



3000 and 3000E Traffic Controllers

3000/3000E TS-2 Firmware v3.4

Peek is pleased to announce the release of Version 3.4 of the NEMA TS-2 compatible firmware for 3000 and 3000E Traffic Controllers.

Product..... **TS-2 Firmware for 3000 and 3000E Traffic Controllers**
Version..... **Version 3.4**
Release Date..... **7/6/04**

Importance of This Update

This is an optional update for TS-2 3000 and 3000E Series Traffic Signal Controllers. This is a minor update that includes repairs for some issues that were detected in the v3.3.6 release of the firmware. This version of the firmware also includes updates that had been released previously as part of the v3.3.7 interim firmware release.

Product Compatibility

This firmware is designated part number 8216A Version 3.4, and is released for use in all field and production 3000 and 3000E Traffic Controllers that have been designated NEMA TS2 units. It should not be installed in units selected to run as NEMA TS-1 units, nor those that communicate via NTCIP or Protocol-90. It can be used to update either earlier versions of series 8216A firmware, or 5921 firmware.



Note If this update is used to replace 5921 firmware, the controller will no longer be compatible with the Smartways software. An update from the 5921 firmware also requires that all Special and Restricted Menu settings be cleared.

This release is compatible with version 2.0.2 or higher of *CLMATS*[®], but CLMATS version 2.2 or higher is recommended. The firmware should not be used with versions of CLMATS older than v2.0.2 and is not compatible with *Smartways*[®].

Delivery Methods

This firmware may be delivered to the controller in one of two ways: either as two binary files that can be burned to the controller's two EPROM memory chips, or as a single binary file that can be loaded into Flash memory via the controller's Port 2 serial port. This latter option is only available on 3000E controllers that are designated 'Flash Memory Enabled'.

Information furnished by Peek Traffic is believed to be accurate and reliable, however Peek does not warranty the accuracy, completeness, or fitness for use of any of the information furnished. No license is granted by implication or otherwise under any intellectual property. Peek reserves the right to alter any of the Company's products or published technical data relating thereto at any time without notice.

If you are updating EPROM chips to be placed into your 3000 or 3000E controller, the proper checksums for the two binary files are listed in **Table 1**.

Table 1 – Proper checksums for v3.4 TS-2 3000 and 3000E firmware

EPROM	Checksum value (hex)
0	5D96
1	C0C2

Installing Updated Firmware to EPROMS

To upgrade an EPROM-equipped 3000 or 3000E Traffic Controller in the field, follow these instructions:

1. If you ordered updated EPROMS from Peek rather than just the firmware files, skip down to step 6.
2. Locate the following items in order to burn the updated firmware to EPROMS:
 - Two 4MB EPROMs (28 pin DIP package), these may be recycled out of field units
 - an EPROM burner capable of holding a 4MB EPROM
 - EPROM burning software
 - the two binary files containing the updated 3000E firmware
3. If the EPROMs were used previously, erase them.
4. Insert one of these blank EPROMs into the burner and burn the firmware file named **8216A 3.4.2 Build 294-0.bin** onto it. Label it '**EPROM 0**'.
5. Insert the other blank EPROM into the burner and burn the firmware file named **8216A 3.4.2 Build 294-1.bin** onto it. Label it '**EPROM 1**'.
6. Observing all safety and other municipal ordinances, place the intersection to be updated into flash.
7. Power down the 3000 Series Traffic Controller.
8. Open the front panel and remove the two EPROMS that are currently installed in the unit. Replace them with your updated versions, being sure to place the properly labeled EPROM in each socket.
9. Restore power to the unit.
10. Next, you'll need to verify that the controller is functioning correctly. Press the **SHIFT** and **MENU** buttons simultaneously to get to the Main Menu.
11. Press **1** for Dynamic Displays.
12. Press **1** for Controller Func(tions).
13. Examine the Normal Status screen for proper operation and cycling.
14. Press the **MENU** button once, and select **9.Checksum Status**. If a Checksum is present, follow the screen instructions to clear the Checksum. Checksums are latched failures; so you will need to restart the Controller to release the latched failure.
15. Press the **MENU** button once, and select **10.Comm.** (10 is selected by pressing **Shift** and **0** simultaneously.) If 'Overrides Active' appears on the bottom line of the Controller-Master-Comm Dynamics screen, then follow the instructions on the screen to clear the error by pressing the **1** button. The screen should now state "No Overrides Active."
16. Press the **MENU** button once, and select **1**. Examine the top line and the bottom line of the Normal Status screen for the words "ERROR" or "FAILURE." If they occur, try shutting off the unit, reseating the EPROMS, and retrying the above steps. If the error message still appears, contact your Peek customer service representative, as listed on page 8, for assistance. However, if these words are not present, then consider the 3000 Series unit to be a healthy, functioning controller.
17. Return the intersection to normal operation.

Installing Updated Firmware to Flash Memory

If the 3000E controller shows the 'Flash Memory Enabled' logo on its front panel, it should be updated using: a single binary firmware file from Peek Traffic, and a laptop computer or Pocket PC handheld device connected to Port 2.



Note Additional information about these types of upgrades are available in the release notes for the Firmware Upgrade Utility for Windows (99-395) and for the Pocket Central Utility for Pocket PC (99-393).

The following hardware and software are required in order to perform this type of upgrade:

- a 3000E controller that is designated 'Flash Memory Enabled'
- Either a laptop PC running Windows NT, Windows 2000, or Windows XP
OR a Pocket PC device running Pocket PC 2002 or Pocket PC 2003
- a serial cable to connect the PC or Pocket PC device to Port 2 of the traffic controller
- If using a PC for the upgrade, you will also need the 3000E Firmware Upgrade Utility for Windows, which is available from Peek Traffic
- If using a Pocket PC device for the upgrade, you will need the Pocket Central software, which is available from Peek Traffic



Important Although previous 3000E products were updated using removable and programmable EPROM memory chips, and although it is possible to remove the Flash chips from the newer devices, it is highly recommended that you **do not remove these chips from the units**. Firmware updates for Flash Memory Enabled units should only be performed using the following procedure.

The basic steps required to upgrade a Flash memory-equipped 3000E controller in the field are listed here:

1. Locate the binary firmware v3.4 file that you received from Peek Traffic. (**8216A 3.4.2 Build 294.pfw**)
2. Store the firmware file in a known location on the PC or Pocket PC where the update utility will be run.
3. Observing all safety and other municipal ordinances, place the intersection to be updated into flash.
4. Power down the 3000 Series Traffic Controller.
5. Connect the PC or Pocket PC to the device using the required serial cable.
6. Open the Firmware Upgrade Utility on the PC (or the Pocket Central software on the Pocket PC device.)
7. Place the controller into Flash Memory Program mode by powering up while holding down the **SHIFT** and **PGUP** keys.
8. Use the Utility to query the device about its current firmware.
9. Load the **8216A 3.4.2 Build 294.pfw** firmware file into the Utility's memory.
10. Send the new firmware to the controller.
11. When **both** the PC and the controller show that the firmware update has completed, press the **END** key on the 3000E to restart the unit with the new firmware. Disconnect the PC or Pocket PC from the controller.
12. Next, after the controller powers up again, we need to verify that the controller is functioning correctly. Press the **SHIFT** and **MENU** buttons simultaneously to go to the Main Menu.
13. Press **1** for Dynamic Displays.
14. Press **1** for Controller Func(tions).
15. Examine the Normal Status screen for proper operation and cycling.

16. Press the **MENU** button once, and select **9.Checksum Status**. If a Checksum is present, follow the screen instructions to clear the Checksum. Checksums are latched failures; so you will need to restart the Controller to release the latched failure.
17. Press the **MENU** button once, and select **10.Comm.** (10 is selected by pressing **Shift** and **0** simultaneously.)
If 'Overrides Active' appears on the bottom line of the Controller-Master-Comm Dynamics screen, then follow the instructions on the screen to clear the error by pressing the **1** button. The screen should now state "No Overrides Active."
18. Press the **MENU** button once, and select **1**. Examine the top line and the bottom line of the Normal Status screen for the words "ERROR" or "FAILURE." If they occur, try shutting off the unit, resending the firmware file to the flash memory, and retrying the above steps. If the error message still appears, contact your Peek customer service representative, as listed on page 8, for assistance.

If these words are not present, then consider the 3000E unit to be a healthy, functioning controller.

19. Return the intersection to normal operation.

Known Issues in this Release

The following issues are known to exist in the Version 3.4 firmware.



Important

If the programming of the controller contains Preemption, and **ANY** of the phases in the preemption process use the Call-to-Non-Actuated (CNA) mode, the Walk Rest Modifier (WRM) function **MUST ALSO** be used in those phases. A very common situation where this may be encountered is when a one interval Dwell preemption is created (for example, often used in Opticom preemption) and the controller will not exit the preemption run properly if the run was activated during an active Walk phase. (ECR#1083)

Table 2 — Issues remaining in this release

Issue	Workaround	Issue ID (ECR#)
A very common usage of Preemption, a one interval Dwell (for example, used for Opticom preemption) will not leave preemption if the run was activated during an active Walk phase.	If the programming of the controller contains Preemption, and ANY of the phases in the preemption process use the Call-to-Non-Actuated (CNA) mode, the Walk Rest Modifier (WRM) function MUST ALSO be used in those phases.	1083
Loading Manual Permissives via "Load Perms & Forces with Check" command not working.	An operator can load the Manual Force Offs and Manual Permissives manually using the keyboard.	334

Issues Addressed in this Release

The following are issues that existed in previous releases of TS-2 Firmware for the 3000 and 3000E Traffic Controllers which have been rectified in Version 3.4:

Table 3 — Issues fixed in this release

Issue	Resolution	Issue ID (SCR#)
Preemption Exiting to Coordination with CNA coordinated phases did not stay in sync	CNA variable logic was modified to keep the designated CNA phases intact while in preemption	58
Not-PED overlap did not stay in GRN between parent phases on power-up	The start-up logic was modified to only apply pedestrian calls to phases in which WALK and PCLR times have been entered	126
Cycling Failure Flash when MAX times entered as ZERO	The <FREE> cycle length algorithms were changed to include the minimum green times if MIN GREEN times are greater than the entered Max times	128
Not-PED overlap had a problem with a "NOT PED" phase entry. Not-PED overlap enables were not functional.	Modified the NOT-PED overlap logic to correctly use the "NOT PED" data entries in the overlap programming screen	135 & 274
Coordinated phase Ped Permissive did not open properly with pedestrian override mode ON (POM=On). Also, coordinated phase pedestrian permissive did not close properly in Actuated, Lead/Lag operation when using POM.	Modified the Pedestrian Override Mode's control of pedestrian permissives based on whether or not the total pedestrian time for each phase fits within its phase allocation	136
Incompatible exit phases were allowed by the preemption checking algorithm	Modified the preempt check run algorithm to flag incompatible Exit phases as INVALID	138
Valid preemptions would not run when intervals had a barrier mixture of GRN and YEL phases	Changed the preemption checking algorithm to verify that phases programmed in FIXED intervals all contain GREEN->YEL-> RED.	140
Hardwire Interconnect Master and Slave Modes were not working properly	Added new logic to distinguish the proper time for the local master timer to be reset to zero and synced with the master controller	172
Incorrect operation of UCF & Soft Flash when there was no phase in ring 1. The controller skipped Entry Phase yellow.	Modified the UCF and Soft Flash logic to verify that all the entry phases have completely cleared to RED before dropping CVM (in the case of UCF) or transferring outputs to the flashing state (in the case of Soft Flash).	201

Issue	Resolution	Issue ID (SCR#)
New capability added: Inhibit Pedestrian Override. The Pedestrian Override function can be disabled by a TOD circuit	Implemented using Time of Day circuit #133. This circuit, labeled 'IPM', prevents the local cycle timer from pausing when a phase cannot be forced off due to a large Ped movement. It also allows the coordinator to run a pattern that has an actuated Ped that is larger than that allocated to the phase.	266
A Standard Overlap was simultaneously displaying green and yellow. When a compatible parent phase was called while a standard overlap was clearing to yellow, the controller brought up the overlap green while the yellow was still ON.	The controller now checks to see if overlap is currently showing yellow, before forcing it to green	272
A field-requested download was not working for Isolated Locals	Repaired download request so that it functions properly for isolated local controllers	392
Preemption was locking up if it used fixed green plus fixed yellow plus fixed red intervals followed by an all red flashing Dwell.	The controller now checks a preemption run to verify that it does not contain two consecutive ALL RED intervals. The alternative method that could be used if this sequence was desired would be to replace the two red intervals with a single Fixed Dwell Red interval. See also SCR#428.	403
Manual Pedestrian Permissive was not working for a lead/lag single permissive sequence. Or another way to put it is that a manual pedestrian permissive entry does not work correctly for AUTO Multi or Single permissive types in either start or end of Main Street.	The controller now correctly calculates the End of Permissive point for the manual pedestrian permissive mode	414
Manual permissive was not working for a lead/lag Yield permissive sequence, or another way to put it is that manual pedestrian permissive entry was not working for Lead/Lag and permissive type Yield, in either start and end of main street mode.	Modified the existing Yield logic to correctly account for a Lead/Lag sequence using Manual Ped Perms.	415
The controller would not transition to a Coordinated state if it was resting in green	If the controller is resting in a coordinated phase, it now sets the cycle timer to 0. Otherwise, the device behaves as before, relying on a transition to take place from one green to another.	418
The controller was locking up when it attempted to exit a preemption run that ends with a single Fixed Red interval followed by an all red flashing Dwell	The controller now checks a preemption run to verify that it does not contain two consecutive ALL RED intervals. The alternative method that could be used if this sequence was desired would be to replace the two red intervals with a single Fixed Dwell Red interval. See also SCR#403.	428
In Floating Force Off mode, transitioning from 2/6 GRN to only phase 3 (no other calls), the Force off for phase 6 remains ON indefinitely. Only servicing another ring-2 phase removes the phase 6 FO.	Force-off logic was added to clear force-offs in rings in which no phases are on	435
A Yellow phase may be short-timed on a standard overlap when Red Rest is applied	Modified the transition from YEL to RED overlap logic to check for other overlap parents in YELLOW before forcing the overlap to RED.	437
While in the process of Double Clearing an overlap, the controller erroneously halted a ring in red rest when cycling to phases within a co-phase set. One ring should have proceeded to the next green as the other ring finished timing the double clearing overlap, but instead both rings stalled out in red rest until the double clearing overlap was finished.	Changed the Red Rest and Null intervals to check the NEXT decision in the ring against the NEXTs programmed for the overlap that is currently double-clearing. If the NEXTs for the ring do not match, then that ring may now proceed to the INIT interval and service the green.	438
The controller locked up when exiting preemption if the initial preemption call was activated during the Flash Entry Phases upon entering UCF. Only the preemption exit type "Resume Interrupted" functioned properly.	Modified the preemption exiting logic to check for a transition into UCF so that, in that case, the controller always exits to Soft Flash entry phases. This is similar to issue IR#A31, which was previously corrected in firmware v3.1.1	439
In Fixed Force Off mode and zero seconds of Red time for phase 6, transitioning from 2/6 GRN to only phase 3 (and with no other calls) the Force off for phase 6 remained ON indefinitely. Only servicing another ring 2-phase removed the phase 6 FO.	Changes were made to the Fixed Force-Off logic to clear Force-offs in rings in which no phases are on	440
"No Early Coord Ped" was not applied correctly when a ring contained only a coordinated phase. (For example, the coordinated phase is 6, while phases 5, 7 and 8 were not used.)	Redesigned the "No Early Ped Function" to rely on the force-off point of the No-Early-Ped phase rather than on the previous phase's force-off point	441
Short Route Offset-Seeking could skip phases if the offset was attained during CNA pedestrian clearance	Modified 'Extend Tight Permissives' to allow the proper "extensions" throughout the coordinated phase pedestrian clearance, even when the proper offset has already been attained	452

Issue	Resolution	Issue ID (SCR#)
Short Route Seeking with single permissives could skip phases under certain demand scenarios	Added logic to "push back" the start permissives of specific phases during Single Permissive operation to allow demand to be serviced in the proper order while Offset seeking	453
Overlap Mode 3 (5 Section Left Control, Single Indication Only) was not working properly. The Overlap head did not always go dark when ADJ LT Phase was active.	Modified the MODE 3 overlap logic to use the "ADJ LT" entry instead of the "Parent" entry in determining when the overlap should go dark.	475
A 'Divide by Zero' error was reported if a user paged down from any of the Phase Times WALK or PCLR entries and then pressed any arrow key	Corrected the data entry screen array to place the cursor appropriately after paging down from Phase Times WALK or PCLR entries	478
If a Ped call came in during coordination just before the 'last chance for Ped' counter expires, the overlap terminates, but by the time the overlap clearance is finished, the coordinated pedestrian phase is omitted. And also, when this occurs, the overlap is locked out for the remainder of the the coordinated green phase.	The 'last chance for Ped' timer calculation was not including a clearance factor for a Not Ped Overlap. This has been corrected.	480 / 965
Double Diamond MMU logging indicated that Port 1 time-of-day broadcasts were not stable. DDMMU version 2.2 showed that time of day 'jumps' ranged from 5 to 20 seconds over an hour of testing.	Modified the method in which the Real Time Clock (RTC) values are sent to an MMU. Previously, this time was read out using Port 1, Frame 9 while time was rolling. The routine now uses the RTC driver to read the time, which prevents reading a time that is rolling over.	510
A controller could lock up when competing preemption calls occurred just as the controller went into the Flash Entry phases. But this only happened when omits had been applied to all pedestrian and vehicle demands.	Modified the preemption exit logic to set the exit phases to the Flash Entry phases that preemption was entering at the time the controller attempted to go to either UCF or Soft Flash.	522
A false Controller conflict condition was reported just after a true MMU fault occurred and the MMU was then reset	Added test conditions to prevent the 'Check MMU Error' function from executing when the MMU is in either the Reset or Fault state	772
Force-off was not being asserted on the coordinated phase in lead-lag, End of Main Street mode, during Actuated operation, when there were constant calls on all phases	Corrected the Force-Off logic for Lead/Lag Coordinated Phases	819
Cycling Failure Flash occurred prematurely when certain demand patterns existed. The fault was premature because none of the calls were waiting for more than two times the 'free cycle length'.	Corrected the "Twice the cycle length" logic to return the proper value. This fix also repaired some large pedestrian times and double-clearing overlap clearances.	821
Controller skipped phases when Walk Rest was enabled and the unit was timing the cycle slow in order to get in step, when a Yield Permissive, or a No Early Release was applied to a coordinated phase	The controller now catches all phases correctly in such situations.	851
Preemption could lock up on exiting when a preemption call was applied during the Double Clearance Yellow portion of NOT PED overlap processing.	The controller now clears the appropriate NOT PED overlap control variables once the preemption logic has completed its preliminary overlap processing.	854
Coordinated phase force offs were absent in a random fashion. This resulted in erroneous cycle faults directly, and also, during a lengthy dwell period, the phase cycle counters timed down rather than remaining at rest, which also caused erroneous cycle faults.	Moved various timers out of the interrupt logic to eliminate timing race conditions, not only in coordination but in other areas of operation. Also modified the Cycle/Coord Failure logic such that the cycle counters for each phase are loaded with the appropriate values when the controller transitions to and from Coord and Free.	857
Max Dwell Time was not using the correct timing value.	Corrected the array indexing when 4 Splits/Cycle is in effect.	858
Verifying sections of an EEPROM card by checking the CRC was taking extra time to execute. This was creating lags in operation.	Improved the read and check functions of the EEPROM driver. This improved overall performance fractionally.	895
A bus error was occurring when some users navigated down the Dynamic Status screens. This required a power down of the controller to clear the error.	The problem has been corrected. Testing verifies that navigation through the dynamic screens no longer generaties this bus error.	901
(TS-2 firmware only) Controller volt monitoring (CVM) was activating and then deactivating momentarily on start-up. This was causing an intersection monitor to force the controller into Flash.	This was being caused by the routine that synced up the device with its real-time clock (RTC) on startup. Previously, this routine would wait for the RTC to roll-over to reset the time, however this delay of up to a second could occasionally cause the CVM voltage to drop, thus triggering the monitoring hardware to send the intersection into Flash mode. The routine now uses the RTC driver so that it no longer causes a delay of anything more than 190 microseconds, which ensures a steady CVM output.	945

Additional Guidance on the 3000 and 3000E Traffic Controllers

These are some other sources of information about Peek's 3000 and 3000E Traffic Controllers.

Additional Documentation

These documents provide useful information about 3000 Series controllers and other products often used along with them:

Table 4 – Additional Documentation about 3000 Series traffic controllers

Document	Part Number
<i>3000 Series Operating Manual</i>	8204C
<i>3000 Series TS1 Firmware (8216B) Release Notes</i>	99-331
<i>3000 Series NTCIP Firmware (8216C) Release Notes</i>	99-333
<i>3000 Series Protocol-90 Firmware (8216F) Release Notes</i>	99-371
<i>CLMATS Installation Manual</i>	81-858
<i>CLMATS Operating Manual</i>	81-883
<i>CLMATS Release Notes</i>	99-275
<i>CLMATS Preemption Management Module Release Notes</i>	99-365
<i>Double Diamond MMU Operating Manual</i>	8314B
<i>M3000 Operating Manual</i>	5928
<i>M3000 Firmware Release Notes</i>	99-329

Additional information is also available at the Peek website: <http://www.peaktrafficinc.com/>.

Technical Support

This information will connect you with Peek Traffic Corporation if you require additional help concerning 3000 and 3000E Traffic Controllers.

Peek Traffic U.S. -- Customer Service Center

2511 Corporate Way
 Palmetto, FL 34221
 toll free in the U.S.: 1.800.245.7660
 tel: 1.941.845.1200
 fax: 1.941.845.1504
 email: service@peekglobal.com