable across browsers and different system configurations.
- (bugfix) The CLI command "**wl-dhcp-interval**" is now fully supported.
- (bugfix) When changing a module's "personality" over the web interface, changing to an Industrial Serial device now automatically enables the Ethernet port (for configuration purposes -- out-of-box condition of an Industrial Serial device is to have the radio disabled until configured).
- (bugfix) The "**write authentication level requirement**" for all CLI commands which alter stored configuration has been increased to "cfg" level, since that is the level necessary to issue the "commit" or "apply-cfg" commands. Previously, one could issue a "configuration change" for some commands which could never be applied or committed.
- (bugfix) The "**read authentication level requirement**" for all CLI commands which display configuration has been lowered to "cfg" level, since any user could find out their values by issuing the "cfg"-level "cfg-dump" command, anyway.
- (new) Added new CLI command "**speedlink**" to enable or disable the fast-roaming feature on DP55x systems. A user might want to configure "speedlink disable" if the AP-blacklist-avoidance logic in the DP55x radio firmware results in too-hesitant association to a network (the software-selected association logic is more aggressive for the first power-on association). Although the command is supported in DP50x systems for compatibility of configuration files, it doesn't do anything
- (bugfix) Security certificates uploaded via the Web interface now set the file permissions correctly. These permission issues could be a nuisance for those users who have already installed certificates. Use of the Airborne Management Center should automatically correct the problem upon the first "apply all configuration files" to an Airborne device.
- (bugfix) For "**wl-security wpa-psk**" and "**wl-security wpa2-psk**", the "have we calculated the right pre-shared key" flag "is-psk-calc" was not getting cleared for a change in "wl-ssid" made through the web interface.

Known issues for Firmware build 1.50:

- None.

Release 1.40 (August 2010)

(IMPORTANT) Release 1.40 is the minimum firmware version required for Veyron Revision F.

Changes to Veyron Firmware since V1.24:

- (new) The CLI command "**cfg-encrypt {disable | enable | locked | protected | permanent}**" has been added (listed as "Configuration | Advanced Settings | Encrypt Wireless Keys" on the web interface). The default is "**disable**", which is normal Veyron operation. When set to "**enable**", the module will split its User Configuration settings upon its next "**commit**" into the normal User Configuration file and a new Encrypted Configuration file ("**/var/etc/config/user_enc_config.uue**"). The affected parameters are **pw-***, **wl-key***, **ftp-password**, **ssh-default-password**, **eap-password**, **is-psk-calc**, **pre-calc-psk**, **priv-key-password**, and **priv-key2-password**. This new file is first AES-encrypted (lightweight) into a binary format, then **uuencode**'d into a text-only format so that it can more easily be copied to and from the Veyron. *The encryption utilized is only suitable for obscuring the file from "prying eyes", because the encryption key is embedded within the file itself*. This mechanism also, however, means that the Encrypted Configuration file can be copied from a "master" Veyron to any number of other Veyrons and the file will be immediately usable by those other Veyrons (without the need to explicitly enter any encryption keys, unique or otherwise). If "**cfg-encrypt disable**" is later re-configured (note limitations below), the two configuration files will be automatically re-merged into a fully-plaintext format upon the next "**commit**" operation. When set to "**locked**", this parameter can only be altered by a "**manuf**"-level user and then only via the "**clear cfg-encrypt**" command, which changes the module to use "**cfg-encrypt enable**". When set to "**protected**", this parameter can only be altered by a "**manuf**"-level user and then only via the "**clear cfg-encrypt**" command, which changes the module to use "**cfg-encrypt disable**", and *irrecoverably clears all the encrypted parameters listed above*. When set to "**permanent**", this parameter can only be altered by the "**reset**" command, which reverts the entire module configuration to Factory/OEM defaults. This new command requires "**oem**"-level authentication to change from **"disable**" or **"enable**", effectively "**manuf**"-level authentication to change from "**locked**" or "**protected**".
- (new) A new CLI command "**auth-level** *command level*" has been added to allow elevating the authentication level required to issue the "write" variant of a given CLI command. Currently, the only "*command*" recognized is "**reset**". This cannot be used to lower the authentication level of "*command*" below its factory default. The "**auth-level**" command itself is "**manuf**" level (5). There is no web-based interface corresponding to this CLI command.
- (new) The CLI command "**cfg-dump enc**" has been added to display the Encrypted Configuration file on a serial port, TELNET, or SSH.
- (new) The "Configuration" web page now provides a link for "Encrypted Configuration" if "**cfg-encrypt enable**" is configured.
- (new) The "Configuration | Upload Configuration File" web page now provides the option of uploading the Encrypted Configuration file. Note that this option is displayed whether or not "**cfg-encrypt enable**" is configured (it might be necessary to upload the file before enabling its use...).
- (new) Serial ports now support "**flow b**" to provide simultaneous hardware and software flow control.
- (new) New CLI commands "**wl-rssi**" and "**wl-noise**" have been added to immediately display the numeric wireless "**signal level (dBm)**" and "**noise level (dBm)**" from the "**wl-status**" command. This should allow customer CLI parsers simpler access to this information.
- (new) The CLI command "**wl-link-timeout**" now specifies the number of seconds that the module will wait after wireless loss-of-Association before it considers a DHCP Renew necessary. The default for this is

1 second. Specifying 0 seconds means that all 802.11 roams will result in a new DHCP request, even if to the same SSID. This parameter is on the web interface's Advanced Configuration page.

- (new) Dual-FLASH Veyron Revision F is now supported.
- (new) SDS mode is now supported by "**wl-tunnel-mode sds**".
- (improved) The "Maintenance | Change Module Personality" web page now defaults to the existing port-enabled settings of the module ("**hwcapuser**") instead of the minimum required for each Device Type. The web page will no longer allow selecting a Device Type for which the minimum required ports are not available on the device, nor will it allow "enabling" a port which is not physically present on the Quatech product's hardware (such as a serial port on an ABDG-ET boxed product).
- (improved) Clarification has been added to the "**help**" text about use of the "**drop**" option with port forwarding.
- (improved) Clarification has been added to the "**help**" text about the "**intf-type**" command.
- (improved) The "Maintenance | Change Module Personality" web page now defaults to the existing port-enabled settings of the module ("**hwcapuser**") instead of the minimum required for each Device Type. The web page will no longer allow selecting a Device Type for which the minimum required ports are not available on the device, nor will it allow "enabling" a port which is not physically present on the Quatech product's hardware (such as a serial port on an ABDG-ET boxed product).
- (improved) The "Maintenance | Change Module Personality" web page can now change back and forth from a SPI WLNG configuration to any other WLNG configuration. Previously, such personality changes were restricted due to factory configuration of the module to use SPI.
- (improved) The CLI **"*-port**" commands (i.e. "**serial-port**", etc.) now provide a warning for the administrator if he/she attempts to enable a non-existent port (i.e. one which is disabled by the factory, due to not being populated on a boxed motherboard).
- (improved) Security has been enhanced by restricting when Ubicom Locator can *change* the IP configuration of a module (inspection still works, as always). If the module's administrator has reconfigured the module's passwords, Locator can no longer *change* the module's IP configuration (such a change is *unauthenticated*; by explicitly setting one or more passwords, the administrator has declared his/her intention to not allow default unauthenticated access to the module). Furthermore, if the administrator has already configured an explicit static IP address, Locator can no longer *change* that static address. Essentially, these security enhancements move Locator back into the "out of box deployment" role for which it was intended, and out of a potential use as an all-too-easy attack vector against a network of modules.
- (improved) Packet forwarding now supports "passive" FTP from the wireless to the wired networks, and "active" FTP from the wired to the wireless networks.
- (usability) The command "**serial-port-p2**" has been added as a synonym for "**serial-port2**".
- (reversion) Removal of warning messages when the user enters an invalid configuration.
- (clarification) Confusing references to the not-supported protocol "PEAPv1" (not applicable to our products) have been removed from the module's "**help**" text for both the CLI and web interface.
- (bugfix) Restored several commands that were missing from the "?" (list commands) listing. These include: eap-password, ftp-password, pre-calc-psk, priv-key-password, priv-key2-password, pw, pw-cfg, pw-leap, pw-manuf, pw-oem, pw-root, ssh-default-password, wl-http-def, wl-http-port, wl-key1, wl-key2, wl-key3, wl-key4. Deprecated commands are still not included in the list because they are just that, deprecated.
- (bugfix) All the "Configuration | * Configuration" web pages used to display specific configuration files will now display properly even if those files have HTML special characters embedded within them.
- (bugfix) Corrected a CLI shell-fault which blocked **restart** of a module via the web interface if the primary serial port was disabled.

- (bugfix) The "Configuration | Connection Settings" web page is now always available, even to those modules with no enabled serial ports. This allows access to the web server and TELNET server controls.
- (bugfix) The DHCP Server ("**eth-role router**", "**eth-dhcp-server enable**") is now started only after complete IP configuration has taken place for the Ethernet port, and is automatically restarted whenever the Ethernet IP address changes.
- (bugfix) Packet forwarding ("**eth-role router**") is now automatically disabled during any reconfiguration of either the Wireless or Ethernet IP addresses, and is automatically re-enabled when both IP addresses have completed configuration.
- (bugfix) The options "**icmp**" and "**bcast**" have been added to the documented options for "**wl-route**" in the built-in Help files.
- (bugfix) Corrected a problem in which some web interface links which should have been disabled were still available after a port-configuration change.
- (bugfix) Ignore the serial <BREAK> sequence when in CLI mode.
- (bugfix) The CLI command "**restart**" now works from SSH and from the Debug port.
- (bugfix) One can now "**update ftp**" from SSH and from the Debug port.
- (bugfix) The "**commit**" command no longer displays file-permission warnings when issued from SSH or the Debug port.
- (bugfix) Basic "**update**" (xmodem) no longer prints a spurious warning message after a successful file download.
- (bugfix) The web interface now properly lists the "**US**" regulatory domain as the default.
- (bugfix) The module no longer attempts to re-apply any "**user-**" names or "**pw-**" configurations from an OEM configuration file at each boot.
- (bugfix) The module will no longer attempt to configure any static "**wl-gateway**" or "**eth-gateway**" if DHCP is enabled on *either* network; the gateway provided by DHCP is always used (if DHCP fails, then the Fallback IP configuration takes effect). If both networks are configured for Static IP and both "**wl-gateway**" and "**eth-gateway**" are configured, "**wl-gateway**" is the address used.
- (bugfix) Corrected a CLI shell-fault which blocked **restart** of a module via the web interface if the primary serial port was disabled.
- (bugfix) The "Configuration | Connection Settings" web page is now always available, even to those modules with no enabled serial ports. This allows access to the web server and TELNET server controls.
- (bugfix) The CLI "**debug-port**" command will refuse to disable the DEBUG port if the version of u-Boot installed on the module does not support DEBUG being disabled.
- (bugfix) The CLI "**device-type**" command now recognizes the "personality lock" flag set at the factory, and will refuse to change the module's personality if that flag is configured.
- (bugfix) RTS/CTS flow control now works correctly in RS232 mode on serial port 2 of the Industrial Serial product
- (bugfix) Fixed version-upgrade error from firmware prior to 1.21 which would result in failure to configure the radio's IP address until the module was **restart**ed a second time.
- (bugfix) The module's DHCP Client ID is now passed to the server as an Ethernet address if it is specified as an Ethernet address, and is passed as a string, otherwise.
- (bugfix) The module's DHCP Vendor Class ID is now passed to the DHCP server even when no DHCP Client Name ("hostname") is configured.
- (bugfix) If a module has no radio attached, it can now acquire a DHCP address over Ethernet.
- (bugfix) Error messages are no longer directed specifically to the Debug Port -- that could be disabled, and might cause such commands to fail.
- (bugfix) The <CR><LF> handling of the CLI has been corrected to be more-like the Ubicom products.

- (bugfix) The CLI command "*command* **?**" "help" facility now works if the user is logged-in at the "read" authentication level but not at the "write" authentication level.
- (bugfix) A privilege-escalation vulnerability has been closed in the web interface. This vulnerability would allow users logged-in to the web interface at one authentication level, to instead have the ability to change parameters which should only be writeable at a higher authentication level (e.g. someone logged-in at the "**cfg**" level might be able to change the "**oem**"-level "**serial-default**" parameter).
  Limitation: unlike with the CLI, the web interface does not yet provide warning-message feedback to the user when such a privilege-mismatch has been encountered during a **"commit"; ;** the parameter simply isn't changed.

Known issues for Veyron Firmware build 1.40:

- None.

Release 1.24 (March 2010)

Changes to Veyron Firmware since V1.23:

- (new) The Linux kernel has been changed from 2.6.29.2 to 2.6.31.12.
- (new) The output of the "**help**" and related CLI commands (such as "**?**") is now sorted in alphabetical order.
- (new) In order to enable Ethernet DHCP and Auto-IP, the CLI commands **eth-dhcp**, **eth-dhcp-client**, **eth-dhcp-vendorid**, **eth-dhcp-acqlimit**, **eth-dhcp-fb**, **eth-dhcp-fbip**, **eth-dhcp-fbgateway**, **eth-dhcp-fbsubnet**, **eth-dhcp-fbper**, and **eth-dhcp-fbauto** have been implemented and correspond directly to their **wl-*** counterparts. Their settings are all independent, per-interface (subject to some restrictions). The primary restriction is that no more than one of **wl-dhcp** or **eth-dhcp** can be set to "**1**" at a time. Neither network interface can use DHCP, or one network interface can use DHCP, but both can't use DHCP at the same time.
- (new) The CLI imposes an interlock when both **wl-dhcp** or **eth-dhcp** are set to "**1**" at the same time. The user is warned that this is an illegal configuration, and any "**commit**" performed while in this state will save the default configuration of **wl-dhcp** and **eth-dhcp** (as identified by the device type).
- (new) The CLI imposes an interlock when **{wl|eth}-dhcp** is "**0**" and the corresponding **{wl|eth}-ip** is not configured to a valid IP address and IP subnet.
- (new) The CLI command "**eth-role {client | router}**" controls configuration of the firewall, and also controls the semantics of **eth-ip** and **eth-gateway**. If "**eth-role client**" is active, then the Ethernet's IP address is **eth-ip** and its gateway is **eth-gateway**. If "**eth-role router**" is active, then the Ethernet's IP address is **eth-gateway** and the Veyron *is* the gateway. Additionally, in router mode **eth-ip** is the base address of the dhcp address pool (if dhcp is enabled) and is also the default address used in packet forwarding from the wireless to the wired interface. An interlock is imposed if "**eth-role router**" and **eth-gateway** or **eth-subnet** is not configured as a valid IP address & mask
- (new) The CLI command "**eth-dhcp-server {disable | enable }**" has been added to control whether or not the Veyron's DHCP server is enabled on the Ethernet port. This is "**enable**"ed by default only on DirectEthernet modules. The CLI has an interlock to warn the user if they have both "**eth-dhcp**" and "**eth-**

dhcp-server" enabled at the same time; such a configuration will not be "**commit**"ed (per-device-type default value will be saved, instead).

- (new/modification) DNS and WINS server configuration is now system-level instead of per-interface (that is the way it is supposed to be, anyway). Accordingly, the CLI commands "**dns-server1**", '**dns-server2**", "**wins-server1**", "**wins-server2**", and "**dns-lookup**" are now synonyms for the (now deprecated) commands "**wl-dns1**", "**wl-dns2**", "**wl-wins1**", "**wl-wins2**" and "**wl-dns**".
- (new) Two new module device types have been added: 20 for Industrial Ethernet and 21 for Industrial Serial. The Veyron web pages, "**wl-device**", and "**name-manuf**" commands all reflect these changes with new titles and default values. For the web pages, the "Device Type" in the heading now reads "Industrial Serial" or "Industrial Ethernet", when applicable. For "**wl-device**", the value can now be "**INDUSTR-SERIAL**" or "**INDUSTR-ETHERNET**". For "**name-manuf**", the default value can now be "**DPAC-Airborne-IndustrialS**" or "**DPAC-Airborne-IndustrialE**". For modules configured to allow Personality change, "Industrial Serial" and "Industrial Ethernet" are now options.
- (new) The new CLI command "**ver-kernel**" shows the exact version of the Linux kernel being run on the Veyron.
- (new) The new CLI command "**sys-info**" displays a variety of firmware version, disk, and memory utilization information which is useful for detailed diagnostic analysis. This information is now also displayed as the "top level" page of the web interface's "**Maintenance**" tab.
- (improved) The Veyron web pages now have many title bars which group related settings together in a more-easily-understood fashion.
- (improved) Eliminated some instances of an unnecessary "Association bounce" during initial Veyron bootup. Correction of the underlying race condition now results in IP connectivity being established consistently after the first time the radio completes Association, not the second time.
- (bugfix) The CLI commands "**{wl|eth}-dhcp-rel**" and "**{wl|eth}-dhcp-renew**" now work correctly.
- (bugfix) Saving DHCP Fallback Persistent is now triggered upon a change in any of IP, Subnet, or Gateway, not just the IP address.
- (bugfix) The command "**wl-mac-clone**" now works.
- (bugfix) The command "**wl-mac**" now works reliably in Adhoc mode ("**wl-type p**"). Previously, it did not work if the Veyron had to Establish the specified SSID instead of Join an existing SSID.
- (bugfix) Corrected an error in configuration of Adhoc, Open Authentication, No-Security networks ("**wl-type p**" with "**wl-security disable**").
- (bugfix) When the radio has a static IP address (i.e. "**wl-dhcp 0**"), the radio-power-management commands are not unnecessarily re-asserted every second.
- (bugfix) The parameters "**wl-sleep-timer**" and "**wl-sleep-timer-p2**" are now configurable via the web interface "**Configuration / Advanced Settings / Power Save Settings**" group.
- (bugfix) Restarting the module via the web interface is now much more reliable. The module can still time-out on a particularly slow browser, however, and proceed with restart before such a browser has retrieved the "progress bar" from the module's web server.
- (update) The copyright date on the web interface has been updated to include 2010.

Known issues for Veyron Firmware build 1.24:

- None.

Release 1.23 (February 2010)

This release is available only as factory preload on ABDG-ET-IN5010 devices. It has not yet been tested on other platforms.
This release will not be posted to the website and will be superseded by a later maintenance release after testing is complete on all platforms.

Changes to Veyron Firmware since V1.22:

- (new) Auto-IP (RFC 3927) basic support is now available for the wireless network. Behavior is as follows: for static IP, unchanged; for DHCP, unchanged if successful; for DHCP unsuccessful and fallback enabled ("wl-dhcp-fb 1") and wl-fbip is not 0.0.0.0 and is not 169.254.y.z, use the wl-fbip address; for DHCP unsuccessful and fallback enabled and wl-fbip 0.0.0.0, auto-ip is launched for an arbitrary 169.254.y.z address; for DHCP unsuccessful and fallback enabled and wl-fbip 169.254.y.z, auto-ip is launched to try the configured address first (if there's a conflict, it will negotiate a different address). Note that multicast DNS is not supported -- only IP address negotiation.
- (new) The multicast UDP relay agent is now supported on DirectEthernet modules
- (new) DirectEthernet and DirectSerial "revision L" boards are now supported. DirectSerial "cable plugged-in" detection is not yet implemented.
- (new) CLI and web pages now only show the configuration options applicable to the modules capabilities. For example, if a module has not serial ports, then the CLI commands and web pages applicable to serial ports will not be presented to the user (and thus won't confuse them). Likewise, if a module has no Ethernet port, the Ethernet CLI and web pages will be suppressed. These changes should simplify module configuration significantly.
- (new) The "locator" responder task now supports a "verbose" response mode which provides the u-Boot environment variables (i.e. system capabilities) to the "locator" requester.
- (bugfix) A serial port is no longer locked-out if flow control is changed to "none" or "hardware" while it is currently in an XOFF state.
- (bugfix) Several anomalies regarding changes to serial-port configuration from a TELNET or SSH session have been resolved. Serial port configuration is now correctly adopted, without need for module restart, after an "apply-cfg serial" regardless of the CLI session which issued that command.
- (bugfix) A SSH-initiated CLI session now correctly recognizes the modules capabilities. Previously, it always treated the modules as having all ports available.
- (bugfix) Web page column widths are now better-looking on some browsers and fonts (i.e. they won't wrap to two lines as often).
- (bugfix) An issue with recognizing <backspace> from some terminal emulators has been resolved. The CLI now recognizes both <^H> and <DEL> as <backspace> characters.
- (bugfix) Reference to the non-existent command "io-dir-h" has been removed from the built-in CLI help.

Known issues for Veyron Firmware build 1.23:

- None.

Release 1.22 (December 2009)

This release is available only as factory preload on ABDG-ET-DP50x Revision L devices. It has not yet been tested on other platforms.
This release will not be posted to the website and will be superseded by a later maintenance release after testing is complete on all platforms.

Changes to Veyron Firmware since V1.21:

- (new) Support for DirectEthernet carrier boards "Revision L". Given the appropriate set of hardware configuration flags, Veyron 1.22 inverts the WLAN_CFG LED per the carrier board layout, provides the LAN_LINK functionality (both Link Down and Link Activity), and supports correct usage of "led-mode rssi". LAN_SPD LED functionality is not yet supported: almost everybody runs at 10BaseT, anyway.

  To configure an existing DirectEthernet module for use on the RevL carrier board, new hardware capabilities need to be configured. On an evaluation board, log in through the debug port as "root" and issue these commands: "qtflash edit hwcap 0x0fe0001c" and "qtflash edit hwcapuser 0x00e0001c".

- (bugfix) Corrected several issues with behavior of the "clearbuf" command. The command now works in Tunnel mode.
- (bugfix) Some browser-compatibility improvements in the web pages.

Known issues for Veyron Firmware build 1.22:

- None.

Release 1.21 (December 2009)

Changes to Veyron Firmware since V1.20:

- (new) Added "**wl-security**" types "**wpa-fast**" and "**wpa2-fast**" for EAP-FAST support. These two types support EAP-FAST with TKIP encryption, and EAP-FAST with AES-CCMP encryption, respectively. EAP-FAST "PAC provisioning" is fully-automatic *only* -- the Veyron supplicant does not read the manual-provisioning file formats generated by Cisco APs. Veyron EAP-FAST has been tested successfully with the "OSC Radiator" RADIUS server, version 4.4, as used by WiFi Labs for WiFi certification. Veyron EAP-FAST does *not* work successfully with a Cisco AP's "local RADIUS server".
- (new) Added the CLI command "**eap-fast-provisioning**" to control the level of security maintained during EAP-FAST "PAC provisioning" (i.e. setting up initial credentials with the wireless network). If set to "**unauthenticated**", the site's RADIUS server's identity is not validated before credentials are provisioned. If set to "**authenticated**" (the default) and "**ca-cert-filename**" is configured with a valid root certificate,

the server's identity is validated before credentials are provisioned. If set to "**either**", "**authenticated**" is tried, if possible, then, if not available through the network, "**unauthenticated**" is accepted.

- (new) Added the CLI command "**eap-fast-max-pac-list**" to limit the maximum number of RADIUS servers for which EAP-FAST "PAC" credentials are stored. Default is 10 servers.
- (new) Added the CLI command "**led-mode**" to provide a rudimentary form of RSSI indicator for the module. The default mode of "**status**" is the classic module behavior. The new mode "**rssi**" reconfigures the LEDs such that: COMM LED green means that Signal Strength <= -80 dBm; COMM and LINK LEDs green means that -80dBm < Signal Strength < -60dBm; all three LEDs green means that Signal Strength >= -60 dBm. Note that, for safety reasons, any configuration of a specific LED signal pin for GPIO usage overrides either "**status**" or "**rssi**" mode.
- (new) Added "**wl-security**" type "**wep-leap**" for legacy wireless installations which only support basic WEP encryption (not even TKIP) with LEAP authentication.
- (new) All web pages (except for Firewall configuration) now have a "[DEFAULTS]" button to set their configuration elements back to factory defaults.
- (improved) The **'wl-udp-ping'** command is no longer restricted to use when **'wl-xmit-type'** is **'udp'** or **'both'**; it can be use for any 'wl-**xmit-type'**. Furthermore, the PING is sent not only in accordance with the ARP timeout, but also whenever the module configures its IP configuration (i.e. whenever static IP is set or DHCP completed, including just after boot).
- (bugfix) The interlock to prevent disabling of the Debug port for old versions of u-Boot now correctly detects all intermediate u-Boot versions.
- (bugfix) Corrected numerous problems which could result in loss of IP address and Gateway configuration across radio restarts (either due to "**apply-cfg radio**", "**radio-off**" / "**radio-on**", or the radio driver's watchdog activation). This should correct instances of "overnight loss-of-gateway" and other loss-of-connection when configuration is changed and re-applied. (bugfix) Improved responsiveness of the module when not Associated by not repeatedly attempting to kill services which are not running, anyway, during such a time.
- (performance) Improved general responsiveness of the system by having the background status-monitoring task not re-read the system configuration each second if it hasn't been changed by the user. Also, the background status-monitoring task now directly invokes most sub-tasks instead of going through a costly intermediate shell.
- (performance) The module now immediately responds to Associated and Disassociated events (instead of waiting perhaps up to 1 second for a poll). This can help initial connectivity of the module and improve roaming behavior.
- (diagnostic) Error messages from the background status-monitoring task are no longer suppressed. Instead, they are output on the Debug port.
- (bugfix) Remedied confusion of some command-line applications which were experiencing errors due to Veyron's attempt at TELNET option negotiation. When "**telnet-echo disable**" is configured, the Veyron will not issue any TELNET option negotiation requests.
- (bugfix) Remedied a race condition between the Veyron TELNET daemon and its command shell which resulted in the TELNET daemon echoing characters back to the caller before the command shell was yet even launched. This will correct all known issues of "phantom command echoes" experienced by some customers.
- (bugfix) Filenames, usernames, and passwords for the "**get-cert**" and **"get-cfg**" commands can now contain embedded spaces and other "special" characters.
- (bugfix) Errors experienced in retrieving files with the "**get-cert**" and "**get-cfg**" commands are now reported to the user over the Veyron CLI, instead of (all-but-inaccessibly) over the Debug Port.

- (bugfix) An extra "carriage return" at the start of a Veyron login session is now removed. This should help avoid confusing some non-robust customer applications.
- (bugfix) The WLAN-Route web page now allows the administrator to forward traffic to a non-local IP address without requiring that a port be specified.
- (bugfix) Updated from uClibc 0.9.30 to 0.9.30.1 (maintenance release).
- (bugfix) Detection of a <BREAK> sequence over the serial port is now more robust.
- (bugfix) Improved synchronization between Data and CLI modes across an Escape or <BREAK>. Before, the "**OK**" prompt would not always be displayed immediately.
- (bugfix) Corrected a "false failure" notification in which the Veyron could believe that firmware update failed when, in fact, it had not.
- (bugfix) The "**serial-default**" command is now correctly recognized for all serial ports, even when the module is configured for DirectEthernet operation. Previously, "**serial-default**" was fixed at "**cli**" for DirectEthernet modules.
- (performance) Improved the runtime footprint of the Veyron firmware by over 250KB. This should help some high-memory-utilization applications.
- (performance) Consolidated similar web pages to result in a 134KB disk-image size improvement and about a 30KB web-server runtime size improvement.

Known issues for Veyron Firmware build 1.21:

- None.

Release 1.20 (October 2009)

Changes to Veyron Firmware since V1.12:

- (new) Sophisticated firewall capabilities are now available to prevent access to network addresses and ports from the wired side of a DirectEthernet module, and to protect the Veyron itself and any devices on its wired side. New CLI commands include "**wl-route**", "**eth-route**", "**wl-route-default**", "**eth-route-default**", "**del-wl-route**", "**del-eth-route**", and "**apply-cfg firewall**". Control from the web interface is *very* nice. See below for more explanation of the CLI commands.
- (new) Full multi-port operation is now supported. Arbitrary combinations of UART, SPI, Ethernet, dual-UART, dual-UART+Ethernet, SPI+UART, and SPI+UART+Ethernet are orthogonally configurable. *Note that this substantial communications capability has implications for power-management.* Specifically, the more ports which are enabled, the more power the Veyron will consume. Customers should take advantage of our ability to turn ports "off". Also, before the module's radio can enter "**sleep**" mode, all ports must permit "**sleep**" operation. Thus, if any port remains "on" yet in an otherwise dormant CLI session, that command-ready CLI session will keep the module awake even if no application is truly using that CLI. *The module can't tell the difference between "temporarily inactive" and "not used at all" unless the port is actually turned "off".*
- (new) Radio "**sleep**" mode works when in multi-UART or SPI-UART combination modes. *When multiple CLI/Tunnel ports are enabled, all ports must request "**sleep**" before the radio can safely enter that mode*. This means that *customers who wish to use "**sleep**" with single-UART or SPI-only configurations must*

disable the second UART port or the radio will never go to sleep! In other words, they can't leave the second-UART "dangling" in CLI mode. This is a critical "change" to pre-1.20 behavior, but there really is no other way to reliably support both multiple ports and "**sleep**".

- (new) The second serial port is now fully supported via the new CLI commands "**esc-str-p2**", "**esc-mode-serial-p2**", "**esc-mode-lan-p2**", "**serial-default-p2**", "**bit-rate-p2**", "**data-bits-p2**", "**parity-p2**", "**flow-p2**", "**input-size-p2**", "**serial-assert-p2**", "**stop-bit-p2**", "**wl-tunnel-port-p2**", "**wl-tcp-port-p2**", "**wl-tunnel-mode-p2**", "**wl-tunnel-p2**", "**wl-tcp-timeout-p2**", "**wl-retry-time-p2**", "**wl-tcp-ip-p2**", "**wl-tcp-ip2-p2**", "**wl-udp-port-p2**", "**wl-udp-ip-p2**", "**wl-udp-xmit-p2**", "**wl-xmit-type-p2**", "**wl-udp-rxport-p2**", "**wl-sleep-timer-p2**", and "**clear-buf-p2**". The first serial port can be "addressed" via a set of "**-p1**" commands corresponding to these. If no suffix is provided (i.e. if the original commands are used), the UART/SPI port over which the user is communicating is used by default, or the first UART/SPI port is used if the user is communicating over TELNET or SSH. See below for explanation of the CLI commands.
- (new) "Single-signon" control of user names and passwords. All user passwords are encoded into the Linux standard "**/etc/passwd**" file and are no longer subject to plain-text viewing. Furthermore, the DPAC CLI user names are directly mapped to Linux users and groups; there is no need to maintain them separately in the DPAC configuration files. These passwords are now consistent for DPAC CLI, Linux shell, HTTP (web), SSH, and FTP. ***Due to the encoding taking place, upgrade to 1.20 from 1.12 is "one-way" for maintaining passwords.*** If someone needs to downgrade to 1.12, they will need to re-enter their user names and passwords into their configuration.
- (new) A CLI command, "**pw-root**" has been added to change the Linux root password from its default of "**rootpassword**".
- (new) LED pins can now be configured as either their standard LED configuration, or as general-purpose GPIO. This is configurable via both the CLI and web interfaces. New CLI commands are "**post-led**", "**rf-link-led**", "**wln-cfg-led**", and "**conn-led**". *For this capability to be enabled, the value 0x0f000000 must be OR'ed to the Veyron environment variable "**hwcap**".* This is done automatically by the built-in upgrade script for 1.20.
- (new) The CLI "**http-port**" command now accepts another value, "**off**". This option completely disables the HTTP server (at the next module restart), thus saving both processing power and memory. This can be used as a security feature, or it can be used to free up memory to be used by another service.
- (new) The mode "**wl-security wpa-psk128-tkip**" has been implemented to support migration mode w/Cipher Suite TKIP and/or 128-bit WEP for the Group Cipher using WPA PSK.
- (new) The mode "**wl-security wpa2-psk-tkip**" has been implemented to support migration mode w/ Group Cipher Suite TKIP using WPA2 PSK.
- (new) The CLI "**wl-xmit-type**" command now accepts another value, "**ssh**". When configured for "**ssh**", the "**pass**" command will establish an SSH tunnel with the server at "**wl-tcp-ip**" (falling back to "**wl-tcp-ip2**") over the port "**wl-tcp-port**". The credentials used for the secure login are the same as those with which the user is currently "**auth**"enticated ("single signon").
- (new) So that "**wl-xmit-type ssh**" can be used with "**serial-default pass**", the commands "**ssh-default-user**" and "**ssh-default-password**" have been implemented. If, and only if, SSH is initiated automatically via "**serial-default pass**", this username and password combination is used to initiate the outgoing SSH session.
- (new) The new CLI "**ssh-port**" command is meant to behave like "**http-port**". The SSH server is only launched at module restart if an SSH key has been generated; this command can also be set to "**off**" to disable launch of the server even if keys have been generated.
- (new) A new CLI "**wl-ssh-port**" controls the TCP port on which the Veyron's SSH server listens. Default is 22 (standard for SSH).

- (new) SSH needs to know if it's OK to connect to each server in the network. Unless told otherwise, the SSH client will refuse (rightfully) to connect with a previously-unknown server. The new CLI "**ssh-trust**" command controls whether or not the SSH client will accept credentials from previously-unknown servers. If set to "**0**" (the default), the client will refuse to connect to an unknown server. If set to "**1**", the client will connect to a previously-unknown server and store its credentials in the "**/var/etc/config/ssh/known_hosts**" file. The setting of this command is meant to be used for initial network configuration *only*. Setting it at other times undermines the security provided by SSH; as such, the setting is *not* stored persistently, but resets to "**0**" with each restart of the module. A CLI "**save**" command needs to be issued after network trust configuration has been performed; otherwise, the credentials are not saved to the Veyron's FLASH.
- (new) The command "**wl-sleep-status**" will now report the current power-management mode of the radio as on one of "**active**", "**doze**", or "**sleep**".
- (new) When the CLI is in "**pass**" mode (either automatically or manually) and the radio is in "**sleep**" mode, the Veyron will now wake the radio when it needs to attempt to connect to the "**wl-tcp-ip**" endpoint and, if no endpoint is available, will go back to "**sleep**" for "**wl-retry-time**" seconds. Previously, the radio stayed awake until a connection was made. This new optimization can result in substantial power savings in some customer scenarios.
- (new) The CLI command "**telnet-echo**" controls whether or not characters sent to the CLI are echoed back to a user connected via TELNET or SSH. If "**enable**", TELNET and SSH characters sent to the CLI are echoed back; this is the default for Veyron modules. If "**disable**", TELNET and SSH characters are not echoed back; this was the default for Ubicom modules.
- (new) The CLI command "**clear**" is now able to set the configuration objects "**pw-wpa-psk**", "**ftp-server-path**", "**wl-key-1**", "**wl-key-2**", "**wl-key-3**", and "**wl-key-4**" back to their factory defaults.
- (new) The commands "**ftp-server**" and "**ftp-server-listen-port**" have been implemented to allow control of the Veyron's built-in FTP server. For "**ftp-server**", the value "**enable**" starts the FTP server listening on **"ftp-server-listen-port**" (default port 21). For "**ftp-server**" values "**disable**" and "**off**", the FTP server is not even loaded. On the web interface, these are configured on the "Advanced Settings" page.
- (new) The "**list-cfg**" and "**list-cert**" CLI commands (and their web counterparts) now show the size of each listed file, the total size of all listed files, and the space available in the Veyron's RAMdisk.
- (new) The **"discover**" and **"wl-scan**" commands now check to see if there is enough memory available to save their results (both CLI and web versions). If not, they will display the necessary and currently-available RAMdisk space (to assist the administrator in disk cleanup).
- (performance) User-defined commands, the CLI "**sh**" command to enter the Linux shell, and logins on the debug port and/or SSH which then change their "**auth**" name no longer incur the memory hit of an additional Linux shell (which existed to re-login to the appropriate account).
- (performance) Committing a set of configuration changes from the web interface or uploading new firmware from the web interface no longer incurs the memory hit of an additional Linux shell.
- (bugfix/performance) Uploading new firmware from the web interface no longer consumes memory in 1MB chunks, but rather in (more easily allocated) 128KB chunks. This changes allows firmware upload to complete successfully in situations which previously would have failed due to out-of-memory conditions.
- (bugfix) Radio "**sleep**" mode is more stable (i.e. the radio is now much better at waking when it should and going back to sleep when it should). Specifically, several state-synchronization issues between the Veyron control and status-monitoring tasks have been resolved.
- (bugfix) When the CLI is in "**pass**" mode (either automatically or manually) and the radio is in "**sleep**" mode and "**esc-mode-serial brk**" is active, the user can now send a <BREAK> over the UART without causing the radio to unintentionally wake up.

- (bugfix) A race condition between **wpa_supplicant** and the Veyron background "status monitoring" task has been corrected. This race could result in a failure to initiate acquiring a DHCP address if the radio associated extremely quickly during powerup.
- (bugfix) The channel-set part of the Regulatory Domain logic has been corrected for the latest ETSI regulations (i.e. Great Britain now includes channels 12 and 13).
- (bugfix) Linux shell "job control" (i.e. ^C, ^Z, etc.) now works on UART ports. Previously, if you initiated a default "**ping**" from the Linux shell on the UART port, you were stuck unless you could log in another way and kill it manually...
- (bugfix) Linux "standard error" messages are now directed to the correct UART port when in the Linux shell. Previously, everything sent to "standard error" (such as "--help" output, etc...) would go to the Debug port (whether or not you could see it...). CLI-mode error output still goes to the Debug port (as it should).
- (bugfix) The **"discover**" and **"wl-scan**" commands now remove their temporary-results files when completed (this saves disk space). Other temporary files are now also deleted after use.
- (bugfix) Once a Veyron module had initiated an AdHoc network itself (i.e. "Start"ed the IBSS instead of "Join"ed it), it would never do so again -- it would neither "Start" *nor* "Join" that AdHoc network. This is now fixed.
- (bugfix) Race conditions between "**qtsh**" and "**qtperiodic**" have been resolved to correct situations where restart of the radio (such as through "**apply-cfg radio**") would result in re-application of the *previous* configuration, or perhaps even loss of *any* configuration.
- (bugfix) When the Veyron is configured in AdHoc mode with WEP, the module's Beacons now properly show that encryption is in use.
- (bugfix) The radio's "nickname" is now properly configured when it is in Infrastructure mode and brought up by **qtperiodic**.
- (bugfix) The radio's regulatory domain is now properly configured when it is in AdHoc mode and brought up by **qtsh**.
- (bugfix) The Veyron web interface now, on most browsers (not IE, unfortunately), will show updated configuration fields without having to exit and restart the browser. This fix utilizes more-aggressive browser-cache control in the web pages.
- (bugfix) The default UART2 TCP tunnel port (**"wl-tunnel-port-p2**"), UDP transmit port ("**wl-udp-port-p2**") and UDP receive port ("**wl-udp-rxport-p2**") no longer conflict with the default UART1 ports. They have been increased by 1 relative to the UART1 ports.
- (bugfix) For Ethernet + UART configurations, the Veyron firewall now automatically allows access to the **"wl-tunnel-port**" and "**wl-udp-rxport**" ports.
- (bugfix) The web server and SSH server are now launched with full "**root**" account privilege.
- (bugfix) The environment variable "**hwcapuser**" is no longer reset to factory defaults whenever a configuration is <Commit>ed from the web interface.
- (bugfix) A "Discover Airborne Modules" from the web interface of a DirectEthernet module will now show the modules on the wireless network as well as any others on the wired network.

Firewall CLI command details:

wl-route [tcp|udp|all] [port xxx] [forward|drop] [xxx.xxx.xxx.xxx:xxx]
Sets up a specific rule for incoming wireless traffic.
The **tcp|udp|all** option selects the protocol for this rule. The port option defines the port number for this rule. You cannot set the port option if the protocol is not **tcp** or **udp**. The **drop** option will cause traffic matching

the protocol and port specifications to be dropped. The **forward** option will cause traffic to be forwarded to the Ethernet interface, and requires another parameter to define the destination IP address and port. The other parameter is formatted as **xxx.xxx.xxx.xxx:port**.
For example, the command "**wl-route tcp port 80 forward 192.168.2.101:8080**" will cause all TCP port 80 traffic received on the wireless interface to be forwarded to IP address 192.168.2.101, port 8080 on the Ethernet interface.
wl-route with no parameters will display the current set of wireless routing rules in the order that they will be applied to incoming traffic.
eth-route [tcp|udp|all] [ip xxx.xxx.xxx.xxx] [port xxx] [accept|drop]
Sets up a specific rule for incoming Ethernet traffic.
The **tcp|udp|all** option selects the protocol for this rule. The ip option defines the IP address for this rule. The **port** option defines the port number for this rule. You cannot set the **port** option if the protocol is not **tcp** or **udp**. The **drop** option will cause traffic matching the protocol, ip, and **port** specifications to be dropped. The **accept** option will cause traffic matching the specifications to be forwarded to the wireless interface.
For example, the command "**eth-route tcp port 80 drop**" will cause all TCP port 80 traffic received on the Ethernet interface to be dropped.
eth-route with no parameters will display the current set of Ethernet routing rules in the order that they will be applied to incoming traffic.
wl-route-default [forward|drop]
Sets the default handling of incoming wireless traffic.
The **forward** option will cause the traffic to be forwarded to the IP address defined by the **eth-ip** setting. The **drop** option will cause all incoming wireless traffic to be dropped. The default is **forward**.
eth-route-default [accept|drop]
Sets the default handling of incoming Ethernet traffic.
The **accept** option will cause the traffic to be forwarded to the wireless interface. The **drop** option will cause all incoming Ethernet traffic to be dropped. The default is **accept**.
del-wl-route [tcp|udp|all] [port xxx]
Deletes the rule defined by the **tcp|udp|all** and **port** parameters from the current set of wireless port forwarding rules.
del-eth-route [tcp|udp|all] [ip xxx.xxx.xxx.xxx] [port xxx]
Deletes the rule defined by the **tcp|udp|all**, **ip**, and **port** parameters from the current set of Ethernet firewall rules.

Multiport CLI command details:

- Each of the new "**-p2**" commands will behave exactly the same as the non-suffixed versions of the commands, with the exception that they will operate on serial port 2.
- If the non-suffixed version of the command is entered, it will operate on the serial port over which it is entered. If the non-suffixed version of the command is entered on a TELNET or SSH session, it will operate on the first serial port or SPI port.

- To explicitly operate on the first serial port (or SPI port) from either a TELNET/SSH session or the second serial port, add the suffix "**-p1**" to the commands.
- The commands "**pass-p2**", and "**pass-any**" have been added. These commands are intended to be only used from a TELNET/SSH session. The "**pass-p2**" command will attempt to establish a TELNET/SSH pass connection with the second serial port, if it is in "**listen"** mode. Issuing the "**pass**" command either without a suffix or with the "**-p1**" suffix from a TELNET/SSH session will attempt to establish a TELNET/SSH "**pass**" connection with the first serial port, if it is "**listen**" mode. Issuing the "**pass-any**" command from a TELNET/SSH session will attempt to establish a TELNET/SSH "**pass**" connection with the first serial port found that is in "**listen**" mode.
- Note: When setting up UDP connections for the serial ports, you must specify different "**wl-udp-rxport**" parameters for each serial port. Otherwise, one port will not be able to connect because you can only bind a single process to a single network port.

Known issues for Veyron Firmware build 1.20:

- None.

Release 1.12 (August 2009)

Changes to Veyron Firmware since V1.11:

- (bugfix) Race condition that would sometimes prevent wakeup from sleep mode has been fixed.
- (bugfix) Extra checkbox from module personality web page has been removed.
- (bugfix) IWPRIV tool has been changed to return an actual error code instead of a generic one.
- (bugfix) WEP encryption problem in Ad-Hoc mode has been fixed.
- (bugfix) UDP data will not be transmitted over the network if udp-ip is 0.0.0.0 or udp-port is 0.

Known issues for Veyron Firmware build 1.12:

- None.

Release 1.11 (August 2009)

Changes to Veyron Firmware and u-boot since V1.10:

- (bugfix) Several help files had non-ASCII characters left in them from their original cut-and-paste from the PDF users guide. These have now been fixed.

- (bugfix) The u-Boot bootloader no longer fails with a CRC self-check error when its "consoletty" port is not specified as the debug port. This includes the case of "no console port", as happens when the debug port is disabled through the u-Boot environment variable "hwcapuser". If all serial ports are "disabled" through "hwcapuser", u-Boot will still attempt to display critical error messages over the primary serial port ("ttyS0"), otherwise, it will now boot silently, without displaying any messages. The Veyron Linux runtime will not allow disabling the debug port unless this version of u-Boot (or later) is installed.
- (new) The u-Boot bootloader now recognizes the "silent" environment variable. If this variable is set to any value, u-Boot will not display any output except critical error messages during bootup -- even if all the serial ports are enabled.
- (change) Unnecessary device drivers (keyboard, mouse, etc.) and library options (custom printf() options, etc.) have been removed from the Linux kernel image in order to save space.
- (bugfix) Fixed a potentially fatal virtual-memory-allocator race condition.
- (bugfix) Fixed an error which caused the Discovery service to fail if it received a "Discover" packet before its radio was fully configured. Restart of the module was required to restore Discovery operation.
- (change) SPI performance should be improved due to use of the "low-latency" TTY options.
- (new) GPIO control has been added to Veyron. CLI commands include io-read, io-write, io-dir, io-pullup, io-dir-f, io-dir-g, iopullup-f, io-pullup-g.
- (new) Deep-sleep has been added to Veyron. Added CLI commands radio-startup, wl-sleep-timer.
- (new) The "wl-region" command is now fully implemented, allowing Veyron to be used in non-FCC-like regulatory domains.
- (new) Module I/O port control has been greatly simplified with the new "ethernet-port", "serial-port", "serial-port2", and "debug-port" commands. Each of these accepts either "enable" or "disable" and can be used to display the current I/O port configuration. Use of these commands directly modifies the "hwcapuser" environment variable and requires a module restart to apply. They are available on the web interface under "Maintenance/Change Module Personality". The Veyron Linux runtime will not allow disabling the debug port unless the 1.11 version of u-Boot (or later) is installed, due to the bugfix described above.
- (new) Module primary "personality type" control has been greatly simplified with the new "device-type" command (not to be confused with the existing "dev-type" command, which provides a numeric response). This command accepts "uart", "ethernet", "serial", or "spi" as its option and configures the module "dev-type" to the proper code and upgrades "hwcapuser" to the minimum I/O port configuration needed to support the personality (i.e. if a port is needed, it will be enabled, but only conflict ports will be disabled - such as SPI/Ethernet). It is available on the web interface under "Maintenance/Change Module Personality".
- (new) The command "eth-mac" has been added to enable override of the factory-configured Ethernet MAC address. Note that use of this command does not overwrite the Quatech factory-configured "ethaddr". For security purposes, this command is not available through the web interface.
- (bugfix) The command "wl-mac" now functions properly in all circumstances. For security purposes, this command is not available through the web interface.
- (new) The configuration of the second serial port can now be controlled via the "bit-rate2", "data-bits2", "parity2", "flow2", "stop-bit2", and "serial-assert2" commands. They are available on the web interface under "Configuration/Serial Port 2 Settings". Such configuration in 1.11 is of limited use, however, since the second serial port can only accept a Linux login shell.

- (new) The "clear pre-calc-psk" command now removes the pre-calculated WPA pre-shared key from the module. This can be used to "clean up" the security configuration when changing from a PSK mode to a non-PSK "wl-security" mode.

Known issues for Veyron Firmware build 1.11:

- None.

Release 1.10 (June 2009)

Changes to Veyron Firmware and u-boot since V1.04:

- (new) smaller disk image (i.e. faster update times and more memory available after update). Please note the difference in sizes between the 1.04 image and the 1.10 image... (3415969 vs. 2916195 bytes)
- (new) embedded web server. Browsers supported include Firefox 3.x, Internet Explorer 6.0-8.0, Opera 9.6+, and Chrome 1.0.
- (new) SPI support. *This support is mutually exclusive with Ethernet -- there are insufficient CPU resources for both to be enable simultaneously*. Enabling SPI requires both that the Veyron's "hardware capabilities" be configured correctly and that it's "device type" be set correctly. The SPI protocol *is not identical to that of the Ubicom*. This was necessary in order to achieve the significant performance boost through the Atmel ARM processor.
- (new) CPU PowerSave. The Atmel ARM processor clock is now gated-off during CPU-Idle time, re-enabled by any interrupt. The benefit to this seems to be about 30mA of current draw when idle, and is consistent across all device types. *There appears to be no performance penalty for this benefit* -- the CPU clock is *gated*, not disabled, so there is *no settling time* to re-emerge from the CPU-Idle mode (see Atmel document 6217). Given this behavior, CPU-Idle PowerSave is now enabled *at all times* on the Veyron. The saving will be available to all configurations, regardless of the "**pm-mode**" setting.
- (new) Peripheral PowerSave. The Veyron has always supported "hardware capabilities" configuration through the u-Boot environment variable "**hwcapuser**". Prior to 1.10, this only controlled whether or not the drivers for those peripherals were loaded. With 1.10, the peripherals themselves are now disabled, often resulting in significant power savings. For example, the power savings for UART and Serial modules (with the Ethernet disabled -- bit 4 of **"hwcapuser**" cleared**),** is now a minimum of 20mA, possibly up to 70mA if someone were to connect an Ethernet to a UART or Serial development board!. Note that enabling the Ethernet peripheral powersave requires update of *both* the Veyron firmware to 1.10 *and* u-Boot to 1.10. For DirectEthernet modules, the serial ports can now be disabled. Disabling the primary serial port (bit 0 of **"hwcapuser**") saves about 8mA, disabling the secondary serial port (bit 1 of **"hwcapuser**") saves about 7mA, and disabling the debug port (bit 2 of **"hwcapuser**") saves less than 1mA. Disabling all of them saves between 15-16mA. Even for UART and Serial modules, disabling the secondary serial port and debug port (if not used) will

result in about 8mA savings. These serial-port savings do not require update of u-Boot; only update of the Veyron runtime firmware.

- (bugfix) The "**discover**" CLI command (and "**qtlocate**" Linux command) are now better at filtering out the module's own address from the displayed results. This is mostly visible only to DirectEthernet configurations.
- (bugfix) Some early-boot race conditions with the "**/dev**" directory have been resolved, resulting in a more stable/repeatable boot sequence and fewer warnings on the debug console.
- (bugfix) A race condition within "**apply-cfg radio**" has been resolved, resulting in fewer instances of the radio immediately reassociating just after it successfully associated (i.e. fewer "wlan up; wlan down; wlan up" sequences -- it's now just "wlan up").
- (modification) Unnecessary device drivers have been removed from the Linux kernel and from the "**/dev**" directory.
- bugfix) Web server recognizes ".html" variants of the default web page requested by various browsers.
- (bugfix) The Ethernet now comes back up completely after being brought down for reconfiguration (such as through "**apply-cfg**").
- (bugfix) The CLI command "**wl-mac**" now behaves as documented, changing the MAC address used by the radio.
- (change) The number of queries and interval between queries made by the CLI "**discover**" command (and Linux "**qtlocate**" command) have been changed to 5 iterations, one second apart, to better match the behavior of the MS-Windows "locator" utility.
- (new) The command "**eth-info**" has been added to the CLI (and web pages, when applicable) in order to provide information about the Ethernet which is similarly useful as the "**wl-info**" command is for the radio.
- (bugfix) "**?**" (help) is now implemented for the CLI commands "**dev-type**", "**ver-fw**", and "**ver-radio**".
- (bugfix) The webpage listing of regulatory domains is now sorted.
- (bugfix) The webpage listing of possible channels now includes "14".
- (bugfix) Resetting the module to factory defaults now clears out any user-made modifications to the web-server configuration file "**/var/etc/config/lighttpd.conf**".
- (bugfix) The background periodic-status task is now killed upon module "**restart**" so that it will not interfere with the restart process.
- (bugfix) TELNET terminal behavior is fixed (CR/LF was having some problems).
- (bugfix) If "**serial-default**" is not set to "**cli**", suppress "**OK**" only for the initial connection.
- (new) Many web page tweaks and improvements.
- (change) "Module Status" and "Module Extended Status" have been merged into one web link.
- (bugfix) Corrected web-page display of hex and IP address values (were always showing default values).
- (new) Added the CLI command "**blink-post-led {on|off}**" (and corresponding web link) to blink the POST LED for purposes of physically locating a module.
- (bugfix) "**serial-default pass**" now automatically reconnects after loss of connection.
- (new) The Veyron can now detect when its firmware has been changed. A file "**/var/etc/config/fwrev.txt**" is now created whenever the firmware changes. Furthermore, when the firmware revision changes, the script "**/etc/first_run.sh**" is executed to make any necessary corresponding module configuration changes to ensure firmware compatibility.
- (bugfix) During "**restart**", the module waits an additional second (was 1, now is 2) between sending out "graceful" Terminate commands to all processes and "immediate" Kill commands to all

(remaining) processes. This allows a little more time for Graceful Termination of network connections (some tunnel & TELNET connections were not receiving the TCP "Finish" packet sequence before module rebooted; this made resuming those connections more difficult because the original connection had to time-out instead of being properly Closed).

- (bugfix) Inbound hardware flow control now works correctly on DirectSerial modules.
- (bugfix) Use of the Linux logging file **"/var/log/wtmp**" has been discontinued. The file could potentially grow to a size large enough to interfere with other uses of the Veyron's internal RAMdisk.

Known issues for Veyron Firmware build 1.10:

- The "wl-mac" command does not reliably configure the radio's MAC address after the unit is rebooted (the radio usually retains its factory default MAC address). Configuration appears reliable when performed via an immediate "apply-cfg radio" command.

Release 1.04 (April 2009)

Changes from 1.03 include:

- (new) Veyron now supports the "PKCS12" certificate format ("p12", "pfx") natively without need for conversion to a ".cer" or ".pem" file. This is the "native" format for files generated by the Microsoft Internet Authentication Service (MS-IAS).
- (new) Veyron now defaults to avoiding a TLS security enhancement standard in OpenSSL since OpenSSL 0.9.6d [9 May 2002]. OpenSSL's resolution to a theoretical weakness in TLS 1.0 (see http://www.openssl.org/~bodo/tls-cbc.txt, Section 2) actually breaks Microsoft TLS, which has not been updated since 2002 to address the problem... To re-enable this security enhancement (good for FreeRADIUS, Steel-Belted RADIUS, and DeviceScape, but fatal to MS-IAS and Cisco APs' built-in RADIUS server), add a line "strong_tls_cbc=1" to the "network" section of a custom "wpa_supplicant.conf" file.
- (new) Veyron now fully supports DirectEthernet and DirectSerial (RS-422 and RS-485) products.
- (new) Veyron now supports a user-editable Linux "/etc/hosts" file. This file is used for statically naming the machines assigned specific IP addresses in a customer's network (i.e. you can use machine names instead of addresses, even without DNS). To use this, add the desired "ipAddr hostName" line to "/var/etc/config/hosts" and execute "qtflash save". The file will appear as both "/etc/hosts" (symbolic link) and "/var/etc/config/hosts" (actual file).
- (enhancement) Performance has been improved significantly in the periodic "watchdog" tasks within the Veyron. This improves both responsiveness and memory utilization.
- (bugfix) Non-graceful TELNET session termination no longer leaves an "orphan" unterminated shell session.
- (bugfix) Fixed prematurely sending "OK" over the CLI under some circumstances before the "radio off" command was complete.
- (bugfix) The command "wl-telnet-port" is now honored by the TELNET server.

Release 1.03 (March 2009)

Changes to Veyron Firmware since V1.02:

- (new) Added support for a WINS server to both the DHCP client and server.
- (bugfix) Changed TCP Data inactivity timer so it would actually close the socket.
- (new) Added support for reflashing u-boot and at91-bootstrap via the Linux shell commands "**qtflash uboot**" and "**qtflash at91boot**".
- (new) Added the Linux shell command "**qtlocate**" and corresponding CLI command "**discover**" which broadcast Ubicom discovery packets to the Veyron's subnet and report the modules which respond. *Note that functioning of this protocol requires either Veyron firmware 1.02B or Ubicom firmware 4.3.0.39 (or later) due to inappropriate fixed-UDP-port responses of all previous firmware versions*.
- (bugfix) Fixed a memory leak in **qtperiodic** when the Veyron is configured with "**wl-con-led pass**". A file handle wasn't being closed for that configuration setting, so a new file handle was being created each second, consuming memory.
- (new) Added two commands to support for a Veyron startup message: **startup-msg [enable | disable]** Enables display of **startup-text** message when the module is able to accept commands. Default is **disable**. **startup-text [String]** message to be displayed if **startup-m**sg is enabled. Can be up to 31 characters. Default is "**Ready**".
- (bugfix) Enabled network interface **operstate** control for Marvell radios from the **wpa_supplicant** service. This corrects issues of the wireless network never entering "**IF_OPER_DORMANT**" operational state during 802.1X re-authentication. Non-802.1X packets can no longer be transmitted through the radio while it is in the process of authenticating with the network. All higher-level protocol packets are *dropped* during reauthentication. This should result in no passing of data packets with old security keys during reauthentication (i.e. no "MIC errors"), but incurs the cost of relying on higher-level protocol retransmission to avoid potential loss of data (if necessary for the application).
- (new) CLI command **arp-staleout-time**: Usage: arp-staleout-time [Integer].
  The amount of time since the last observation of the IP address before scheduling that entry for removal from the ARP table. Default is 120 seconds. A reboot is required for any changes to take affect.
- (new) CLI command **arp-reachable-time:** Usage: arp-reachable-time [Integer]
  The amount of time before sending an ARP to each device in the ARP table. (In reality, the real rate is a random amount of time between 0.5 and 1.5 times this value) Default is 120 seconds. A reboot is required for any changes to take affect.
- (bugfix) The Ethernet PHY is now always hard-reset within the u-Boot loader (at no discernable POST-time penalty to non-Ethernet applications). All PHY reset timings have been tailored to the Veyron's Broadcom BCM4241 chip, instead of having more "generic" timings. These actions dramatically improve early-boot Ethernet PHY stability and connectivity.
- (bugfix) All Veyron network services are now started by or after the CLI shell. This improves power-on to POST times and avoids some IP address transients (DHCP) which could interfere with service operation.
- (bugfix) The Marvell 8385 radio driver now correctly passes IEEE 802.2 LLC packets to the host processor. The Veyron does not currently recognize such packets, but LLC packets are no longer incorrectly stipped of their link header and random data passed to the host (potentially affecting other protocols).
- (new) If the FACTORY_RESET pin is asserted during u-Boot powerup, the user will always have at least 2 seconds to interrupt u-Boot over the debug port (even if interruptibility is disabled via having set

"bootdelay -1").

- (new) If the u-Boot "bootdelay" is set greater than 10, the value is interpreted as tenths of a second instead of seconds. This allow finer tuning of interruptible-boot timings.
- (bugfix) Intermittent-power and spurious-reset DataFLASH stability has been substantially enhanced by ensuring that there is almost no possibility of issuing spurious DataFLASH commands while reading the system firmware during boot. These fixes were introduced into AT91Bootstrap and u-Boot 1.0.4.
- (new) Additional CLI and data-tunnel diagnostic capability is now available.
- (bugfix) The Veyron's POST LED signal would not become active if the device's "**serial-default**" mode was anything but "**cli**".
- (bugfix) The Veyron's TELNET server would not be properly initiated (if at all) if the device's "**serial-default**" mode was anything but "**cli**".
- (new) The Veyron now supports the DirectSerial motherboard in RS-232 (only) configuration.
- (bugfix) If there were more than 32 parameters (or intervening spaces) on a CLI command line, the parser would exceed the parameter array boundary and would corrupt memory.

Known issues for Veyron Firmware build 1.03:

- No processor board power management support (radio power management is supported via pm-mode doze)
- No Web server support.

Release 1.02 (January 2009)

Changes to Veyron Firmware since V1.01:

- The Veyron default "sysctl.conf" file sets the ARP staleout time, '/proc/sys/net.ipv4.neigh.default.gc_stale_time', to 120 seconds, up from the Linux default of 60 seconds. This now matches the MS-Windows and Quatech WLNB/WLNG behavior.
- Any modifications the user makes to 'sysctl.conf' (besides the above change in defaults) are now persistently saved to the module's configuration by the CLI 'save' command, instead of being re-defaulted at each boot. The module's 'passwd' and 'group' files are now also saved persistently, instead of being defaulted-at-reboot
- The default ARP system configuration "**base_reachable_time**" has been adjusted from 30 seconds to 120 seconds. Note that to update an existing 1.01B Veyron unit, one must go to the Linux shell and execute "**cp /etc/sysctl.conf.default /var/etc/config/sysctl.conf**", then "**qtflash save**" (or just "**save**" from the Airborne CLI).
- The radio now exhibits hysteresis when moving back into 802.11 PowerSave mode, instead of trying to jump back into PSP as soon as possible after any transmit or receive. The hysteresis window is nominally 10 milliseconds (after the latest data packet transmit or receive), though this can vary due to Veyron's clock granularity. Generally, 10 milliseconds is 10% of the time between beacons from an AP. In testing with the Symbol AP-4131 configuration here, "update ftp" shows sequences of up to 20-packet exchanges between the Veyron and the FTP server without an intervening PS-Mode-change packet (average is about 8 packets, whereas previously it was 2 packets), and performance

appears substantially faster.

- A new feature has been added for UDP data tunnels. The CLI command "**wl-udp-ping**" (default "**0**") has been added to refresh the ARP cache by periodically "ping"ing the "**wl-udp-ip**" server at 3/8 the configured ARP "**base_reachable_time**" interval. Setting this to "**1**" enables the "ping" so long as "**wl-xmit-type**" is either "**udp**" or "**both**". Testing at Quatech shows that this option does maintain the Veyron's ARP cache without further explicit ARP exchanges, however some servers send a *directed* ARP *to* the Veyron in an apparent attempt to confirm the Veyron's IP address. Again, when "**wl-udp-ping 1**" is configured, we have observed *no further broadcast ARP exchanges between the Veyron and the server*.
- The "POST" LED now lights when the Veyron CLI is immediately ready to accept commands, not (earlier) when the CLI begins applying the module's configuration. This has been done to remedy some customers' command timeouts when issuing the first instructions to the module.
- A rate-parsing error has been corrected in the standard Linux "wpa_supplicant" code which could block retrieval of data about the last AP in a scan listing. This could significantly skew roaming behavior.
- A rate-encoding error has been corrected in Marvell's radio driver. This error resulted in only one rate being populated in the scan-report record instead of all of them.
- The Linux "wpa_supplicant" now recognizes the configuration of the Veyron CLI "**wl-assoc-backoff**" command.
- A new Veyron CLI command, "**wl-assoc-retries**" has been added. This parameter designates the number of consecutive Association and Authentication attempts that the radio driver and/or "wpa_supplicant" will initiate before waiting "**wl-assoc-backoff**" milliseconds (before it initiates another Association attempt).
- The previous default behavior of "wpa_supplicant" was a 5 second backoff after a single Association attempt. The current default behavior is a 10 second backoff after three Association attempts. The module's configuration can now be tailored by the customer for the needs of their particular environment.
- The Linux "wpa_supplicant" will now never issue a "broadcast association request" if it has an explicitly configured SSID (i.e. if "**wl-ssid**" is anything other than "**any**"). Such broadcast requests are always redundant if an SSID is configured, are often useless because AP's don't advertise all their SSIDs (if they advertise any at all!), and, perhaps most importantly for "high density" environments, can result in truncation of internal Scan Result Tables (due to size limits) with useless Probe Response records from APs advertising SSIDs to which the module can't even Associate.
- All commands which configure passwords, passphrases, and crypto keys have been guarded to not echo those configuration items from the CLI.
- The Marvell radio does not unnecessarily re-scan for an AP after "wpa_supplicant" has already scanned.
- "wpa_supplicant" informs the Marvell driver about the specific AP determined "best" for roaming instead of just that AP's SSID.
- The default value of **"/proc/sys/net/ipv4/tcp_syn_retries**" has been changed from 5 to 2 so that TCP timeouts to a blocked port are 21 seconds instead of 189 seconds (Linux default is 189). This change requires a corresponding change in **"/var/etc/config/sysctl.conf**", which is copied from **"/etc/sysctl.conf.default**" if not present at boot.
- The CLI "**reset"** command now removes any user modifications to the **"/var/etc/config/sysctl.conf**" file. The file will be automatically defaulted at the next module restart

Known issues for Veyron Firmware build 1.02:

- No processor board power management support (radio power management is supported via pm-mode doze)
- No Web server support.

Release 1.01 (December 2008)

Changes to Veyron Firmware since V1.00:

- Correctly handle resolv.conf file parsing for various DHCP server responses.
- Changed the default beacon lost count used for scanning and re-association from 60 to 6.
- Added new CLI command "wl-beacons-missed" to change the beacon lost count.
- Fixed serial output hang when HW flow control is used and CTS is deasserted coincident with the DMA buffer empty interrupt
- Improve compatibility with certain Access Points when transmitting packets while in power save mode.
- Increment the received packets dropped tally if a packet is dropped by the IP stack due to congestion.
- Use Open Authentication for LEAP instead of Network Authentication for improved compatibility among various Access Points.

Known issues for Veyron Firmware build 1.01:

- No processor board power management support (radio power management is supported via pm-mode doze)
- No Web server support.
- When wl-udap=0, Ubicom locator still finds unit.
- Packet delays of multiple DTIMs may be experienced when running in power save mode with Symbol APs

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Release 1.00 (November 2008)

- Initial release of firmware for the Veyron module.

Known issues for Veyron Firmware build 1.00:

- No processor board power management support (radio power management is supported via pm-mode doze)
- No Web server support.
- When wl-udap=0, Ubicom locator still finds unit.