Software Components

Product: E4000

Date: 12/6/2017

Revision: Standard J.1

System software components:

The following files make up the E4000 software components.

E4000 Main (Processor) PCB Application FLASH

|  |  |
| --- | --- |
| Software component | Main Application |
| Hardware platform | E4000 (1002358) Main Processor (P80C51) |
| Filename/Bytecount/Date | EA.01.09.EF\_RB.obj 403,217 12/5/17 11:27:54 AM |
| File Type | Binary |
| Displayed Version Text | EA.01.09.E |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | Engineering\Private\E4000\RFR Engineering\Software\Releases\CD Backup\PCO 00092595 EA.01.09E\_RB |
| Offsite CD identifier | E4000 Offsite 1 |
| Backup Directory | Engineering\Private\E4000\RFR Engineering\Software\8051RB swap\US 10 Prod\EA.01.09.E\_RB |

E4000 Main (Processor) Flashflink Configuration

|  |  |
| --- | --- |
| Software component | Fflink Configuration |
| Hardware platform | PC |
| Filename/Bytecount/Date | EA.01.09.E\_RB.jcf 962 12/5/2017 11:28:22 AM |
| File Type | Binary |
| Displayed Version Text | N/A |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | Engineering\Private\E4000\RFR Engineering\Software\Releases\CD Backup\PCO 00092595 EA.01.09E\_RB |
| Offsite CD identifier | E4000 Onsite 2 |
| Backup Directory | Engineering\Private\E4000\RFR Engineering\Software\8051RB swap\US 10 Prod\EA.01.09.E\_RB |

E4000 Main (Processor) PCB Application EPROM (No longer supported)

|  |  |
| --- | --- |
| Software component | Main Application |
| Hardware platform | E4000 (1002358) Main Processor (P80C51) |
| Filename/Bytecount/Date | EA.01.09.E.bin 135,244 10/13/2004 11:22:30 AM |
| File Type | Binary |
| Displayed Version Text | EA.01.08.E |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | ECN 00081355\main Processor\EPROM |
| Offsite CD identifier | E4000 Offsite 1 |
| Backup Directory | ECN 00081355\main Processor\EPROM |

E4000 Network PCB

|  |  |
| --- | --- |
| Software component | Network Card Application |
| Hardware platform | E4000 (1002358) Network (N80C31) |
| Filename/Bytecount/Date | ES.01.02.N.bin 32,768 byes 07/01/2003 1:56 PM |
| File Type | Binary |
| Displayed Version Text | N/A |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | ECN 00080629\Network |
| Offsite CD identifier | E4000 Offsite 1 |
| Backup Directory | ECN 00080629\Network |

E4000 Configuration Executable File

|  |  |
| --- | --- |
| Software component | Setup Application File executable |
| Hardware platform | PC |
| Software Tools | N/A |
| Filename/Bytecount/Date | E4000.exe 745,561 5/25/2005 4:02:50 PM |
| Displayed Version Text | NC.02.01.E |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | ECN 00081355\Configuration |
| Offsite CD identifier | E4000 Offsite 1 |
| Backup Directory | ECN 00081355\Configuration |

E4000 Configuration Help File

|  |  |
| --- | --- |
| Software component | NexLink help file |
| Hardware platform | PC |
| Software Tools | N/A |
| Filename/Bytecount/Date | E4000hlp.hlp 237,203 09/07/2004 10:31:32AM |
| Displayed Version Text | N/A |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | ECN 00081355\Configuration |
| Offsite CD identifier | E4000 Offsite 1 |
| Backup Directory | ECN 00081355\Configuration |

E4000 Configuration Installation Files

|  |  |
| --- | --- |
| Software component | Setup Application Install Files |
| Hardware platform | PC (minimum) |
| Software Tools:  Required File: | N/A |
| Filename/Bytecount/Date | DISK1.ID 5 05/25/2005 4:07:14 PM  DISK2.ID 5 5/25/2005 4:07:14 PM  SETUP.INS 70,547 11/12/1998 4:49:22 PM  SETUP.EXE 45,312 10/01/1998 3:21:02 PM  SETUP.PKG 411 5/25/2005 4:07:14 PM  SETUP.ISS 325 5/25/2005 4:07:12 PM  SETUP.INI 57 5/25/2005 4:07:12 PM  \_INST32I.EX 320,411 10/01/1998 3:20:56 PM  \_ISDEL.EXE 8,192 10/01/1998 3:20:56 PM  \_SETUP.DLL 6,128 10/01/1998 3:22:12 PM  \_SETUP.LIB 193,373 5/25/2005 4:07:12 PM  \_SETUP.1 807,314 5/25/2005 4:07:14 PM  \_SETUP.2 241,366 5/25/2005 4:07:14 PM |
| Displayed Version Text | N/A |
| Onsite CD identifier | E4000 Onsite 1 |
| Backup Directory | ECN 00081355\Configuration\Install\ |
| Offsite CD identifier | E4000 Offsite 1 |
| Backup Directory | ECN 00081355\Configuration\Install\ |

**Document**: Software Naming Conventions

**Product**: E4000 software

**Date**: 06/19/2003

Revision: C

This document describes the convention used to create a text string to uniquely identify software versions and subsequent revision levels on the E4000 project. When a text character in the text string signifies some characteristic of the software, indicate it’s meaning here. Add to this list as the product evolves and new characters are needed.

The software version’s unique text string will be used in:

1. The name of the executable file that is distributed to manufacturing.
2. Any labels placed on PROMS.
3. Search tokens to identify the project’s files on archive CD-ROM at the time of release.

The software version convention is as follows:

ab.cc.dd.e

a is a letter to indicate major product.

E - designates E4000

b is a letter to indicate software component type (letter optional).

A – Main processor software

B – Configuration Installation Files

C – Configuration Executable File

H – Configuration Help File

S – Serial card software

cc is a number from 01 to 99 indicating a metrological revision level.

dd is a number from 00 to 99 indicating a non-metrological revision level.

e is a letter used to indicate the language of any displayed text.

E - English

N - Not applicable to software

**Document**: Software Release Log

**Product**: E4000 software

**Date**: 12/06/2017

Revision: Standard J.1

Place all versions and subsequent revisions of the software components below.

E4000 Main (Processor) PCB Application

| Version | Date released | Description |
| --- | --- | --- |
| v.01.01k | 6/24/2002 | Initial Release |
| EA.01.02.E | 8/18/2002 | Corrected outstanding issues   1. The error occurs when counting down and the units digits changes (except when the change is from 1.00 to 0.99). At that time the LSD counts down two instead of one. 2. Changed product price entry from net to gross per marketing, 3. Changed symbol for liters from Ltr to L, Change the format of the temperature displayed on the ticket from XX.XF or C to XX F or C, and Changed temperature compensation message to read “VOL. CORR. TO Tref’ where Tref is the reference temperature for the product per NTEP. |
| EA.01.03.E | 2/21/2003 | 1. Feature Changes:    1. Changed the price calculation so that the tax by percent acts on the discounted price not the gross price.    2. Added a display to the route menus that will allow the driver to modify the gross price after the delivery is complete and before the ticket is printed. The new display will be the same as display “4 Route No Flow Control”, except that the operator will be able to use the ‘^’ and ‘>’ buttons to change the gross price. This feature will be specific to each product so that the driver will only be allowed to adjust the price of those products that have this feature set to on.    3. Added after display ‘4 Supervisor Product Data’ of the product data menus that will allow the price adjustment to be turned on for the selected product.    4. Suppressed printing the discount, % sales tax, and/or volume tax lines of the delivery ticket when the value of the item is zero.    5. Modified the firmware so that the register prints a delivery ticket for the last delivery upon power up if a ticket for the last delivery was not printed prior to power being removed. If power was interrupted before the delivery was complete, a ticket for the partial delivery will be printed.    6. Removed the requirement that flow must be stopped for 10 seconds before a ticket can be printed in the no-flow control delivery mode    7. Remove a button press from the non-Preset delivery ticket printing button presses.    8. Stopped the register from printing tickets and updating the shift report when no product is delivered.    9. Removed timer that de-energized the flow control outputs if flow was not present for 200 seconds. 2. Bugs Corrected    1. 137 The dump record at pointer data logger command does not return requested data.    2. 138 The Batch Overrun is not working correctly. |
| EA.01.04.E | 6/23/2003 | 1. Automated Wireless/Blossman Gas Feature Additions    1. Modified pass-thru printing so that the handheld can send any character including binary.  Created substitute characters for ESC, GR, and LF.    2. Added commands to mimic START/STOP buttons and enable remote deliveries.    3. Add check to prevent delivery start if the printer is not ready to print.    4. Added serial command for printer status.    5. Added serial command to read the delivery stage of the register. 2. Bug Fixes    1. Double Printing via the HH serial port. |
| EA.01.05.E | 8/29/2003 | Fixes   1. Removed Cancel scroll from route menu 2. Set defaults for US propane:  Volume Units Gallons  Temperature units Deg\_F  Batch type non-Preset  Pulse type Quad  Volume resolution 0.1 3. Set drain down time to 30 seconds 4. Adjusted ticket alignment |
| EA.01.06.E | 6/17/2004 | Adds   1. printer driver for Blaster printer    1. Serial command 14,13       1. 0 = Epson       2. 1 = blaster 2. pulse output to software    1. Will provide a pulse for each 0.1 of the selected volume units. |
| EA.01.06.E (Flash) | 8/12/2004 | Flash version of EA.01.06.E above. |
| EA.01.07 |  | Not Released |
| EA.01.08.E (EPROM and Flash) | 10/12/2004 | See “Misc new features and adjustments as implemented” (below) for details   1. Adds:    1. Multiple-delivery selection on product-by-product basis    2. Preset delivery selection to route menu    3. Screen to display both gross and net volume after delivery    4. Zero volume delivery ticket option    5. Totalizer to track the on-board volume 2. Fixes:    1. Removed string ‘name’ from product line of ticket    2. Adjusted the number of significant digits displayed for the zero volume to agree with the number displayed for the volume delivered    3. Changed the default for the batch preset type from ‘price’ to ‘volume’    4. Removed 10 second timer used to determine the end of auto calibration    5. Set printer port handshaking default to hardware |
| EA.01.09.E (Flash) | 7/14/05 | See “Features of an E4000 Dual meter system” (below) for details   1. Adds:    1. Device ID for addressing registers when HH is used    2. Miscellaneous Charge for per delivery charges    3. Printing Message to shift and calibration report screens to indicate when data is being sent to printer 2. Fixes:    1. Calculation of unit price displayed by register |
| EA.01.09.E\_RB | 12/06/2017 | Added (see below for details)  The file names for the new SW revisions will identified with the letters RB.   * The microprocessor (uP) in the E4000 is no longer available and requires KEP to move to a new variant, the 8051 RB. The move to the new uP is not compatible with the current E4k SW. EA.01.09.E RB is the first of several new SW revisions for the RB uP. * While the old SW is not compatible with the RB uP the RB SW will be compatible with the old uP. * The file names for the new SW revisions will be identified with the letters RB appended to the revision #.     Bug fixes:  N/A |

E4000 Network PCB

| Version | Date released | Description |
| --- | --- | --- |
| ES.01.01.N (751rs232a) | 8/19/2002 | Initial Release |
| ES.01.02.N | 6/23/2003 | 1. Various changes as required by the changes described in EA.01.04.E above 2. Bug Fixes    1. Double Printing via the HH serial port. |

E4000 Configuration Executable File

| Version | Date released | Description |
| --- | --- | --- |
| EC.01.00.E | 6/19/2003 | Initial Release |
| EC.01.01.E | 8/21/2004 | Added Epson/Blaster printer selection to config program. |
| EC.01.02.E | 10/13/2004 | Revised for EA.01.08.E changes above. |
| EC.02.00.E | 3/1/2005 | Added additional taxes for Canada |
| EC.02.01.E | 7/15/05 | Revised for EA.01.09.E changes above. |

E4000 Configuration Help File

| Version | Date released | Description |
| --- | --- | --- |
| EH.01.00.E | 6/19/2003 | Initial Release |
| EH.01.01.E | 8/21/2004 | Updated help |

E4000 Configuration Installation Files

| Version | Date released | Description |
| --- | --- | --- |
| EB.01.00.E | 6/19/2003 | Initial Release |
| EB.01.01.E | 8/21/2004 | See above |
| EB.01.02.E | 10/13/2004 | Revised for EA.01.08.E changes above. |
| EB.02.00.E | 3/1/2005 | Added Additional Canadian Taxes |
| EB.02.01.E | 7/15/05 | Revised for EA.01.09.E changes above. |

Misc new features and adjustments as implemented.doc

1. Currently, delivery tickets are printed manually and a message is printed on the bottom of each delivery ticket when Multiple Deliveries is set to “YES”.
   1. Modify the firmware so that the printing of this message is suppressed when the CANCEL button is pressed to print the ticket less than 3 minutes after flow stops. The message will be printed if flow stops for 3 consecutive minutes during a delivery. Even if flow is restarted stopped and then the ticket is printed.
   2. Make Multiple Deliveries selectable on a product by product basis.
      1. Move the Multiple Deliveries screen from the Supervisor/Misc menu to the Supervisor/ Product Data menu.
      2. Place the Multiple Deliveries screen after the Price Adjustment Option screen
   3. Modify the Multiple Deliveries serial command to support configuration on a product by product basis. Old serial command (03,26) will be used with fluid number to accomplish this.
   4. Modify configuration program to support new function. Will add a check to verify the E4000 version.
2. Currently, the preset deliveries must be selected from the supervisor menu. Once selected all deliveries must be made in the preset mode. Customers have expressed the desire to be able to select preset or non-preset mode at the time of delivery.
   1. Add a screen to the route menu just before the Batch Preset Type screen for the selection of the delivery mode. This screen will be active only when “Preset” is selected on the Supervisor/ Batch/Batch screen.
      1. The screen will be titled “Preset Delivery?”. The selections will be “No” and “Yes”. The default after initialization should be “No” and the last selected value should be retained.
         1. When “No” is selected, the “Batch Preset Type” and “Qty To Deliver” screens will not be displayed and the delivery will proceed as if “non-Preset” had been selected at the Supervisor/ Batch/Batch screen.
         2. When “Yes” is selected, the “Batch Preset Type” and “Qty To Deliver” screens will be displayed and the delivery will continue just as a preset menu currently does.
   2. Add serial command for remote configuration.
      1. Serial command 03,30
      2. Selections
         1. No = 0
         2. Yes = 1
   3. Modify configuration program to support new function.
3. W&M inspectors have requested that it be possible to view both the gross and net volume for the last delivery without entering the W&M menus. This allows the inspector to check the meter without breaking the seal.
   1. Add a screen that displays the gross and net volume to the route menus. The new display will be that same as the screen displayed during the automatic volume calibration.
   2. The new screen will be displayed when the “^” or “>” buttons are pushed after the delivery ticket is printed but before the CANCEL button is pressed to return to the “Select Product” screen. A second press of the “^” or “>” buttons should will recall the original screen. Repeated presses of the “^” or “>” buttons will swap between the two screens.
   3. Pressing the CANCEL or ENTER button will return the register to the product select screen.
4. Remove “Name” from product name row on delivery ticket.
   1. Current Product # 1 Name DIESEL  
      Desired Product # 1 DIESEL
5. The start volume printed on the ticket should have the same number of decimal places as the end volume (net or gross). e. g.:
   1. Current  
       Start Volume 0.00 UUU  
       Net Volume 12.3 UUU  
      Desired  
       Start Volume 0 UUU or 0.0 UUU or 0.00 UUU or 0.000 UUU  
       Net Volume 123 UUU 12.3 UUU 1.23 UUU 0.123 UUU
6. Change the default value for the Route/Batch Preset Type screen. From “Price” to “Volume”.
   1. The function of the selections will remain the same.
   2. The default selection will be Volume after initialization and retain the last selection when entering the screen.
7. During auto volume calibration for materials that foam it may be necessary to stop flow for a period during the calibration to allow the foam to subside. This done to keep the foam from over filling the prover, and creating a spill and to prevent calibration errors. Currently, when a auto volume calibration is in progress, The E4000 de-energizes the relay outputs whenever the flow stops for 10 seconds and will not allow them to be re-energized.
   1. Eliminate the automatic de-energization of the relay outputs when flow stops for 10 seconds.
   2. The relay outputs should be energized when the ENTER button is pressed at the W&M/VOL/AUTO/ AUTO CALIBRATION START FLOW screen.
   3. The relays should de-energize:
      1. Anytime the CANCEL/STOP button is pressed or
      2. When the enter button is pressed at the W&M/VOL/Auto/K-FACTOR screen
8. Set the default value for printer port handshaking to hardware.
9. Operators have a need to generate a delivery ticket as proof that they checked the tank even if they did not make a deliver any material.
   1. Add screen to the supervisor/Misc menu so that the operator can print zero volume tickets if desired.
   2. The new screen will be called “Print 0.0 Volume?” The selections will be “No” and “Yes”. The default selection will be “No”.
      1. If “No” is selected and a delivery is started but no material is registered no ticket will be printed. (A change in the delivery stage from 0D to 1 D, 4 D, or 10 D will be the test for the start of a delivery.)
      2. If “Yes” is selected and a delivery is started but no material is registered the register will terminate the delivery as if the delivered quantity was greater than zero (e. g., the data logger and shift reports will be updated, and a delivery ticket will be printed, etc.)
   3. Add serial command for remote configuration.
      1. Serial command 16,19
      2. Selections
         1. No = 0
         2. Yes = 1
   4. Modify configuration program to support new function.
10. Operators have requested a totalizer that tracks the amount of product that remains on the truck as deliveries are made. The drivers will uses this totalizer to determine when refill the truck.
    1. Create a totalizer that keeps track of the quantity of material remaining on the truck. In operation the driver will reset the total when he fills the truck by entering the gross (not net) volume on board. As deliveries are made, the gross volume delivered will be subtracted from the totalizer at the end of the delivery.
    2. Modify the Route/Delivery Reports screen to read: Delivery Vol Reports When Delivery is selected, the register will operate, as it does not.
    3. Selecting Reports will call the same screens and functions as selecting Reports on the current Route/Delivery Reports screen.
    4. When “Vol” is selected a new screen will titled “On Board” will be displayed. The bottom line of this screen will display the volume from the new totalizer. To reset the totalizer the driver would enter the desired value at the On Board screen.

# Features of an E4000 Dual meter system

# Intent

The intent of the E4000 dual meter system is to allow the user to make single deliveries from either of meter or deliveries from both meters at the same time. The single meter deliveries would require separate delivery tickets. Simultaneous deliveries will require separate tickets. Calibration and shift reports will remain separate. One printer in the cab of the truck will print all tickets and reports for both meters.

The dual meter functionality will be added to both the standard and the Canadian W&M versions of the E4000.

# Hardware Configuration

The two registers will be connected to the printer via a smart printer switch furnished by a third party. Addressing will be used to enabled the HHC to communicate with the registers individuality

E4000 B

E4000 A

Ptr

Port

HHC

Port

HHC

Port

Ptr

Port

System Printer

HHC

(optional)

Smart

Printer SW

# Functionality

The user will then start the deliveries from the registers in the normal manner. After the deliveries are completed, and separate tickets have been requested, the user will print press the CANCEL or ENTER button on the appropriate register to print its delivery ticket. There will be no prohibition against making single deliveries from both meters at the same time and it will be permissible give the command to print the ticket from register A while the ticket from register B is printing. But a method will need to be devised (via the smart printer sw) to allow the user to remove the first ticket printed from the printer and insert a blank ticket for the second register’s delivery without losing the delivery information. Registers will be prevented from making deliveries until the delivery ticket for the last delivery is printed.

Register A can start a delivery before a pending ticket for register B is printed and visa-versa.

Pressing a register’s ENTER button after the original ticket has printed will print a duplicate of the ticket from the register whose button was pressed. The duplicate message must be printed on all duplicate copies of delivery tickets.

Due to the topography of the Dual meter system it will be necessary to devised a method to pass configuration and operations commands to register A and register B.

# Implementation

Menus and Screens

Supervisor/Misc.

Add a screen to the Supervisor/Misc menu for setting the register’s device ID. The screen will be called “Device ID”. Selections will be numeric values between 01 and 99. The initialized default value will be 01.

Printing Message

Add the “PRINTING” message that is displayed while delivery tickets are being printed to both the Shift and Calibration report screens to indicate when printing is in progress.

Disable ENTER input during printing of shift and Calibration reports.

# Calibration

The procedure to calibrate a dual meter register will not change. Register will be calibrated locally only. It will still be necessary to be able to download the K-factor via the serial port.

# Configuration

It is required to be able to configure the registers locally and remotely via the registers HHC serial ports. When configured via the HHC port, the registers will be configured individually from separate configuration files. A combined configuration file will not be required.

# Delivery Tickets

Ticketing Numbering

Ticketing numbering will be maintained independently by each register.

Delivery Tickets

Tickets for deliveries (whether the deliveries are made simultaneously or not) will be the same as the as the current tickets.

### Combined Delivery Tickets

Combined delivery tickets are not required.

# Shift Report

Shift reports will be the same as the current.

# Other new features

Miscellaneous Charge

Some user charge a flat rate fee on a per delivery basis. This fee is applied product by product.

Add a screen to the Superviser/Product Data menu after the tax screens for a miscellaneous charge to be included on the delivery ticket.

1. The new screen will follow the Tax $/Gallon (US) or the TAX 6 (Canadian) screen and will be called “Misc Fee”. The screen will be for numeric entry of a number in the form XXX.XXX and the units will be $.
2. The calculation for the total will be modified so that this charge is added to the total after taxes and discounts have been calculated. There will be no change to the Total Net Price calculation displayed by the register, only the delivery ticket.
3. Change the name on the current TOTAL line to FUEL TOTAL.
4. Two lines should be added to the delivery ticket just below the current total line and will look like this:  
    MISC FEE $ XX.XX  
    TOTAL SALE $ XXXX.XX  
   The TOTAL SALE line will be the sum on the FUEL TOTAL line and the Misc Fee line.
5. If the value entered for the Misc Fee on the Supervisor Product Data menu is zero the line will not be printed on the delivery ticket.
6. Add serial command for remote configuration.