

## QtPro Firmware Release Notes:

Release Date	Version Number	Description
12/15/10	1.0	Initial Release of firmware.
04/04/12	1.1	Increase the value of MINRMSforShortCircuit from 40000 to 100000 as 50+ emitters on a run was bumping up against the 40000.
03/29/11	1.2	<p>1. Add the code to initialize the contact closure parameters so that the code would not be susceptible to concluding that contacts were closed on the power on state of the PIC CPU registers 2. Changed the short circuit DSP RMS reading down from 100000 to 62000 as the 100000 value was not achievable. Furthermore, this value was determined based on what reading was associated with 1W being dissipated by the sense resistor. In reality, due to the 5 ohm series sense resistor and due to the high impedance of the output coupling caps at 100 Hz and the deficiency of the source power caps at 100 Hz - we are not really able to trigger shorts based on 100 Hz - nor are we particularly susceptible to the 100 Hz shorted wave burning out the sense resistors. There are a number of reasons for this:</p> <p>The 100 Hz wave has a crest factor of 1 - but its output is limited by the source so we will never see an 8 VRMS 100 Hz wave - only about 1.3 VRMS</p> <p>The masking has a much lower crest factor but it too is limited in output. The output is really only at risk of burning out the system when Music is played.</p> <p>The amplifiers may thermally limit if Music exceeds certain values. A sense resistor is likely only at risk if music is being played while there is a short.</p> <p>It would require a broadband reading to protect the resistor.</p> <p>2. Changed the DSP initialization code to check for Comm Errors on DSP initialization and report them by zone and for the system. This code was calling a routine that simply returned without recording the errors. Now they are reported as type 8 errors. Will help a bit with debug and to record any transient faults due to latch up.</p> <p>3. Made it such that any error will return to the Main LCD screen and turn on the back light. The code to force a return to the main screen seemed to have been removed in the port.</p> <p>4. Cleaned up the general.h file to remove a few defines that are no longer used.</p> <p>5. Simplified the t.htm file to remove verbiage on setting up a scope and test environment; removed t_more.htm and added tdata.htm which is the fault detect data page named as a data collection function so as not to entice users to set up fault detection.</p>
04/25/11	1.2a	Mike Vasheko updated the embedded.js file to filter all characters but 0-9, space, a-z when submitting administration data. The presence of a ' was causing strings to terminate and causing the Administration:Zone Names screen to draw blank.
06/29/11	2.0	This build is for AutoDesk and for all systems going forward - we will try to only load it onto systems that have at least ECO2.3. It selects the 100 Hz level based on

		<p>the board revision;</p> <p>Fixed the allowed emitter delta to 4000/6000/8000.</p> <p>Upped the short circuit read to 500000 because we are reading RMS/2 and the numbers got bigger</p> <p>I changed the DSP from 2 x RMS detectors to 2x average peak detectors - which led to the larger / linear number</p> <p>This code indicates the Board Rev on the LCD Home Screen</p> <p>This code has the new Masking settings for the deficient emitters</p> <p>This code updates the boardstate immediately when an error is cleared from the LCD or web software</p> <p>This code has simpler t.htm - for display and quick save purposes only.</p>
04/04/12	3.0	<p>This build adds the compressor into the DSP - post all of the work Gordon and I did to perfect the compression curve. At the same time, we have lowered the output level of the 100 Hz tone as the tone was found to be causing pre-mature clipping of Audio Inputs. It also made the clipping very bad as it introduced a 100 HZ component to the clipping. Software sets the level of the tone based on the board rev, with the goal of outputting a 1 V pp 100 Hz sign wave. The software also allows one to shut off the tone if even this 1 V pp is too much for Audio. You have to gain access to the toptions.htm page to do so.</p> <p>We report in the print settings (bottom above the copyright) if the Tone is On or Off.</p> <p>We also set the fault margin on fault detect to 2000, regardless of number of emitters as Gordon now feels that the relationship between the reading and the number of speakers is linear. We set the short-circuit threshold to 150,000 to factor in the lower tone level. We upped the initial steady state timer value to 15 minutes but force-set the timer to 0 if you set the tone to 1 V pp on the toptions.htm page (really just for test - so you don't have to wait so long). We set the margin between static and dynamic delta's allowed at three times the single emitter delta in hopes of surviving a HVAC failure. We also shrank the amount of time it takes to boot the device as we learned a while ago that the main DSP caps were of the wrong value, causing the DSP's not to clock-up correctly, and it was not the delay between de-asserting reset and programming the device. This saves time when programming and testing the PCBs.</p> <p>We added a 150 HZ high pass filter to each of the Audio Inputs in the Main DSP.</p> <p>We also added back the averaging of each fault detection reading - 50 readings, 100 milliseconds apart.</p>
12/28/11	3.1	<p>Lowered the offset for Aux A and B from +66 to +60 (-3 dB from the top end such that one can not clip the power amps - although at this setting three down from the highest setting will still clip the power amp. We strove to allow three DB of clipping at the max setting to provide installers with the ability to trade off some clipping on paging for added perceived loudness. Also went back to Input A and B (Aux A and B) range of from 1 to 30 instead of 1 to 15 as was the change on 3.0. To accomplish this we brought the offset down from 60 (from 66 - see above) to 30. So the total change was from 66 to 30 which allows an extra 15 1 dB steps, and then terminates the top down three dB.</p> <p>Remember that the table is in 0.5 dB steps.</p> <p>We also slightly modified the compressor curve to minimize the clipping that would occur using a microphone - although we have never really managed to pull off decent microphone performance.</p>
01/06/12	3.2	<p>When I built 3.1, I did it for Steelcase and then moved it over to form CSM MPFS directory. I forgot that I had set the Input A and Input B volume controls to 30 in Steelcase and then did not do it in CSM. I ran the testing in the Steelcase directory</p>

		and specifically checked for the ability to run from 1 to 30 (not just 1 to 15). Ehn I made the CSM version I copied the file over, and then made a mistake, so went to the 3.0 original directory to get a fresh copy of the embedded.js file - forgetting that it had been updated with the 1 to 30. This just fixes embedded.js to draw from 1 to 30.
04/04/12	3.3	<p>Changed the Pass band of Input 1 and Input 2 in the MB DSP to bump allowed high freq from 4000 to 6300 Hz to pass, and took out some low end.</p> <p>Added three dB to the Post Compressor gain of the compressor circuit in the Zone DSP.</p> <p>Kept the Masking zero tap filter settings that were in for 3.2 as these actually matched the standard emitter in a test performed today (4-3-2012_ by Courtney better than the original ones.</p> <p>Got rid of the 12K Input A/B Equalizer tap in SW but not in the DSP (so four finger reset would not be necessary on upgrades</p> <p>Changed center taps on INput 1 and Input 2 to 3150 and 6300 to be consistent with standards (from 3200 and 6400)</p> <p>Changed the Version to 3.3</p>
04/27/12	3.4	<p>Added a compressor with faster attack time. Changed the MB DSP to filter the 200 and 400 Hz paging energy in order to allow us to get louder without distortion.</p> <p>Added 10 dB in front of Paging so that a - 10dBV (1 Vpk-pk_ signal could clip the power amp on full (30 ) output.</p>
	4.00	<p>Added code to lower the probability that a power fail during reboot (or shortly after an IP address was assigned) could result in a code failure. This occurred because the software writes the IP Address into non-volatile memory but must clear the area in order to do so. If it powers off after clearing the area but before writing the memory, it fails.</p> <p>This code also adds back the code that loops waiting for the DSP's clock to come up. This is likely not needed now that we have the DSP fix, but has been added, just in case.</p> <p>This code also adds an ability to set the IP Address of the unit and the associated IP parameters.</p> <p>This code also reports a watchdog time out as a 4 in the system error bit 0x40000000.</p> <p>This code also disables the TCP/IP stacks reboot server as this may be causing problems at a customer who has reported that the unit reboots when on the network - but not when not on the network.</p> <p>If a developer is writing microchip code and using a reboot server packet (totally unrelated to CSM) he could be resetting the machine.</p> <p>This code also implements the Input B ramping with masking ramping.</p>
	4.02	Added a few features for sales, including reporting of ForServiceCall on main LCD screen.
	4.03	Fixed embedded.js to handle issues with javascript failing due to a hideAlerts variable that was undeclared but used and/or the same name as an HTML element. Result was that the code did not work on ie version 8.
	5.00	<p>Changed the web based software to the multiple zone selection model for better look. Add All button.</p> <p>Added automatic Power Paging detect and configuration by sensing return sense current and if below a threshold it automatically inverts the signal. Have a</p>

		<p>warning on LCD that paging is bridged</p> <p>Add ability to detect/display bootloader version (shown on both HTML and LCD)</p> <p>BUGFIX: Ignore valid but useless SNTP response to avoid time bug</p>
	5.1.0	<p>Added significant filters on MB DSP to filter below 160 Hz so as not to trip short or fault detect on paging, in addition, added code to Short Detect to not check for shorts if paging.</p> <p>BUGFIX: Not always properly displaying bootloader and hardware revs on LCD</p> <p>BUGFIX: Stop displaying SMTP password in HTML settings printout</p> <p>BUGFIX: Save config when commissioning ramp changes (to avoid power loss restarting or removing ramp)</p> <ul style="list-style-type: none"> <li>+ Add easy access to single zone controls via HTML</li> <li>+ Remove "For Service" screen on LCD</li> <li>+ Save config immediately on any LCD interaction that updates it</li> <li>+ Autodetect number of zones on bootup by watching for first DSP that fails to respond; rest of system should dynamically support</li> <li>+ Display masking level as RAMP on LCD if commissioning ramping still active; do not trigger time-of-day LCD warning if only commissioning ramping active</li> <li>+ Switch from "day/night" to "max/min" masking level concepts:</li> <li>+ Support wider range of masking start times and ramping rates</li> <li>+ Overhaul of masking level calculations to support new min/max concepts, reversible order, and more flexible time settings</li> <li>+ Add popup warnings in web interface if user tries to submit configs that would behave unusually</li> <li>+ INTERNAL: Added Firmware-engineer-accessible method of regression testing masking level math</li> <li>+ Examine paging levels as part of process of determining if short is present</li> <li>+ Short detection uses voting method based on both paging and output levels</li> <li>+ Change secret HTML password to fixed value instead of generating from MAC</li> </ul>
	6.0.0	<ol style="list-style-type: none"> <li>1. A single code base will be used for the Qt 600 and Qt 300, new product. This is the first code release for the Qt 300. This is done using auto detect of the zone modules.</li> <li>2. Added command line support for HTML control of the Qt over a network connection in support of Creston and AMX systems.</li> <li>3. Removes "For Service Call" screen on LCD. It is still available on the CMS.</li> <li>4. Saves configuration immediately on any LCD interaction that updates it. An earlier revision did this for configuration changes through software interface.</li> <li>5. When the system is first installed, the Auto Ramping feature is available. If the unit is shut down during that process, the current level was not saved. This code version will save the level in persistent memory to ensure the duration of the ramp stays on schedule when the power is turned off.</li> <li>6. Displays masking level as <b>RAMP</b> on LCD if commissioning ramping still active; does not trigger time-of-day LCD warning if only commissioning ramping active.</li> <li>7. Changed from "day/night" masking to "max/min" masking level concept: <ol style="list-style-type: none"> <li>a. Supports wider range of masking start times and ramping rates (24 hour time range per setting)</li> <li>b. Masking level calculations changed to support new min/max concept, reversible order, and more flexible time settings</li> <li>c. Adds popup warnings in web interface if user tries to submit configurations that would behave unusually or illogically (for instance, warn against (and reject) a ramp interval selection that is greater than the time delta between Min start and Max start times).</li> </ol> </li> <li>8. Improved Emitter Network Fault Detection process to reduce false positives <ol style="list-style-type: none"> <li>a. Added code to Short Detect to not check for shorts if paging is active</li> <li>b. Examine paging levels as part of process of determining if short is present</li> </ol> </li> </ol>

		<p>c. Simplified screen to activate and deactivate fault detection per zone</p> <p>9. Changed second level password to fixed value “prosecret” instead of generating the password from the MAC address.</p> <p>10. Hides <i>email notification of faults</i> email source password from print settings</p> <p>11. Added line level boost feature for auxiliary inputs when the incoming level is lower than expected.</p>
	6.1.0	<p>Change – add Friday as weekend option</p> <p>Bug Fix - Auto ramp settings saves fixed</p> <p>Bug Fix - Qt300 fault zone naming corrected (not fixed!)</p>
10/09/14	6.2.0	<p>1. TCP Reset capability has been enabled in the TCP/IP Library.</p> <p>2. Timeout times in the TCP/IP NTP Driver have been increased from 5 to 25 seconds.</p> <p>3. MAC address is now an amalgamation of the CSM MAC address (top 4 bytes) and the Pic32 MAC address (bottom 2 bytes).</p> <p>4. Bug Fix: Qt300 fault zone naming corrected.</p> <p>5. Copyright year has been changed to 2014.</p> <p>6. Additional information provided by Todd has been added to the Help Screen.</p> <p>7. All Interrupt Flags are manually cleared at power up.</p> <p>8. Bootloader Version 3 is being released simultaneously.</p>
12/10/14	6.2.1	<p>Javascript errors in v6.2.0 have been removed.</p> <p>(code branch found under c:\bob\qtpro\qtpro....)</p>

06/02/15	6.3.0	<ol style="list-style-type: none"> <li>1. ½ dB control of masking volumes has now been fully implemented.</li> <li>2. A special Mute Button has been added to the Operations Page of the web interface. This Mute Button is made available in Modify Mode, but not in Review Mode.</li> <li>3. A one-second delay is implemented before any Flash Write activity is commenced. In this way, when a user is cycling through a volume menu on the front panel, no visited volume values will be written to flash until the user has released the UP or DOWN button and a full second has passed.</li> <li>4. A checksum is calculated on the full set of System Parameters and stored at the end of the list.</li> <li>5. The firmware now maintains two alternate copies of the nonvolatile database. For each next Write Block operation, the alternate database will be written. In this way, even if a power outage occurs in the middle of the Write operation, at least one database will always be perfectly preserved, and the worst that can happen is that, even though one database is destroyed, only the last change made was lost, rather than the entire database.</li> <li>6. Bug Fix: The calculated Number of Zones was not being range checked. The only legitimate values are 3 or 6.</li> <li>7. A Telnet Command Line Interface has been implemented. This includes a new Mute Function corresponding to Item #2 above.</li> <li>8. Bug Fix: In previous versions, if the masking volume was changed from the Front Panel, then the Day/Night ramp settings were completely eliminated in all six zones. This “feature” has been modified. Now, only the zone for which masking volume is changed will see the termination of the Day/Night ramp settings.</li> <li>9. Bug Fix: In previous versions, if the masking volume was changed from the Front Panel, then the Commissioning settings were completely eliminated in all six zones. This “feature” has been modified. Now, only the zone for which masking volume is changed will see the termination of the Day/Night ramp settings.</li> <li>10. In the Operations Web Page, Drop-Down Menus have been eliminated from the “Review Mode” display.</li> <li>11. In the Operations Web Page, in Modify Mode, bug fixes have been made on the “Select All”, “Unselect All” Button.</li> <li>12. TCP Reset capability that was enabled in the TCP/IP Library in v6.2.0 has been disabled again.</li> <li>13. Bug Fix: The software I2c driver had a serious timing bug: the time between the setup of the data pin and the toggling of the Clock pin was too short. It should have been a minimum of 100ns. But it was operating at 75ns.</li> </ol>
09/13/16	6.5.0	<ol style="list-style-type: none"> <li>1. Support new Qt Active emitters. MCS UI updated to allow selecting an Emitter Type (STD or AE) on a per zone basis. Emitter type indication shown in LCD screens for masking volume and audio volume showing either ‘Qt’ for Standard emitter or ‘Qt AE’ for active emitter. This is also supported by the CLI interface.</li> <li>2. Added STD Masking spectrum to AE emitters. The user can now select between AE spectrum and STD spectrum through the MCS software. MCS UI updated to allow selecting the spectrum type when selecting emitter type. Note: this property is not yet implemented in the CLI.</li> <li>3. Major re-implementation of the contact shutdown feature which had a number of issues as it was tied to volume levels. The contact shutdown now uses its own property and volume level properties stay the same. The Mute property has also been modified to behave in the same manner.</li> <li>4. Change to the linker address map: the application code was allowed to overwrite both copies of the configuration space.</li> </ol>

		<ol style="list-style-type: none"> <li>Fixed issues in CLI where the INPA and INPB Audio Input levels were set and read correctly but did not take effect in the DSP. This was reported by Todd and resulted in a beta version sent to the customer with the fix.</li> <li>Fixed a minor UI bug: in Review Mode using 'Prosecret' password the user could type values into the Equalizer sliders and have the slider located updated although no change was made in the DSP.</li> <li>Fixed the A/B sensitivity controls from the MCS UI which did not work. Updated to 3 levels: Low Level (+12dB boost), Normal Level (0dB gain boost) and High Level (-12dB attenuation).</li> </ol>
12/15/16	6.5.1	<ol style="list-style-type: none"> <li>Fixed Bugzilla issue #427: Active Emitter Spectrum type is not supported in CLI. Added 'SPEC' command to support setting and getting the spectrum type.</li> <li>Fixed Bugzilla issue #428: Audio Input Equalizer has limited frequency bands available for STD emitter. The 2 lower bands (250Hz and 500Hz) were disabled.</li> <li>Fixed Bugzilla issue #430: CLI commands INCM and DECM were being rejected.</li> <li>Fixed Bugzilla #431: Both Audio A/B inputs were affected (muted) by either one of them being muted.</li> </ol>
5/26/17	6.5.2	<ol style="list-style-type: none"> <li>Re-organized structure holding data saved in NVRAM, separated scratch memory from params to reduce risk of corruption.</li> <li>Fixed bug #429: Masking Sound after power cycle. The issue was caused by the fact that the state of the contact closure was saved instead of being sampled.</li> <li>Fixed bug #433: CLI does not accept Zone Set commands to set the masking equalizer. The commands were rejected because they have another param for the frequency band.</li> <li>Fixed bug #439: Switching from SC to CSM mode causes parameters to be set back to default. Setting the user does not cause any other changes to params. Also changed to way to force default to match our documentation so only the up arrow can be used.</li> <li>Re-instated temperature protection code so that if temperature reached 65C the controller will shut down masking and audio.</li> <li>Enabled use of Qt Command Center version 2.1.4.5 for saving and restoring parameters including emitter type and spectrum.</li> </ol>
11/17/17	6.6.0	<ol style="list-style-type: none"> <li>Implemented a new Auto Ramp feature based on Bugzilla issues #250, 114 and 119. The new Auto Ramp feature allows calendar based ramping of masking with up to 3 ramps and 3 constant values. Auto Ramping will inactivate Time of Day ramping until the Auto Ramp reaches its final masking volume (Time of Day Max) which stays for a day. Added a set of CLI commands to cover this feature.</li> <li>Expanded the Min/Max Time of Day Schedule in Buzilla issue #292 to include Audio A and Audio B. Added separate Ramp to Max/Ramp to Min times, Ramp Intervals and Min/Max levels. The feature also includes added CLI commands.</li> <li>Fixed Bug #383 MCS Password Requirements. The issue was that certain characters did not show up properly if used as part of the password and were replaced with a '-'. Rather than replacing implemented a check to make sure these characters are not used in a password. This change covers bugs #191 and 195 as well.</li> <li>Fixed bug #402: The UI was allowing enabling the fault detection on zones that were set as Qt AE zones. Since the Fault Detection is disabled on AE zones this change makes the UI match the functionality.</li> <li>Fixed bugs #323 and 340: A number of incorrect spelling and grammar mistakes in the Help tab as well as a bad link to CSM website.</li> </ol>

		<ol style="list-style-type: none"> <li>6. Implemented a feature request in bug #440: An emitter type change now causes the masking equalizer to be reset back to default settings.</li> <li>7. Fixed bug #441 to add setting the Emitter Type and Spectrum Type to the help tab.</li> <li>8. Fixed bug #449 where if masking is set to low values and a change to the masking volume is done via the front panel down arrow to lower the volume the masking volume would jump to a very loud volume.</li> <li>9. Fixed bug #320: Pressing the browser 'Back' button from several screens puts MCS in Review Mode instead of Modify Mode.</li> <li>10. Fixed Issues #447 and #435 to add commands to the CLI for Input A/Input B sensitivity and Masking Min increment and decrement commands.</li> <li>11. Fixed bugs #454 and #307, setting Audio A/B Equalizer bands sometime resulted in the band going to back to its previous setting. The root cause the command to set the values was not being sent correctly.</li> <li>12. Fixed bug #448 where setting the Masking Equalizer 6.3KHz band on zone 3 reflected the zone 1 setting. This was caused by a type in the zonedata HTML file.</li> <li>13. Fixed bug #439, changing from SteelCase mode to CSM mode or vice versa would reset all settings back to default.</li> <li>14. Fixed bug #433 where ZOSET command to set the Audio A/B equalizer in CLI was being rejected.</li> </ol>
1/25/18	6.6.1	<ol style="list-style-type: none"> <li>1. Setting time/date on the RTC (Administration tab) will cause the Auto Ramp to recalculate the state and proper masking level.</li> <li>2. The initial masking level on Auto Ramp start and after a settings change will now be calculated and updated immediately, but all other masking level changes will occur at midnight. In version 6.6.0 it defaulted to the start level and only updated at midnight.</li> <li>3. Reduced the delay on an Auto Ramp settings change to get updated masking volume.</li> <li>4. Any masking level change from the front panel will now disable the Auto Ramp.</li> <li>5. CLI: When using the ENAR opcode to enable Auto Ramp it will do a validity check on the dates to make sure they are correct. The ZOSET,ENAR=1 will respond with a NAK if dates are invalid.</li> <li>6. Updated help text for Time of Day schedule and added Help on A/B sensitivity from Todd.</li> <li>7. Added a text alert and some text on the Auto Ramp form to inform user that Auto Ramp changes may take up to a minute to take effect.</li> <li>8. Fixed bug #466: If the ramp rate is lower than 0.5dB per day the ramp will turn into a step at the last day.</li> </ol>
1/11/19	6.7.1	<ol style="list-style-type: none"> <li>1. GUI Updates for: <ol style="list-style-type: none"> <li>a. Time of Day Ops types</li> <li>b. Auto Ramp</li> </ol> </li> <li>2. Added Time of Day type to URL address (&amp;schedType=)</li> <li>3. Initialize Auto Ramp dates to correct size to include buffer</li> <li>4. Updated MCS "Modify Mode" to reflect Auto Ramp Status (Bug #469)</li> <li>5. Auto Ramp disables upon completion of ramps</li> <li>6. Initializing Input A/B to '15' for testing</li> <li>7. Added functionality to Daylight Savings (bug #482): <ol style="list-style-type: none"> <li>a. If majority of countries within a time zone utilize southern hemisphere DST settings, the menu options change to the southern hemisphere DST calendar options</li> <li>b. In the case a country uses northern hemisphere and the DST dropdown options reflect the southern hemisphere, CLI commands can be given to reverse the action.</li> <li>c. Daylight Savings CLI commands:</li> </ol> </li> </ol>



		<ul style="list-style-type: none"> <li>i. CSGET,IDST = 0, the Daylight Savings dropdowns are reflecting</li> <li>ii. CSGET,IDST = 1, Daylight Savings dropdowns are inverted for the Southern Hemisphere</li> <li>iii. CSGET,IDST = 2, the Daylight Savings dropdowns will reflect only the northern hemisphere calendar options. (Locked)</li> <li>iv. <b>CSSET</b>,IDST = 0, the Daylight Savings dropdowns function according to new changes</li> <li>v. <b>CSSET</b>,IDST = 2, the Daylight Savings dropdowns are locked to only reflect the northern hemisphere options</li> </ul>
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## **QT-PRO BOOTLOADER RELEASE NOTES**

DATE	VERSION	DETAILS
	1	
	2	
10/09/14	3	1. All interrupt registers are cleared to zeroes both at power up, and just before jumping to the application.
02/01/15	4	1. New power up message has been added
03/02/15	5	1. For write firmware commands, Read-After-Write error checking has been added.
09/13/16	5	Rebuilt the bootloader based on version 4 (Revision 14 in SVN).