



**INSTALLATION AND INSTRUCTION**

**VITAL INTERFACE UNIT (VIU-20E) (ACSES)  
A80540 ADVANCED CIVIL SPEED  
ENFORCEMENT SYSTEM**

**NOVEMBER 2009 (REVISED APRIL 2020)**

**DOCUMENT NO. SIG-00-09-06  
VERSION E.4**

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The equipment covered in this manual has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

## DOCUMENT HISTORY

Version	Release Date	Details of Change
1	Sep 2009	INITIAL REVIEW COPY
A	Nov 2009	Version A per VS2-F247
A.1	Apr 2010	Updated per telephone conversation with Rich Klein, ITS. See change notice for actual changes made.
A.2	May 2010	Updated per telephone conversation with Rich Klein, ITS. See change notice for actual changes made.
B	Nov 2011	Updated per telephone conversation with Product Line Manager regarding updating VIU family of documents to current ITC Committee requirements. Referenced in email 10/28/11, 9:59 a.m. to Dave Wright. Also inserted new VIU-16i/-8i XML File data. See change notice for actual changes made.
B.1	Apr 2014	Convert to Siemens Format
C	August 2014	<p>Section 1 – page 1-18: Updated tab chart in Figure 1-9 to reflect latest part number configuration.</p> <p>Section 7 – replaced all UI screens with new versions containing updated menus and Siemens logo.</p> <p>Section 7: Identified all parameters not associated with VIU-20e ACSES function.</p> <p>Page 7-1: Rewrote Section 7.2.1 per VIU-20 manual</p> <p>Page 7-7: Added figure 7-18, “ACSES II Network Configuration Screen”, inserted Section 7.3.1 “ACSES II Network” from VIU-20 manual in front of existing Section 7.3.1 “ATCS Router Configuration”.</p> <p>Page 7-8: Inserted Section 7.3.3 “CDL Log Configuration”</p> <p>Page 7-10: Revised Section 7.3.3 “EMP-WIU” per VIU-20 manual, and changed to Section 7.3.5</p> <p>Page 7-17: Section 7.3.8 (formerly 7.3.5) “GPS Configuration” updated per VIU-20 manual.</p> <p>Page 7-20: Inserted Section 7.3.9, “High Availability”</p> <p>Page 7-22: Section 7.3.11 (formerly 7.3.8) “Site Info Configuration” updated per VIU-20 manual.</p>

		<p>Page 7-25: Added Section 7.3.12 “SNMP”</p> <p>Page 7-27: Added Section 7.3.13 “SNTP”.</p> <p>Page 7-28: Updated Section 7.3.14 “TCP Port Configuration” per VIU-20 manual.</p> <p>Page 7-30: Inserted Section 7.3.15 “Time Source” from VIU-20 manual.</p> <p>Page 7-35: Added Section 7.4.3 “CDL Log”.</p> <p>Page 7-36: Updated Section 7.5 “Maintenance” per the VIU-20 manual.</p> <p>Page 7-44: Added Section 7.8 “Applications”</p> <p>Page 8-2: Updated figure 8-1</p> <p>Page A-1: Removed old Appendix A – DEFINING VIU-20e CONFIGURATION PARAMETERS (not applicable), changed previous Appendix B (MINIMUM GUIDELINES FOR TESTING A VIU-20e) to Appendix A.</p> <p>Page B-1: Added Appendix B covering SNMP Traps</p>
D	April 2015	<p>Global:</p> <p>Add “-e” to all VIU 20 references. (VIU 20-e</p> <p>Section1 – Pg 1-1 Para 1.1, Para 1-2, Para 1.3.1 Pg 1-16: Updated Table 1-2 , Steady State Current, Inrush Current, Baud rate, Isolation, Vital I/O Voltage Levels, Max Humidity, Impedance</p> <p>Section 2 – Pg 2-1 Para 2.1 Pg 2-3 Para 2.1.2.1, Para 2.1.2.2, Add text Pg 2-5: Para 2.1.4.1 Added text Pg 2-6: Para 2.1.5.2</p>

		<p>Section 3 Pg 3-1 Para 3.1 extend boot up time 2min 30 sec Pg 3-8, Para 3.7</p> <p>Section 5 Pg 4-1 Change title, Para 5.1 remove text, Figure 5-1 remove drivers Pg 5-2, Para 5.2 remove text</p> <p>Section 6  Pg 6-2 Para 6.3 change DT Utility Pg 6-15, Para 6.8.3.2, add paragraph Pg 6-21 Add range 0-255</p> <p>Section 7 Pg 7-1, add Vista Windows 7 Pg 7-2 Para 7.2.1 change IP address Pg 7-22, Table 7-1</p> <p>Appendix A Pg A-1 Table A-1 remove MCP Radio</p>
E	Dec 2016	<p>Glossary GOL – updated text</p> <p>Section 1  Pg 1-4 Para 1.3.1 Change text to remove reference to TCP/IP network access to Web Browser Pg 1-5 Para 1.3.2 Change text to remove reference to TCP/IP network access to Web Browser Pg 1-10 Para 1.4.4.1 Add Local UI Password info Pg 1-11 Fig 1-6 Add Local UI Password, Add Note Pg 1-15 Fig 1-8 Add Password to USB Menu</p> <p>Section 2  Pg 2-3 Para 2.1.2 Fig 2-3 Add new Power/ECD Combo</p> <p>Section 3  Pg 3-2 Para 3.1.2 Update Boot Display figure Pg 3-4 Para 3.2.1 Updated Upload Procedure Add Note Pg 3-8 Para 3.6 Changed Time Updates removed GPS Receiver</p> <p>Section 4  Pg 4-3 Fig 4-2 Remove reference to HMAC</p> <p>Section 5  No Changes</p>

		<p>Section 6</p> <p>Pg 6-25 Para 6.8.4.3 Fig 6-33 Add Direction of Exit Pg 6-26 Add Direction of Exit Pg 6-27 Change Text Delete Second Radio Channel Section 7</p> <p>Global Section 7 – Update all figures to show new menu arrangement Pg 7-6 Fig 7-16 and 7-17 Update Menu Pg 7-7 Para 7.3.1.1 through 7.3.1.9 Update menus Pg 7-10 Para 7.3.4.3 EMP-WIU deleted Pg 7-14 Para 7.3.7 delete internal GPS Pg 7-15 Para 7.3.7.1 Update Menu and Fig 7-27 Pg 7-16 Para 7.3.7.4 Delete menu parameters Pg 7-18 Para 7.3.8.13 Delete entire paragraph Pg 7-25 Para 7.3.12.10 Deleted Time Source Pg 7-31 Para 7.5 Remove Class D Testing Update Fig 7-46 and Fig 7-48 Pg 7-33 Para 7.6 Remove GPS Update Fig 7-52 Pg 7-34 Para 7.7.1 Update menu Pg 7-43 Add Para 7.9 Security</p> <p>Section 8</p> <p>No Changes</p> <p>Appendix A</p> <p>No Changes</p> <p>Appendix B</p> <p>Pg B-2 Table B-2 Delete Message CRC, Message Bad, and Message Track number</p> <p>Appendix C</p> <p>Addition of new appendix</p>
E.1	OCT 2017	<p>Section 1 Page 1-8, Table 1-1, item 14</p> <p>Section 2 Page 2-7, Section 2.1.6, add note, update Table 2-1</p> <p>Section 7 Page 7-11, Section 7.3.5, add note</p>
E.2	FEB 2018	<p>Glossary: Replaced “Safetran” with “Siemens.” 6.1 Replaced “Safetran” with “Siemens” Updated Figure 6-2 with new graphic.</p>

		<p>Added Section 6.12 Using the OCE to Create Configuration Files.</p> <p>Added Figures 6-44 through 6-51.</p> <p>Updated compatible browsers in Section 7.1.</p> <p>Replaced “Safetran” with “Siemens” in Section 7.2.2.</p> <p>Replaced “Safetran” with “Siemens” in Section 7.3.9.1</p>
E.3	APR 2018	2.1.4 Vital Inputs updated to say “20 discrete vital input pairs” and text added to clarify the vital input male connector keying.
E.4	APR 2020	Updated Figure 1-7, Figure 1-8, Table 1-2, Figure 3-1, Figure 4-1, and sections 3.2.2.1, 3.2.2.2, 3.2.2.3

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## NOTES, CAUTIONS, AND WARNINGS

Throughout this manual, notes, cautions, and warnings are frequently used to direct the reader's attention to specific information. Use of the three terms is defined as follows:

### **WARNING**

#### **WARNING**

INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, COULD RESULT IN DEATH OR SERIOUS INJURY. WARNINGS ALWAYS TAKE PRECEDENCE OVER NOTES, CAUTIONS, AND ALL OTHER INFORMATION.

### **CAUTION**

#### **CAUTION**

REFERS TO PROPER PROCEDURES OR PRACTICES WHICH IF NOT STRICTLY OBSERVED, COULD RESULT IN A POTENTIALLY HAZARDOUS SITUATION AND/OR POSSIBLE DAMAGE TO EQUIPMENT. CAUTIONS TAKE PRECEDENCE OVER NOTES AND ALL OTHER INFORMATION, EXCEPT WARNINGS.

### **NOTE**

#### **NOTE**

Generally used to highlight certain information relating to the topic under discussion.

If there are any questions, contact Siemens Mobility, Inc. Application Engineering.



## ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

Static electricity can damage electronic circuitry, particularly low voltage components such as the integrated circuits commonly used throughout the electronics industry. Therefore, procedures have been adopted industry-wide which make it possible to avoid the sometimes invisible damage caused by electrostatic discharge (ESD) during the handling, shipping, and storage of electronic modules and components. Siemens Mobility, Inc. has instituted these practices at its manufacturing facility and encourages its customers to adopt them as well to lessen the likelihood of equipment damage in the field due to ESD. Some of the basic protective practices include the following:

- Ground yourself before touching card cages, assemblies, modules, or components.
- Remove power from card cages and assemblies before removing or installing modules.
- Remove circuit boards (modules) from card cages by the ejector lever only. If an ejector lever is not provided, grasp the edge of the circuit board but avoid touching circuit traces or components.
- Handle circuit boards by the edges only.
- Never physically touch circuit board or connector contact fingers or allow these fingers to come in contact with an insulator (e.g., plastic, rubber, etc.).
- When not in use, place circuit boards in approved static-shielding bags, contact fingers first. Remove circuit boards from static-shielding bags by grasping the ejector lever or the edge of the board only. Each bag should include a caution label on the outside indicating static-sensitive contents.
- Cover workbench surfaces used for repair of electronic equipment with static dissipative workbench matting.
- Use integrated circuit extractor/inserters tools designed to remove and install electrostatic-sensitive integrated circuit devices such as PROM's (OK Industries, Inc., Model EX-2 Extractor and Model MOS-40 Inserter (or equivalent) are highly recommended).
- Utilize only anti-static cushioning material in equipment shipping and storage containers.

For information concerning ESD material applications, please contact the Technical Support Staff at 1-800-793-7233. ESD Awareness Classes and additional ESD product information are also available through the Technical Support Staff.

## GLOSSARY

TERM	DESCRIPTION
AAR	<u>Association of American Railroads</u> – An organization that establishes uniformity and standardization among different railroad systems.
ACSES	<u>Advanced Civil Speed Enforcement System</u> – A Vital Interface Unit that provides functions according to Wayside Interface Unit (WIU) requirements as defined by the Association of America Railroads (AAR). It also provides functions according to ACSES Encoder requirements. Its dual function capability allows an ACSES train and a train that is capable of interfacing with a WIU to obtain wayside vital information.
Aspect	(Signal Aspect) The appearance of a fixed signal conveying an indication as viewed from the direction of an approaching train. A cab signal conveying an indication as viewed by an observer in the cab.
ATCS	<u>Advanced Train Control System</u> – A set of standards compiled by the AAR for controlling all aspects of train operation.
BCP	<u>Base Communication Packet</u> , or Base Station
CBTC	<u>Communications Based Train Control</u> . An automated control system for railways that ensures the safe operation of rail vehicles using data communication between various control entities that make up the system.
CDL	<u>Control Description Language</u>
CETC	<u>Centralized Electrification &amp; Train Control</u>
CDMA	<u>Code Division Multiple Access</u> . This is a form of spread spectrum signaling using different codes on one or more channels.
Checksum	A simple way to protect the integrity of data by detecting errors in data that are sent through space (telecommunications) or time (storage). It works by adding up the basic components of a message, typically the asserted bits, and storing the resulting value. Anyone can later perform the same operation on the data, compare the result to the authentic checksum, and (assuming that the sums match) conclude that the message was most likely not corrupted.
Configuration File	When changes are made to the default settings in the MCF (Master Configuration File), the custom settings are maintained in the configuration file.

TERM	DESCRIPTION
CRC	<u>Cyclic Redundancy Check</u> . A type of function that takes an input of data stream of any length and produces as output a value of a certain fixed size. The term CRC is often used to denote either the function or the function's output. A CRC can be used as a checksum to detect alteration of data during transmission or storage. CRCs are particularly good at detecting common errors caused by noise in transmission channels.
CTV	<u>Television Compatibility Box</u>
DSU	<u>Data Service Unit</u>
DT	<u>Diagnostic Terminal</u> . Siemens PC-based diagnostic software.
ECD	<u>External Configuration Device</u> . A serial EEPROM (Flash Memory) device used to store site-specific configuration data (MCF, SIN, UCN, etc.) for the VIU-20e.
EEPROM	<u>Electrically Erasable Programmable Read-Only Memory</u> . A type of non-volatile memory used in computers and other electronic devices to store small amounts of data that must be saved when power is removed. When larger amounts of static data are to be stored, a specific type of EEPROM called a flash memory is used.
ELS	<u>Serial Link extension board</u> .
EMP	<u>Edge Messaging Protocol</u> . A common message format used for edge integration. Examples of integration edges are wireless transports and various messaging systems that may be used by the various railroads (e.g., using EMP to communicate between mobile applications and back office applications using wireless communications). EMP defines the message format, header, and operating rules which facilitate interoperable message transmission, reception, decoding, and routing.
ESSR	<u>Ethernet Spread Spectrum Radio</u> .
FRA	<u>Federal Railroad Administration</u> . The purpose of FRA is to: promulgate and enforce rail safety regulations; administer railroad assistance programs; conduct research and development in support of improved railroad safety and national rail transportation policy; and consolidate government support of rail transportation activities.
GCP	<u>Grade Crossing Predictor</u> .
GCS	<u>Geographic Configuration Suite</u> . Used to program the VIU-20e MCF.
GMT	The time as measured on the prime meridian running through Greenwich, England: used in England and as a standard of calculation elsewhere. Also called <b><u>Greenwich Mean Time</u></b> , <b><u>Greenwich Civil Time</u></b> , <b><u>Universal Time</u></b>

TERM	DESCRIPTION
GOL	<u>Geographic Object Library</u> . A collection of pre-configured track and signal elements used by Siemens Geographic Configuration Suite software for building track layouts. Each GOL object possesses the necessary track element characteristics as defined by the FRA rules.
GPS	<u>Global Positioning System</u> .
HMAC	<u>Keyed-Hash Message Authentication Code</u> . A type of message authentication code (MAC) calculated using a specific algorithm involving a cryptographic hash function in combination with a secret key.
HS	<u>Home Signal</u> .
LCT	<u>Line Controller Task</u> , A function of the Siemens™ Packet Switch
LCM	<u>Locomotive Communication Module</u> . Radio located on board a locomotive.
LD	<u>Line Driver</u>
LED	<u>Light Emitting Diode</u> .
LoMA	<u>Limits of Movement Authority</u> . The control center's safety interlocking logic uses the data from all trains to issue <b>limits of movement authority (LoMA)</b> and speed limits to each train, being careful to keep safe separation between trains. The train's onboard computer monitors the LoMA and speed limit data against actual train location and speed to determine potential and actual unsafe conditions. If the train is approaching the end of its LoMA or it is nearing its speed limit, the onboard computer warns the engineer, who is expected to take appropriate action. If the train passes the end of its LoMA, the onboard computer automatically signals for a safety brake application to bring the train to a stop.
MCF	<u>Module Configuration File</u> . Application specific configuration file. Defines how the VIU-20e will operate in a specific application such as the Office Monitoring or Wayside Interface applications. Contains default settings for configurable parameters.
MCP	<u>Mobile Communications Package</u>
MEF	<u>Module Executable File</u> . The VIU-20e executive software. Defines the general operation of the VIU-20e.
MIB	A <b>management information base (MIB)</b> is a hierarchical database used for managing the entities in a communications network. Most often associated with the <u>Simple Network Management Protocol (SNMP)</u> .

TERM	DESCRIPTION
NMEA	<p><u>National Marine Electronics Association.</u> <b>NMEA 0183</b> (or <b>NMEA</b> for short) is a combined electrical and data specification for communication between marine electronic devices such as echo sounder, sonar, Anemometer (winds speed and direction), gyrocompass, autopilot, GPS receivers and many other types of instruments. It has been defined by, and is controlled by, the US-based National Marine Electronics Association.</p> <p>The NMEA 0183 standard uses a simple ASCII, serial communications protocol that defines how data is transmitted in a "sentence" from one "talker" to one "listener" at a time. Through the use of intermediate expanders, a talker can have a unidirectional conversation with multiple listeners, and using multiplexers, multiple sensors can talk to a single computer port. Third-party switches are available that can establish a primary and secondary talker, with automatic failover if the primary fails.</p>
OBC	<u>On-Board Computer</u>
OCG	<u>Office Communication Gateway.</u> Communications traffic router, such as a packet switch, that provides the interface between the office monitoring system and the communications infrastructure.
OID	<b>OIDs</b> or Object Identifiers uniquely identify managed objects in a MIB hierarchy.
OSI	<u>Open Systems Interconnection.</u> A layered, abstract description for communications and computer network protocol design. It is sometimes known as the <b>OSI seven layer model</b> . From top to bottom, the OSI Model consists of the Application, Presentation, Session, Transport, Network, Data Link, and Physical layers. A layer is a collection of related functions that provides services to the layer above it and receives service from the layer below it.
PTC	<u>Positive Train Control.</u>
SIN	<u>Site Identification Number.</u> The 12-digit ATCS address for the VIU-20e equipment entered via the Web interface and stored in the ECD. The SIN has the form 7.RRR.LLL.GGG.SS stored in binary coded decimal, with each digit in one nibble. The digit 0 is represented by "A" and 0 is used as a null byte.
SMA	<u>Sub-Miniature version A.</u>
SNTP	<b>Simple Network Time Protocol</b> , a simplified version of NTP (a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks). SNTP can be used when the ultimate performance of the full NTP implementation is not needed or justified.

TERM	DESCRIPTION
TCP/IP Network	<u>Transmission Control Protocol / Internet Protocol</u> . The suite of communications protocols used to connect hosts on the Internet. TCP/IP uses several protocols, the two main ones being TCP and IP. TCP/IP is built into the UNIX operating system and is used by the Internet, making it the de facto standard for transmitting data over networks.
TMC	<u>Train Management Computer</u> . The CBTC Computer on board a locomotive that interprets messages from the WIU and controls the locomotive operations accordingly.
TRM	<u>Transmission Radio Modem</u>
TSR	<u>Temporary Speed Restriction</u>
UCN	<u>Unique Check Number</u> . A 32-bit CRC calculated over the MCF, SIN and vital configuration parameters. Used to verify that the configuration is correct. It is stored in the ECD to detect file corruption.
UDP	<u>User Datagram Protocol</u> . One of the core protocols of the Internet protocol suite. Using UDP, programs on networked computers can send short messages sometimes known as <i>datagrams</i> (using Datagram Sockets) to one another.
UNS	<u>Unified Numbering System</u>
USB	<u>Universal Serial Bus</u> . A serial bus standard to interface devices. USB was designed to allow many peripherals to be connected using a single standardized interface socket and to improve the plug-and-play capabilities by allowing devices to be connected and disconnected without rebooting the computer (hot swapping). Other convenient features include providing power to low-consumption devices without the need for an external power supply and allowing many devices to be used without requiring manufacturer specific, individual device drivers to be installed.
UTC	<u>Coordinated Universal Time</u>
VIU	<u>Vital Interface Unit</u> . A device that monitors switch positions and signal aspects and then generates vital status messages reflecting the current state of the monitored equipment.
VLAN	<u>Virtual Local Area Network</u>
VPF	<u>Vital Parallel Flashing (VPF) input circuit</u> . The VIU-20e Master I/O circuit with 10 vital inputs that runs appliance model logic and detects steady and flashing inputs. Identical Slave circuits provide 10 additional vital inputs with similar functionality.

TERM	DESCRIPTION
VTP	<u>Virtual Local Area Network (VLAN) Trunk Protocol</u> . A Cisco proprietary Layer 2 messaging protocol that manages the addition, deletion, and renaming of VLANs on a network-wide basis. VTP reduces administration in a switched network. When you configure a new VLAN on one VTP server, the VLAN is distributed through all switches in the domain. This reduces the need to configure the same VLAN everywhere.
WCM	<u>Wayside Communications Module</u> . A radio, such as the MDS or Siemens ESSR radios, located at a wayside and used to transmit vital status messages generated by the VIU-20e to passing trains.
WIU	<u>Wayside Interface Unit</u> . Term used to refer to the VIU-20e in CBTC applications.
WSM	<u>Wayside Status Messages</u> . Messages in EMP format reflecting the status of vital functions at a wayside location. These vital functions include signal aspects and switch positions. These messages are generated by the VIU-20e and are sent to the WCM for transmission.

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## SECTION 1

### INTRODUCTION

#### 1.0 INTRODUCTION

#### 1.1 GENERAL

This document describes the installation, configuration and operation of the Advanced Civil Speed Enforcement System (ACSES) version of Siemens Vital Interface Unit (VIU). The VIU-20e (ACSES model) is part number A80540.

The VIU-20e (Figure 1-1) is a general purpose programmable logic controller that can monitor the state of its inputs, perform logic functions, and generate vital communication messages to report its status or the status of devices connected to its inputs.



**Figure 1-1 Pictorial View of VIU-20e (ACSES Model)**

Each VIU-20e unit provides 20 vital digital inputs that can be connected to an interlocking for Home Signal (HS) (go/no-go), 'C' signals (on/off), or switch positions (normal, reverse, unknown) via relay contact closure or direct interface to compatible solid state interlocking controller relay vital outputs.

If more than 20 inputs are required, multiple VIU-20e units can be networked using standard Internet Protocol (IP/UDP) connectivity over the Ethernet port. In this case, the slave VIU-20e units communicate with the master VIU-20e unit using vital Advanced Train Control System (ATCS) message protocols. The master VIU-20e unit consolidates the message(s) and creates one central message.

**WARNING**

WHEN THE VIU-20e RESPONDS WITH AN ENCODER RESPONSE (MESSAGE TYPE 22, 23 OR 24), IT IS THE RESPONSIBILITY OF THE RECEIVING SYSTEM TO VERIFY THAT THIS MESSAGE IS VALID FOR USE BEFORE ALLOWING ANY NON-RESTRICTIVE OPERATION. THE VERIFICATION SHOULD INCLUDE, BUT IS NOT LIMITED TO, CHECKING THAT THE MESSAGE IS NOT CORRUPT, NOT STALE, CORRECTLY ADDRESSED, NOT HACKED, VALID FORMAT.

**WARNING**

IT IS THE RESPONSIBILITY OF THE RECEIVING SYSTEM TO GO TO A RESTRICTIVE STATE IN A TIMELY MANNER WHEN NO VALID MESSAGES ARE RECEIVED FROM THE NEXT INTERLOCKING (VIU-20e UNIT).

## 1.2 APPLICATIONS

Application-specific functions performed by the VIU-20e are controlled by a Module Configuration File (MCF). The MCF is programmed using the Siemens Geographic Configuration Suite (GCS).

The VIU-20e utilizes application-specific MCFs. In this document, a generic VIU-20e application is presented and is described briefly in the following paragraphs. An expanded description is provided as indicated in later sections of this document.

**WARNING**

THE MCF, APPLICATION LOGIC AND OTHER CONFIGURABLE ITEMS SHOULD BE VERIFIED BY SIMULATION, RACK TESTING AND IN-SERVICE INSTALLATION TESTING.

The VIU-20e as supplied from the factory does not come with an MCF. The MCF is developed on a project phase, and project documentation should be referenced for exact MCF functionality.

**WARNING**

PLEASE REVIEW THIS USER MANUAL CAREFULLY TO ENSURE CORRECT APPLICATION AND MAINTENANCE OF THE VITAL INTERFACE UNIT (VIU). INCORRECT APPLICATION MAY RESULT IN UNSAFE OPERATION.

### 1.2.1 ACSES Interface Application

The VIU-20e can monitor switch positions and signal status controlled by other equipment in an interlocking. When queried by an ACSES equipped train, the VIU-20e will send the information back to the train's on-board computer system (Figure 1-2).

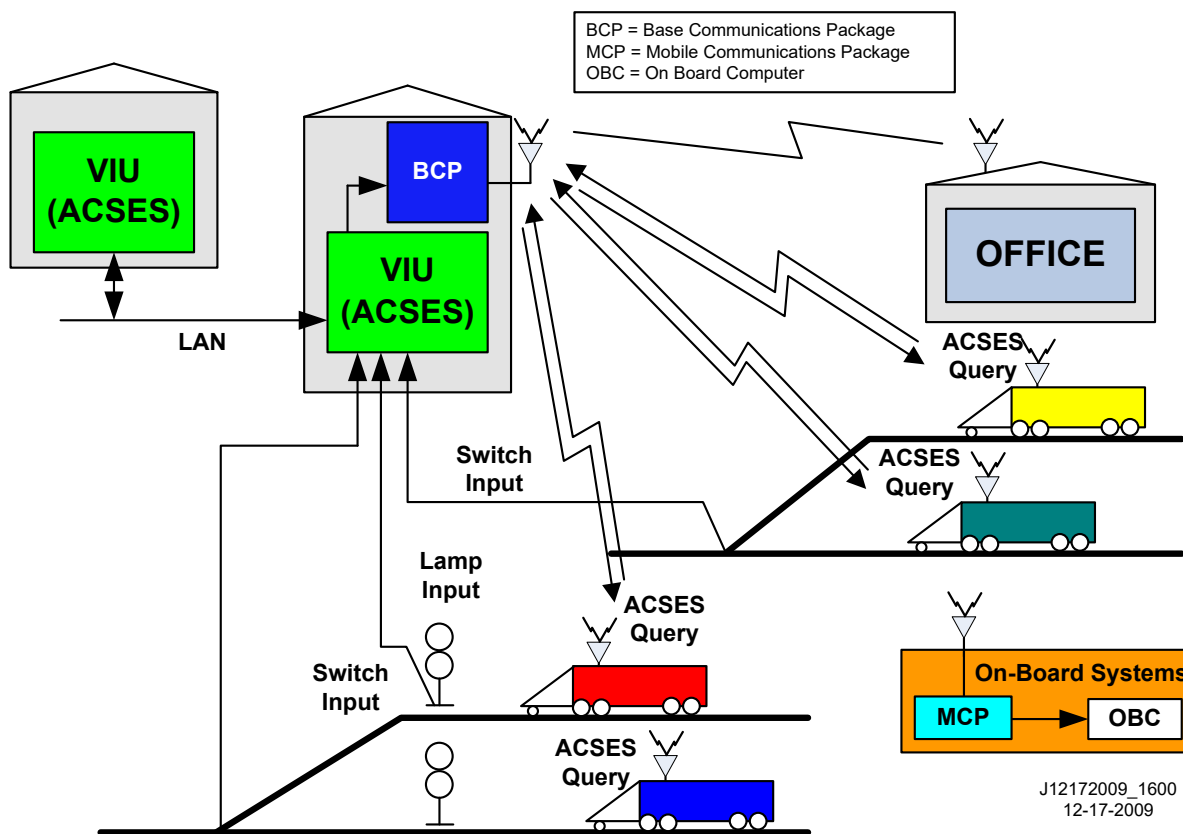


Figure 1-2 VIU-20e Application



**WARNING**

#### WARNING

THE DESIGNER OF THE MCF MUST INCORPORATE STABILIZATION LOGIC, WHERE NECESSARY, TO PREVENT UNSTABLE DATA BEING SENT FROM THE MONITORED SYSTEMS.

## 1.3 SYSTEM DATA LOGS

The VIU-20e maintains several data logs as described in the following paragraphs.

### 1.3.1 Event Log

The Event Log is maintained by the non-vital processor of the VIU-20e. Entries in this log show application level events describing VIU-20e system operations. This log does not contain detailed diagnostic events pertaining to the internal operation of the VIU-20e or associated system. A separate Diagnostic Log maintains these more detailed diagnostic events (paragraph 1.3.2).

- The Event Log is stored in flash memory to prevent data loss when power is removed from the VIU-20e. It does not require a back-up battery.
- The number of events that can be stored in the Event Log is 100,000.
- Events stored in the Event Log are time stamped to the hundredth of a second.
- The log is structured as a circular buffer in that once the log is full, the newest event will overwrite the oldest recorded event.
- The entire Event Log can be downloaded to a Universal Serial Bus (USB) drive.
- The Event Log is accessible using the Web browser user interface. It can be viewed by date/time range and can be downloaded to a PC.
- The Event Log can be viewed using a Web browser directly connected to a free Ethernet port on the VIU-20e.
- Events can be viewed as they are recorded and logged into the Event Log via the **Trace Events** function on the Web browser user interface.

### 1.3.2 Diagnostic Log

The diagnostic log is maintained by the non-vital processor of the VIU-20e. It contains low level diagnostic entries that detail the internal operation of the system that might otherwise clutter the event log. This data is useful for troubleshooting problems related to internal system operation.

- Diagnostic Log can contain five entry types (listed below in lowest to highest verbosity level):
  - a. BASIC - entries that cannot be classified as another type or that need to be visible regardless of the VERBOSITY setting of the log (e.g. "diagnostic log initialized").
  - b. ERROR – critical system errors such as hardware failures the system cannot heal or recover from.
  - c. WARNING – system errors that could indicate a problem but the system can continue operating under this condition.
  - d. INFORMATION – potentially useful information but does not represent a failure or fault in the system. This verbosity level is at the default setting.
  - e. DEBUG – information that may be useful to a software or hardware engineer in understanding the internal operation of the system but is not normally useful for anyone else.
- Diagnostic Log is stored in flash memory to prevent data loss when power is removed from the VIU-20e. It does not require a back-up battery.
- The number of entries that can be stored in the Diagnostic Log is 10,000.

- Events stored in the Diagnostic Log are time stamped to the hundredth of a second.
- The log is structured as a circular buffer in that once the log is full, the newest event will overwrite the oldest recorded event.
- The entire Diagnostic Log can be downloaded to a USB drive.
- The Diagnostic Log is accessible using the Web browser user interface. It can be viewed by date/time range and can be downloaded to a PC.
- Diagnostic Log can be viewed using a Web browser directly connected to a free Ethernet port on the VIU-20e.
- Entries can be viewed as they are recorded and logged into the Diagnostic Log via the **Trace Events** function on the Web browser user interface.

### 1.3.3 CDL Log

The CDL log records the results of a CDL compilation (successful or failed) and any errors that occurred during the compilation.

### 1.3.4 States, Summary, and Maintenance Logs

The Status and Summary logs are maintained on the vital side of the VIU-20e. Most of the events logged in these logs are also logged in the Event and Diagnostic logs, respectively. The Maintenance Log is maintained in the Diagnostic Terminal (DT) installation directory on the PC that is running the DT Utility program. Each of these logs is accessible using the DT Utility program. Please refer to Section 6 for details on viewing these logs.

The Status and Summary logs are lost when power is removed from the VIU-20e.

### 1.3.5 Consolidated Logging

When one or more VIU-20es are operating on a network, each VIU-20e can be configured to forward all events over the network to a “consolidated logger.” The logger will maintain all of the events for every reporting VIU-20e. The logger can be another VIU-20e.

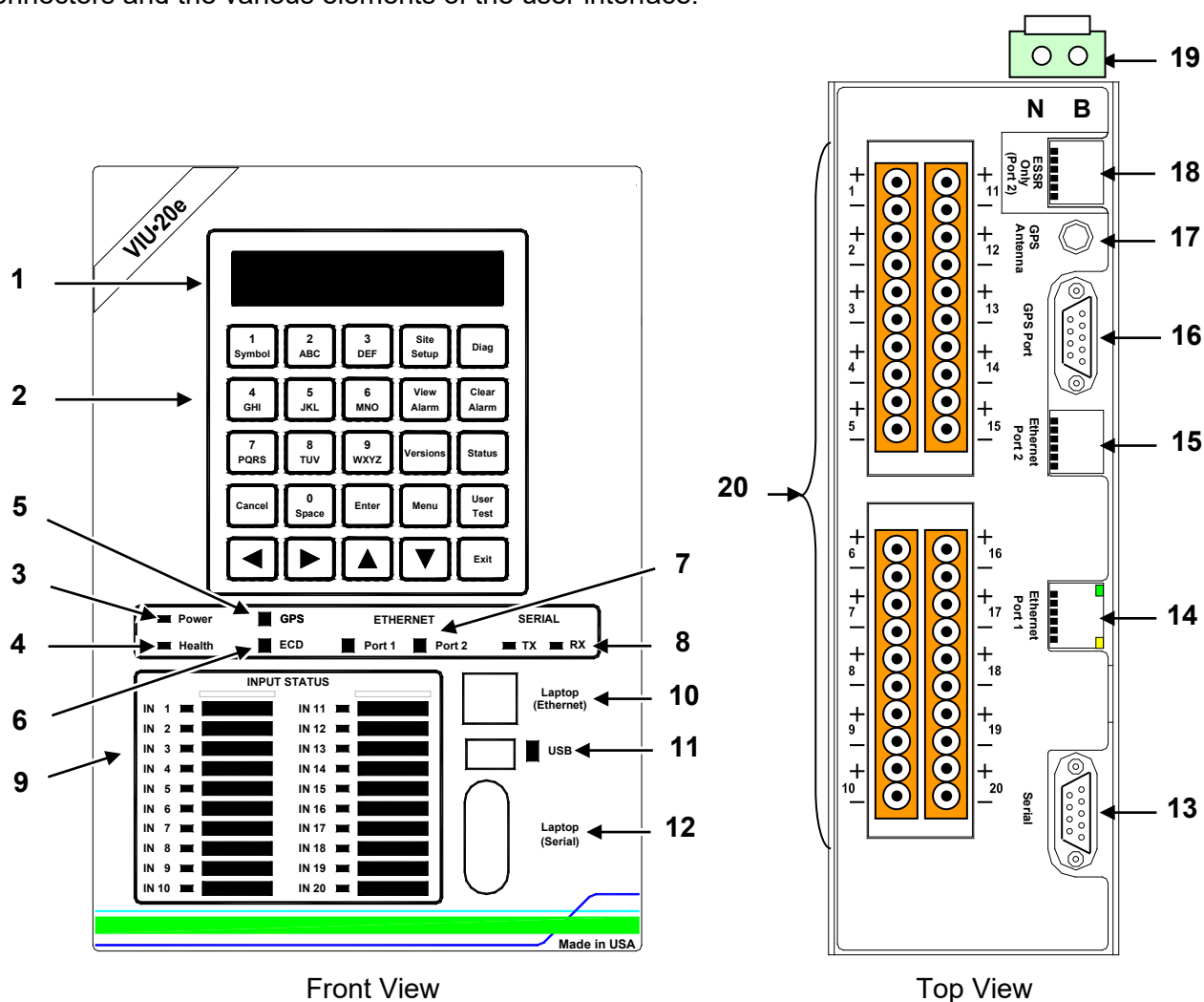
To configure the VIU-20es to send the Event and/or Diagnostic Log entries to the logger, open the web browser user interface, select either Diagnostic Log or Event Log (or do both), enter the IP address of the logger in the Server IP dialog box. Refer to Section 7 for details.

## 1.4 HARDWARE DESCRIPTION

The VIU-20e, Part Number A80540, is a compact fully enclosed unit with no field-replaceable components.

### 1.4.1 User Interface and Connectors

The VIU-20e user interface and connectors are located on two adjacent faces of the unit, the top and the front. Refer to Figure 1-3 and Table 1-1 for location and descriptions of the connectors and the various elements of the user interface.



### Figure 1-3 VIU-20e User Interface and Connector Locations

**Table 1-1 VIU-20e Control, Indicator, and Connector Functions**

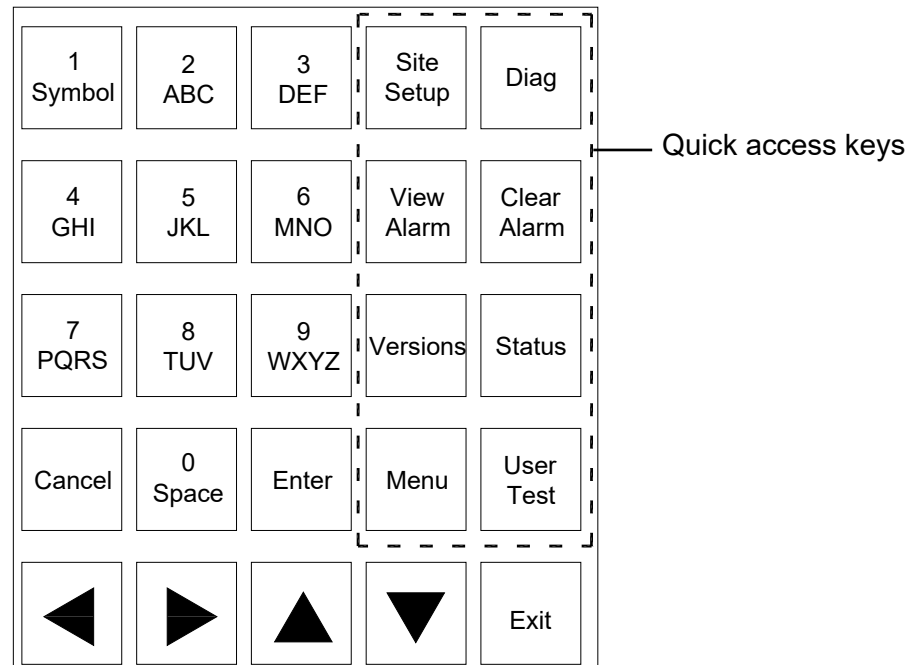
Item No. on Fig. 1-3	PHYSICAL DESCRIPTION	FRONT-PANEL NOMENCLATURE	FUNCTION
1	2-line X 20-character display	Display	Displays site configuration settings, error messages, log contents and system status.
2	Embossed keypad with tactile/audible feedback	25 keys with individual function text	Used to navigate through menu system.
3	Status LED	Power	Green Light Emitting Diode (LED) lights when power is applied to the VIU-20e.
4	Status LED	Health	Yellow LED indicates VIU-20e health as follows: <b>Slow flash (0.5 Hz)</b> – VIU is healthy and communicating with Vital Core. <b>Fast flash (2 Hz)</b> – VIU is unhealthy.
5	Status LEDs	GPS	Yellow and green LEDs are associated with Global Positioning System (GPS) connector on top of unit. LEDs indicate the following: <b>Green on steady</b> = looking for GPS satellites <b>Green flashing</b> = found satellite and generating timing pulse. <b>Green off</b> = GPS failure or not used. <b>Yellow on steady</b> = GPS health OK <b>Yellow off</b> = GPS health problem
6	Status LEDs	ECD	Show TX (green) & RX (red) activity between ECD located on the power connector and the internal CPU.
7	Status LEDs	ETHERNET Port 1 Port 2	Yellow and green LEDs are associated with Ethernet ports 1 and 2 on top of unit. LEDs indicate the following: <b>Yellow not lit</b> = 10 Mbps link rate <b>Yellow lit</b> = 100 Mbps link rate <b>Green flashing</b> = Link-up and message activity.  NOTE: Port 2 indicators apply to either Ethernet Port 2 or ESSR only (Port 2), depending on which is in use. Both cannot be used simultaneously.
8	Status LEDs	SERIAL TX RX	Show TX (green) & RX (red) activity on serial connector located on top of VIU-20e.
9	Status LEDs	INPUT STATUS	20 red LEDs. Indicate status of monitored vital inputs.
10	RJ-45 Ethernet Interface	Laptop (Ethernet)	10/100 Base-T Ethernet port. Yellow and green LEDs adjacent to the port indicate the following: <b>Yellow not lit</b> = 10 Mbps link rate <b>Yellow lit</b> = 100 Mbps link rate <b>Green flashing</b> = Link-up and message activity.

Item No. on Fig. 1-3	PHYSICAL DESCRIPTION	FRONT-PANEL NOMENCLATURE	FUNCTION
11	USB Interface	USB	<p>USB 2.0 interface. Used to connect to a USB flash drive. The VIU-20e can store logs and reports on the flash drive and receive software updates from the flash drive. The 3 LEDs (red, yellow, and green) adjacent to the USB port indicate the following:</p> <p><b>Green on steady</b> = USB drive is inserted and it is safe to remove the USB drive.</p> <p><b>Yellow flashing</b> = file transfer in progress, do not remove USB drive.</p> <p><b>Red flashing</b> = USB drive read or write error.</p>
12	Serial Interface	Laptop (Serial)	Female RS-232 diagnostic serial port used to connect to a PC using a standard RS-232 cable. Use this port when running PC-based DT utility or HyperTerminal to access the VIU-20e.
13	Serial Interface	Serial	Dedicated male RS-232 asynchronous serial port used primarily to connect VIU-20e to an external GPS receiver. May also be used as a general purpose communications port.
14	RJ-45 Ethernet Interface	Ethernet Port 1	Standard 10/100 Base-T Ethernet port.
15	RJ-45 Ethernet Interface	Ethernet Port 2	Standard 10/100 Base-T Ethernet port.
16	Serial Interface	GPS Port	Dedicated serial port for GPS signal output.
17	SMA Connector	GPS Antenna	Female Sub-Miniature version A (SMA) connector (1/4-36 UNS threaded coupling) for GPS antenna interface.
18	RJ-45 Ethernet Interface	ESSR Only (Port 2)	Dedicated 10/100 Base-T Ethernet port. Use to interface with a Siemens Ethernet Spread Spectrum Radio (ESSR) only. Provides radio power as well as Ethernet connectivity.
19	Power / ECD Connection		Two terminal power connector with External Configuration Device (ECD) attached. Allows VIU-20e to be swapped out without reconfiguration. VIU-20e configuration is stored in the ECD.
20	Discrete Vital I/O		Vital I/O connectors. Provide 5 pairs of terminals (+ and -) per connector.



### 1.4.2 Keypad Operations

The front panel has a 2-line, 20-character vacuum florescent display, a 25-key keypad, and a beeper. Menus are navigated with the arrow keys (◀, ▶ ▲ and ▼), the **Enter**, **Cancel** and **Exit** keys. Text and numbers can easily be entered using the cell phone style number/letter keys. There are also special function keys for quick access to VIU-20e settings and information (see Figure 1-4).



**Figure 1-4 Keypad Quick Access Keys**

### 1.4.3 Front Panel Default Display

The VIU-20e default display shows the date and time on the first line of the display and system information on the second line. Important messages will also be displayed here.

2008-Apr-10	15:32
Site data scrolling here	

Use the left (◀) and right (▶) arrow keys to scroll through the system information on the second line of the display or wait for the information to scroll automatically.

#### **NOTE**

#### **NOTE**

If there is no activity on the front panel keypad for five minutes, it will automatically return to this default display.

#### 1.4.4 VIU-20e Main Menu

The VIU-20e provides a main menu that can be viewed on the front panel display. The main menu consists of two items:

**SITE SETUP**  
**USB**

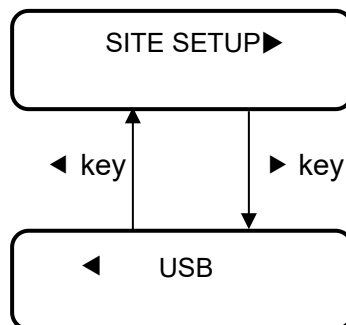
Enter Site ID Number, MCF CRC and UCN  
Upload/download information to/from a USB drive

With the default display showing, press the **Menu** key to access the main menu. The first item in the menu is displayed.



The character appearing after the first menu item name is a right arrow symbol (▶) indicating the key to press to scroll to the next menu item as shown in Figure 1-5.

Press the left (◀) arrow key to scroll back to the first menu item.



**Figure 1-5 Main Menu Navigation**

Press the **Cancel**, **Exit** or up (▲) arrow key to return to the default display from the main menu.

To select a main menu item, scroll to the desired menu item and press **Enter** or the down (▼) arrow key.

##### 1.4.4.1 Site Setup Menu

When SITE SETUP is selected from the main menu, the user is prompted to enter the vital edit mode. If the local UI password has been enabled using the Web UI, the user will then have to enter the local UI password (4 digit hex number) before they can go into edit mode. This is to prevent accidentally taking an operational box out of service and stopping trains.

Use the right (▶) arrow key to display **YES**, then press **Enter** or the down (▼) arrow key to select the vital edit mode. Navigate the menu and change menu entries as indicated in Figure 1-6.

**NOTE**

**NOTE**

If the vital edit mode is selected (even if no data is changed), VIU-20e must be rebooted to return the system to normal operation.

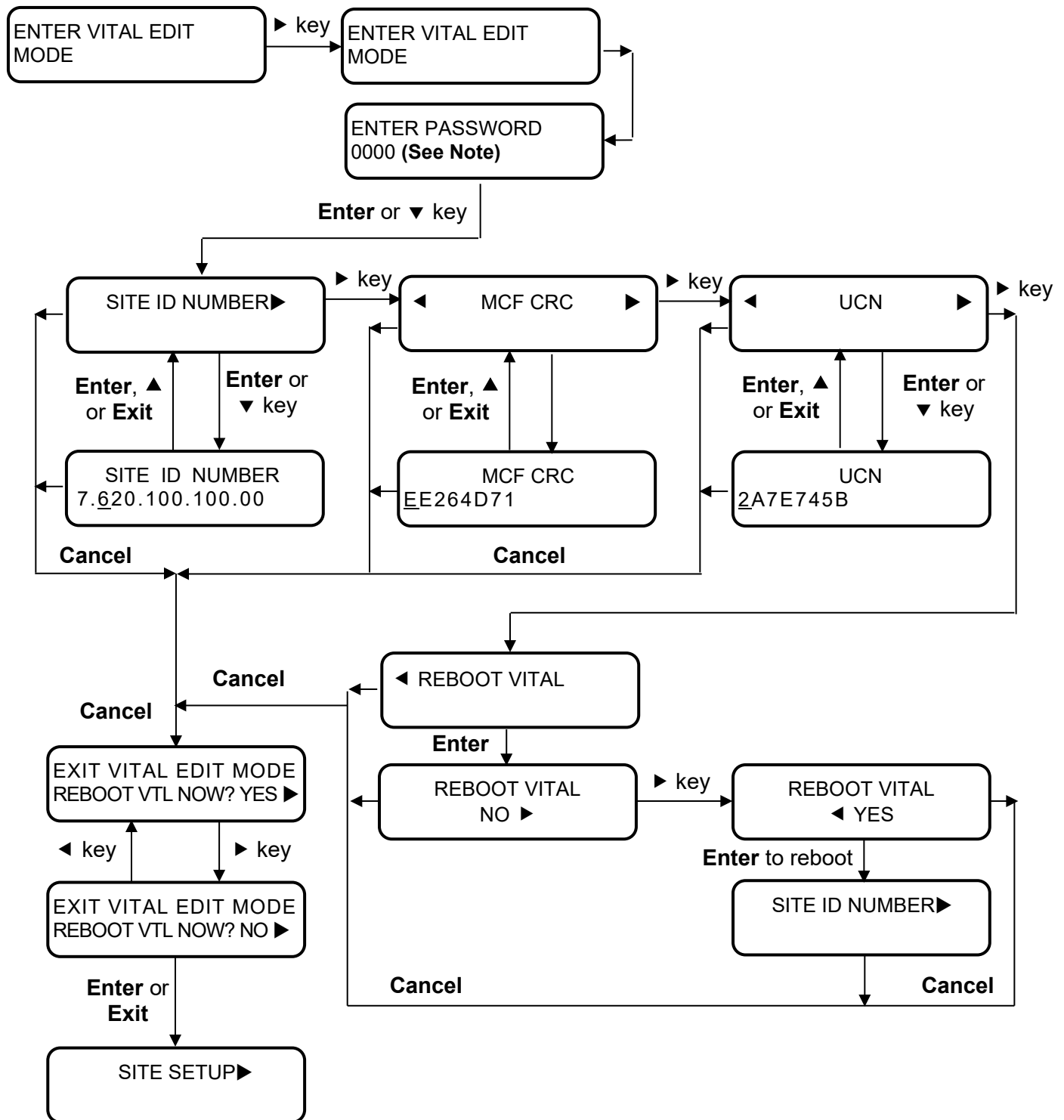


Figure 1-6 SITE SETUP Menu

**NOTE**

**NOTE**  
Local UI Password will only appear when changing VIU state from fully operational to an unconfigured state. If the Master card is not configured the Password display will not appear.

#### 1.4.4.2 Data Entry Using Keypad

The Site ID Number, MCF Cyclic Redundancy Check (CRC) and UCN can be changed from the front panel keypad. Position the underline cursor and save data entries as follows:

- Left (◀) and right (▶) arrow keys: Move underline cursor left or right in the data string.
- **Enter**, up (▲) arrow or **Exit** key: After entering or editing data, press either of these keys to permanently store the changed data in memory.
- **Entering Numbers and Letters:** The number/letter keys on the keypad are used like cell phone keys. When entering data in an alphanumeric field, each consecutive press of a numbered key will produce the characters printed on the key. For example, pressing the #2 key repeatedly produces **2**, **A**, **B** and **C**, then the sequence is repeated. After entering a character, the cursor will move to the next character position approximately one second after the last key press.

If the data field is numeric only, each press of a numbered key will produce only the specific number as shown on the key.

If the data field is alphabetical only, then no numbers will be shown.

**Saving Data:** Changes are saved automatically when **Enter**, up (▲) arrow or the **Exit** key is pressed.

#### 1.4.4.3 USB Menu

When USB is selected from the main menu or when a USB drive is initially installed in the USB port on the front of the VIU-20e, the first item in the USB menu (Figure 1-8) is displayed. Use the up (▲) and down (▼) arrow keys to scroll through the menu items. Each item in this menu provides a YES or NO option. Use the left (◀) or right (▶) arrow button to display the desired option, then press the Enter or down (▼) arrow key to perform the selected operation.

If the local UI password has been enabled using the Web UI, the user will have to enter the local UI password (4 digit hex number) before they can upload a new executive or configuration software that will stop the box performing its normal operation. This is to prevent accidentally taking an operational box out of service and stopping trains.

**NOTE****NOTE**


To perform any of the operations listed in the USB menu, a USB drive must be installed in the USB port on the front of the VIU-20e.

For report functions, the display will indicate the progress with a series of screens similar to the ones shown here.

Shows progress

COLLECTING EVENT RPT  
CREATING REPORT

COLLECTING EVENT RPT  
WRITING REPORT

COLLECTING EVENT RPT  
 36

COLLECTING EVENT RPT  
FINISHED REPORT

When downloading MCF or configuration (CFG) files to the USB drive, the display will indicate the progress with a series of screens similar to the ones shown here.

SAVING VITAL MCF  
SELECTING FILE

SAVING VITAL MCF  
COPYING TO USB

SAVING VITAL MCF  
FINISHED COPYING

When uploading MCF or configuration files to the VIU-20e, the display will indicate the progress with a series of screens similar to the ones shown here.

When the file name is displayed, press the **Enter** key to continue. If the USB drive contains more than one of the file type selected, the right arrow symbol (►) will appear to the right of the file name. Press the right (►) arrow key to scroll through the list of available files. When the desired file name is displayed, press **Enter**.

PLEASE WAIT  
BUILDING FILE LIST

PUT VITAL MCF > VIU?  
VIU\_XX\_LM001.mcf

COPYING VITAL MCF  
COPYING FROM USB

COPYING VITAL MCF  
PLEASE WAIT

COPYING VITAL MCF  
VITAL UPDATE PASSED

**NOTE****NOTE**

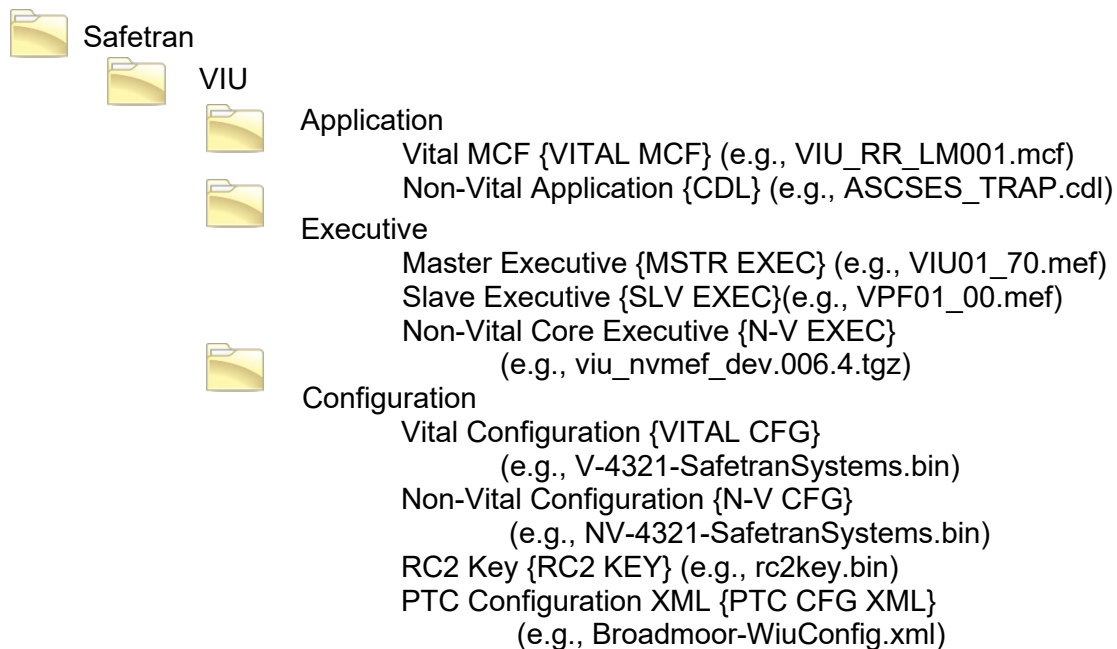
The non-vital executive software will take several minutes to load. No progress bar is displayed during this period.

**NOTE****NOTE**

The VIU-20e will automatically and intentionally reboot when the USB drive is removed from the VIU-20e front panel following a non-vital executive software upgrade.

#### 1.4.4.4 USB Drive File Structure

The file structure on the USB drive must have the format shown in Figure 1-7. The VIU-20e will look in specific folders for each file type. Folder names and relationships are exact, file names shown are for example only.



**Figure 1-7 Example USB Drive File Structure**

1-15

### 1.4.5 Keypad Quick Access Keys

Several 'quick keys' on the keypad provide shortcuts that go directly to a specific menu. Quick keys are located on the right-side of the keypad (see Figure 1-4). Descriptions of the quick keys are as follows:

- **Menu** – Displays first entry in the main menu.
- **Site Setup** – Future use
- **Diag** – Selects diagnostic error messages during bootup, if any. See paragraph 8.2.3
- **View Alarm** – Future use
- **Clear Alarm** – Future use
- **Versions** – Future use
- **Status** – Future use
- **User Test** – Future use

## 1.5 VIU-20E SPECIFICATIONS

**Table 1-2 Viu-20e Specifications**

Power:	
Input voltage:	9.0-20.0 VDC
Steady State Current:	2.2 A at 9 VDC 1.6 A at 12 VDC 1.4 A at 13.5 VDC 1 A at 16.5 VDC
Inrush current	At 9 VDC input - 11 A spike followed by 40 msec at 6.2 A At 13.5 VDC input - 12 A spike followed by 40 msec at 6.4 A At 16.5 VDC input - 20 A spike followed by 40 msec at 6 A
Input Isolation:	2000 Vrms at 60 Hz
Maximum Ripple:	1.0 V (peak-to-peak)
GPS Antenna Connector	Female SMA, 1/4-36 Unified Numbering System (UNS) threaded coupling
Laptop Serial Port:	
Baud rate	300 to 115200 9600 (default)
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	none
Isolation	Serial port to signal battery = 2000 Vrms



**Table 1-2 VIU-20e Specifications (Concluded)**

<b>Top Panel Serial Port</b>	
Baud rate	300 to 115200 9600 (default)
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	none
Isolation	Serial port to signal battery = 2000 Vrms Serial port isolated from all other connectors except common connections with Laptop serial port.
<b>Ethernet Ports:</b>	
Standards Compliance:	IEEE 802.3u Auto-Negotiation and Parallel Detection IEEE 802.3u ENDEC, 10BASE-T IEEE 802.3u PCS, 100BASE-TX
Physical Configuration:	Ethernet RJ45
Isolation	All Ethernet ports to signal battery = 2000 Vrms All Ethernet ports isolated from all other ports.
Radio Ethernet Port Power:	Nominal 18 VDC, 350 mA, 6 Watts
<b>USB Interface:</b>	
Standards Compliance:	Conforms to the USB 2.0 host specification in full speed mode.
<b>Vital Inputs:</b>	
Voltage Levels:	Below 4V = de-energized (including negative polarity) 4V – 6V = indeterminate 7V to 20V = energized 20V to 30V = indeterminate (out of specified operational range)
Overvoltage	Voltages in the range -30V to +30V will not damage the input circuitry and the operation will be as stated above.
Isolation:	2000 Vrms at 60 Hz
Impedance:	6k Ohms
<b>VIU-20e Default IP Address:</b>	
192.168.1.100	
<b>Event Logging:</b>	
100,000 events	
<b>Diagnostic Logging:</b>	
10,000 events	
<b>Environmental:</b>	
Operating Temperature Range:	-40°F to +160°F (-40°C to +70°C)
Maximum Humidity:	95% non-condensing
<b>Physical:</b>	
Dimensions:	8.80 inches high (22.35 centimeters) 6 inches wide (15.24 centimeters) 11.02 inches deep (27.99 centimeters)
Weight:	11 pounds (5 kilograms)

## 1.6 VIU-20E ORDERING INFORMATION

The VIU-20e is available in several configurations to meet specific application I/O requirements. Refer to Figure 1-9 for specific part numbers.

- VIU-20e Assembly:**

8000-80540-0 0 1 2 X

Dash No.	Mtg. Plate D39619	Right Angle Mtg Plate D39620
0	0	0
1	1	0
2	0	1

- Accessories:**

EMI Filter for VIU-20e Power Cable: Z590-00010-0001

8000-80505-X X X X X

Dash No.	"N" Type Antenna Cable	"N" Type Surge to VIU Cable
0	None	None
1	6 FT.	6 FT.
2	6 FT.	15 FT.
3	6 FT.	30 FT.
4	6 FT.	50 FT.
5	15 FT.	6 FT.
6	15 FT.	15 FT.
7	15 FT.	30 FT.
8	15 FT.	50 FT.
9	30 FT.	6 FT.
A	30 FT.	15 FT.
B	30 FT.	30 FT.
C	30 FT.	50 FT.
D	50 FT.	6 FT.
E	50 FT.	15 FT.
F	50 FT.	30 FT.
H	50 FT.	50 FT.

Dash No.	Components
00	With Wilmore DC-DC Converter, 18VDC 25A Surge Arrestor, 8000-80515-00121
01	With Wilmore DC-DC Converter, 18VDC 25A Surge Arrestor, 8000-80523-0001

Dash No.	Antenna Lightning Arrestor	GPS Antenna
0	0	0
1	0	1
2	1	0
3	1	1
4	0	0
5	0	1
6	1	0
7	1	1

Dash No.	MDS to VIU Cable
0	None
1	5 FT.
2	10 FT.
3	15 FT.
4	20 FT.

**Figure 1-9 VIU-20e and Accessory Ordering Information**

## SECTION 2 INSTALLATION

### 2.0 INSTALLATION

**WARNING****WARNING**

RAILROADS OR AGENCIES ARE RESPONSIBLE FOR ENSURING ONLY PROPERLY TRAINED AND/OR AUTHORIZED PERSONNEL HAVE ACCESS TO THE VIU-20E. PROGRAM CHANGES MUST BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES.

VERIFY THAT VIU-20E HAS ALL PROPER COMPONENTS AND IS PROGRAMMED AS SPECIFIED BY THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION DIAGRAM. FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE OPERATION OF THE SIGNAL SYSTEM.

AFTER INSTALLATION OF A UNIT, OR WHENEVER A CHANGE IS MADE TO THE SOFTWARE (TO INCLUDE MOVING AND/OR COPYING THE ECD) OR THE CONFIGURATION, THE INSTALLATION SHOULD BE FULLY OPERATIONALLY TESTED TO ENSURE SAFETY. SYSTEM OPERATION MUST BE VERIFIED PRIOR TO PLACING SYSTEM IN SERVICE OR FOLLOWING PROGRAMMING, HARDWARE CHANGES, OR WIRING CHANGES.

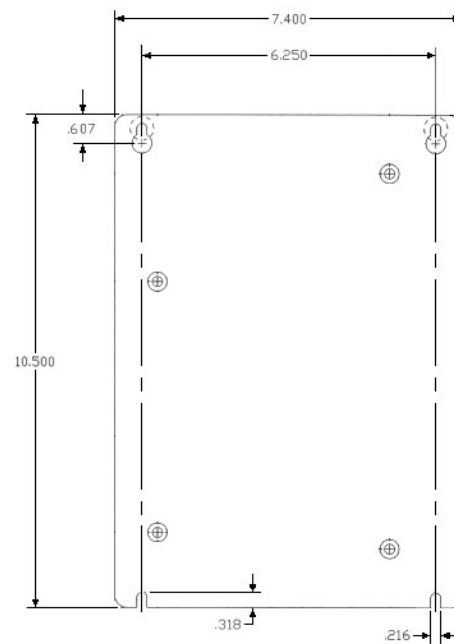
### 2.1 INSTALLATION

The VIU-20e can be wall or shelf mounted.

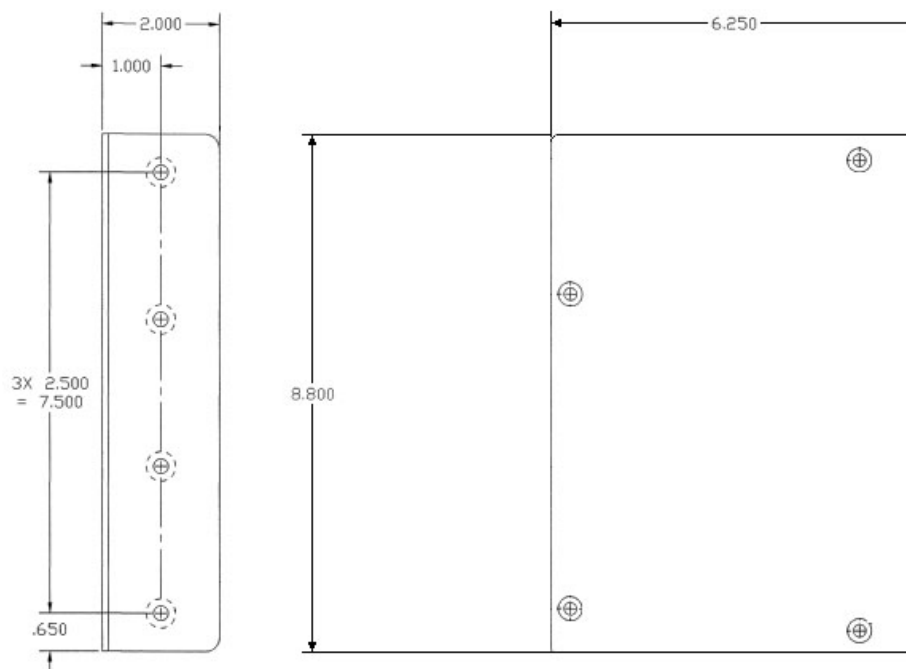
#### 2.1.1 Mounting

Two mounting plate configurations are available for installing the VIU-20e.

- The rack or wall mounting plate contains holes that are spaced such that the VIU-20e can be mounted on relay rails (Figure 2-1).
- A right-angle stabilizing plate is available for shelf mounting (Figure 2-2).



**Figure 2-1 Rack or Wall-Mount Plate, D39619**



**Figure 2-2 Shelf-Mount Stabilizing Plate, D39620**

### 2.1.2 Power Connection

DC Power is supplied to each VIU-20e unit via a 2-terminal cage clamp-type connector located at the back of the top panel. This connector (Figure 2-3) also hosts the External Configuration Device (ECD). The power connector and ECD can only be inserted into the corresponding connectors on the top panel in one direction. Battery polarity is indicated on the VIU-20e top panel.

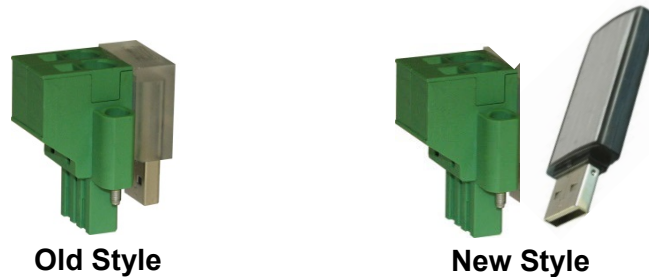


Figure 2-3 Power & ECD Connector



#### CAUTION

WHEN INSTALLING THE POWER / ECD CONNECTOR, FIRST ALIGN THE ECD CONNECTOR WITH THE RECEPTACLE IN THE VIU-20E, THEN INSERT THE POWER CONNECTOR PORTION. DO NOT FORCE THE ECD CONNECTOR AS THE RECEPTACLE IN THE VIU-20E MAY BECOME DAMAGED.

#### 2.1.2.1 Power Conductor Wire Preparation

Verify that “B” and “N” supply wires are installed in the power connector correctly before inserting the power connector into the mating connector on the top panel. Prepare the wires as follows:

- Strip approximately 1/4 inch (6 mm) of insulation from the end of the wire.
- Install EMI filter on cable per paragraph 2.1.3.2.
- Insert the stripped end into the wire receptor until it stops.

#### 2.1.2.2 Installing EMI Filter on Power Cable

In order to reduce radiated electromagnetic interference in the VIU-20e power cable, a clamp-on EMI filter (part number Z590-00010-0001) must be installed as follows:

Step 1: Open the clamp-on EMI filter as shown in Figure 2-4.



Figure 2-4 Clamp-on EMI Filter (Open)

Step 2: Place the open EMI filter under the power cable approximately 1.5 inches from the stripped end of the wires.

Step 3: Wrap the long end of the cable around the outer surface of the filter and back through the center of the filter one time (totaling two wire runs inside the filter – see Figure 2-5).



**Figure 2-5 EMI Filter Installation (Showing Wire Loops)**

Step 4: Snap the filter closed (see Figure 2-6).



**Figure 2-6 EMI Filter Installed**

### 2.1.3 Surge Protection

The VIU-20e unit provides internal secondary surge protection circuits on all vital inputs.

**⚠ CAUTION**

**CAUTION**

SIEMENS STRONGLY RECOMMENDS INSTALLING PRIMARY SURGE PROTECTION ON EXTERNAL LINES CONNECTING TO THE VIU-20e.

### 2.1.4 Vital Inputs

The VIU-20e top panel provides four (4) male, 10-pin, cage-clamp style connectors that provide a total of 20 discrete vital input pairs that can be monitored by the VIU-20e. Discrete input wires are connected to mating female 10-pin connectors (supplied with the unit) which are then plugged into the appropriate connector on the VIU-20e top panel. The four vital input male connectors are all keyed differently so that the female connectors cannot be plugged into the incorrect male connector by mistake.



#### WARNING

**VIU-20e INPUTS SHOULD NOT BE WIRED DIRECTLY TO VITAL OUTPUTS OF ANOTHER ELECTRONIC SYSTEM WITHOUT FIRST TESTING TO PROVE THAT THE VITALITY OF THE OUTPUTS OF THE ELECTRONIC SYSTEM ARE NOT COMPROMISED DUE TO THE ELECTRICAL CHARACTERISTICS OF VIU-20e INPUTS. THIS IS NECESSARY AS THE VIU-20e VITAL INPUTS HAVE AN IMPEDANCE OF 6k OHMS WHICH IS GREATER THAN THE AREMA RECOMMENDED VALUE AND IS NECESSARY WHEN THE VIU-20e IS USED TO MONITOR THE VOLTAGE DIRECTLY FROM THE SIGNAL LAMPS.**

#### 2.1.4.1 Vital Input Connections

Each input on the input connectors has both a positive and a negative terminal connection. This allows for wiring of a larger variety of inputs without multiple wires using a common negative termination. It also prevents problems such as 'sneak paths' when adjacent inputs are wired. Polarity is marked on the case adjacent to each connector.

#### 2.1.4.2 Connector Wiring Procedure

The female connectors supplied with the VIU-20e for the vital input connections will accept wire sizes in the range of #28 AWG to #14 AWG. The connectors contain spring-loaded cage-clamps for attachment of the wires. Each connector consists of a row of wire receptors and actuator spring holes to open and close the cage clamps. Wire each connector as follows:

1. Remove the supplied connector from the mating receptacle on the top of the VIU-20e.
2. Select a proper gauge wire for the application (range is #28 to #14 AWG).
3. Strip approximately 5/16 inch (8 mm) of insulation from the end of the wire.
4. Insert the blade of a small screwdriver into the actuator spring hole associated with the wire hole. The screwdriver blade should be no more than 0.10 inches wide and 0.020 inches thick (2.5 mm x 0.5 mm).
5. Lever the wire cage clamp open by pressing straight down on the screwdriver. Visually note that the contactor receptacle has opened up sufficiently to insert stripped wire. Fully insert wire into receptacle, taking care not to insert wire jacket insulation into metal contactors.
6. Remove screwdriver. Gently tug on the just-inserted wire to ensure the receptacle properly retains the installed wire.
7. Repeat for each wire to be added to the connector.

### 2.1.5 Serial Interfaces

**CAUTION**

SERIAL PORTS HAVE NO SECONDARY SURGE PROTECTION. DO NOT CONNECT TO DEVICES OUTSIDE OF EQUIPMENT ENCLOSURE.

The VIU-20e is equipped with two serial ports.

#### 2.1.5.1 Laptop (Serial) Interface

The VIU-20e front panel provides a standard RS232 interface connector labeled 'Laptop (Serial)' for communication with a Diagnostic Terminal (laptop PC). This interface is a Data Communications Equipment (DCE) port which uses a 9-pin female (DB-9) connector. The cable required to connect this interface is a standard RS232 (straight-through) cable terminated in a male 9-pin (DB-9) connector at the VIU-20e end, and terminated in an applicable connector at the diagnostic terminal (laptop PC).

#### 2.1.5.2 Serial Interface (Top Panel)

The VIU-20e top panel provides an additional standard RS232 interface connector labeled 'Serial'. This is a general purpose communications port for connection to external devices such as a BCP or GPS receiver. This interface is a Data Terminal Equipment (DTE) port which uses a 9-pin male (DB-9) connector. When connecting to a PC via the Top Panel Serial Interface, this connection requires a Null Modem Adapter cable.

### 2.1.6 Ethernet Interfaces

The VIU-20e is equipped with three standard Ethernet ports and one powered Ethernet port. These ports are described in Table 2-1.

**CAUTION**

ETHERNET PORTS HAVE NO SECONDARY SURGE PROTECTION. DO NOT CONNECT TO DEVICES OUTSIDE OF EQUIPMENT ENCLOSURE.

**NOTE****NOTE**

The VIU-20e Ethernet ports are all independently addressable each can be set with its own IP address. The IP address must be on different subnets, i.e. if IP address is aaa.bbb.ccc.ddd then each Ethernet port must have a difference in the aaa.bbb.ccc part of the IP address.



**Table 2-1 Ethernet Port Descriptions**

<b>PORT LOCATION</b>	<b>NOMENCLATURE</b>	<b>INTENDED USE</b>	<b>LED INDICATIONS</b>
Front Panel	Laptop (Ethernet)	Use as an Ethernet interface to a local laptop or desk top computer.	Green: Flashing = message activity. Yellow: Off = 10 MBPS bit rate On = 100 MBPS bit rate
Top Panel	Ethernet Port 1	Use for communication between VIU-20e and other Ethernet equipped devices such as other VIU-20e or Ethernet enabled BCP.	Green: Flashing = message activity. Yellow: Off = 10 MBPS bit rate On = 100 MBPS bit rate
Top Panel	Ethernet Port 2	Use for communication between VIU-20e and other Ethernet equipped devices such as other VIU-20e or Ethernet enabled BCP.  NOTE This port is in parallel with special ESSR only (Port 2). Do not use this port and special ESSR port 2 simultaneously.	n/a
Top Panel	ESSR Only (Port 2)	Ethernet port used for connection to a Siemens Ethernet Spread Spectrum Radio (53325) only.  CAUTION This port is in parallel with standard Ethernet Port 2. Do not use this port and standard Ethernet Port 2 simultaneously.  NOTE This port also provides power to the ESSR radio.	n/a

**Table 2-2 Special ESSR Ethernet Port Connector Pin-outs (RJ45)**

PIN NO.	SIGNAL NAME	ABBR.	SIGNAL DESCRIPTION
1	Ethernet TX	Tx (+)	Radio to Ethernet (Transmit data +)
2	Ethernet TX	Tx (-)	Radio to Ethernet (Transmit data -)
3	Ethernet RX	Rx (+)	Ethernet to Radio (Receive data +)
4	VDC	DCV (+)	Power to Radio
5	VDC	DCV (+)	Power to Radio
6	Ethernet RX	Rx (-)	Ethernet to Radio (Receive data -)
7	Ground	GND (-)	Power ground to Radio
8	Ground	GND (-)	Power ground to Radio

### 2.1.7 GPS Port

The GPS port is a female DB9 connector that provides the 1 pulse per second (pps) GPS signal output from the VIU. It also provides a National Marine Electronic Association (NMEA) 0183 output from the internal GPS receiver. This port is designed to connect to a Positive Train Control (PTC) providing an accurate time source for broadcasting of wayside status messages. Refer to Table 2-3 for connector pin outs.

**Table 2-3 GPS Port Connector Pin-outs**

PIN NUMBER	SIGNAL
1	N/C
2	GPS TX DATA
3	N/C
4	N/C
5	GPS GND
6	N/C
7	N/C
8	GPS PPS-
9	GPS PPS+

### 2.1.8 GPS Antenna

The GPS antenna connector is a female SMA connector (1/4-36 UNS threaded coupling). Connect an external GPS antenna to this jack.

### 2.1.9 USB Interface

A standard USB 2.0 port is provided on the front panel for connecting a USB flash drive.

## SECTION 3 OPERATION

### 3.0 OPERATION

**⚠ WARNING****WARNING**

**RAILROADS OR AGENCIES ARE RESPONSIBLE FOR ENSURING ONLY PROPERLY TRAINED AND/OR AUTHORIZED PERSONNEL HAVE ACCESS TO THE VIU-20e. PROGRAM CHANGES MUST BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES. VERIFY THAT THE VIU-20e HAS ALL PROPER COMPONENTS AND IS PROGRAMMED AS SPECIFIED BY THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION DIAGRAM. FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE OPERATION OF THE SIGNAL SYSTEM. AFTER INSTALLATION OF A UNIT, OR WHENEVER A CHANGE IS MADE TO THE SOFTWARE (TO INCLUDE MOVING AND/OR COPYING THE ECD) OR THE CONFIGURATION, THE INSTALLATION SHOULD BE FULLY OPERATIONALLY TESTED TO ENSURE SAFETY. SYSTEM OPERATION MUST BE VERIFIED PRIOR TO PLACING SYSTEM IN SERVICE OR FOLLOWING PROGRAMMING, HARDWARE CHANGES, OR WIRING CHANGES.**

### 3.1 POWER-UP

When the VIU-20e is first powered up, it performs various vital and non-vital software checks. During this period (approximately 2 min 30 sec), only the power LED is lit while the display shows "VIU SYSTEM BOOTING...PLEASE WAIT."

Following the software checks, the display turns on and the VIU-20e loads various drivers (USB, Ethernet, etc.) before running the VIU executive (MEF). At approximately 1 minute, 30 seconds from power-up, the VIU-20e lights all front panel LEDs to test for bad LEDs. At approximately 2 minutes from power-up, the VIU-20e settles into normal operation, the input status LEDs show current input status and the health LED flashes at 0.5 Hz.

**NOTE****NOTE**

During power-up, the boot monitor checks the integrity of the MEF by performing a 32-bit CRC calculation. If the MEF is not valid, the Boot Monitor will not run it and the MEF must be reloaded.

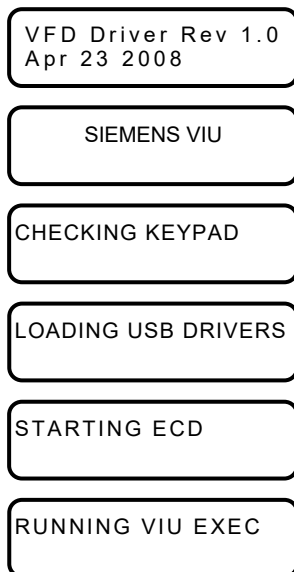
### 3.1.1 VIU-20e Real-Time Clock

The real-time clock will likely contain invalid data when the VIU-20e is powered up for the first time in the field. Therefore, date/time adjustments should be performed immediately following the initial power-up sequence in the field. For units equipped with a GPS receiver, the GPS will provide the time reference and no adjustment is needed. If the VIU-20e is not equipped with GPS, the time and date are set via the Web browser interface or configured for SNTP (see section 8).

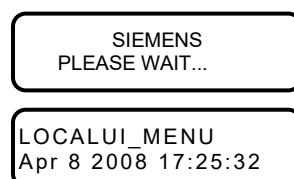
The internal power storage supplies power to the real-time clock when power to the unit is off. Under normal circumstances, the real time clock will retain valid date/time information for at least 10 years with external power removed. The VIU-20e uses a high value capacitor to store power for the real time clock. There are **no** internal batteries in the VIU-20e.

### 3.1.2 Front Panel Boot Display Sequence

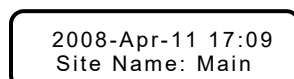
It is possible to monitor the VIU-20e power-up process on the front panel display. The following examples show the normal boot sequence as it appears on the front panel display.



All front panel LEDs are lit at this point to allow visual LED check.



Following a successful boot-up and launching of the MEF, the front panel display will automatically default to a date/time display similar to the one shown below:



The bottom row of the display will cycle through the following information:

- Site Name
- Milepost
- DOT # (Department of Transportation No.)
- Site ID Number (SIN) (ATCS address)
- MCF CRC
- Laptop Baud Rate
- Vital State
- Laptop IP Address
- Port 1 IP Address
- Port 2 IP Address
- Miscellaneous messages.

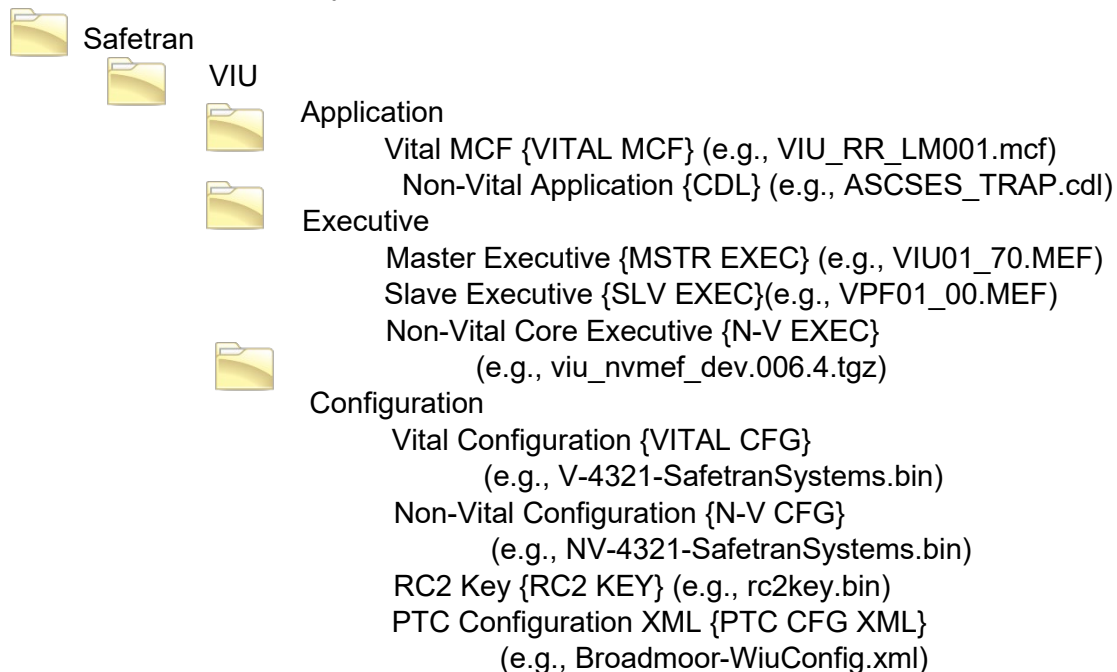
The left (◀) or right (▶) arrow keys may be used to cycle through the above entries.

The site name, milepost and DOT # can be entered using the Web browser interface after uploading the MCF from the USB drive.

### 3.2 UPLOADING AN MCF TO THE VIU-20e

Following initial power up and successful boot up of the VIU-20e, an application-specific MCF can be uploaded via the USB port located on the front panel. That procedure is described in paragraph 3.2.1.

The file structure on the USB drive must have the format shown in Figure 3-1. The VIU-20e will look in specific folders for each file type. Folder names and relationships are exact, file names shown are for example only.



**Figure 3-1 Example USB Drive File Structure**

### 3.2.1 Upload Procedure

1. Insert the USB drive containing the MCF into the front panel USB port.
2. The first item in the USB menu appears on the front panel display.
3. Using the up (▲) or down (▼) arrow key on the front panel keypad, scroll through the menu to **PUT VITAL MCF > VIU?**
4. Enter **Password 0000** appears (if Local UI password has be enabled), enter the four digit password and press the **Enter** key. **(See Note below)**
5. Use the left (◀) or right (▶) arrow key to display **YES**, and then press the **Enter** key.
6. The operation will pause while the VIU-20e builds the file list.
7. If the USB drive contains more than one of the file type selected, the right arrow symbol (▶) will appear to the right of the file name. Press the right (▶) arrow key to scroll through the list of available files until the desired file name is displayed.
8. Press the **Enter** key.
9. Following successful upload of the MCF, the menu will advance to the next item.
10. Scroll to **EXIT USB MENU?**
11. Select **YES**, and then press **Enter** to exit the USB menu.

The procedure for uploading MEFs and configuration files is similar to the one provided above.

**NOTE****NOTE**

Local UI Password will only appear when changing VIU state from fully operational to an unconfigured state. If the Master card is not configured the Password display will not appear.

### 3.2.2 File Transfer Options

When a USB Drive is inserted into the front panel of the VIU-20e, the user can scroll through the following options by toggling to either YES or NO then selecting ENTER (e.g., YES or NO can be selected by toggling the left (◀) or right (▶) arrow key to display YES, then press the Enter key).

#### 3.2.2.1 Download Reports From VIU-20e Into USB Drive

To download (Get) reports, press ENTER until the desired report is shown, select YES, and the file will be generated and downloaded into the USB Drive.

Get full Event Report? Create Report: No Yes  
Get 24 hour Event Report? Create Report: No Yes  
Get 2 week Event Report? Create Report: No Yes  
Get Diag. Report? Create Report: No Yes  
Get Config. Report? Create Report: No Yes  
Get Vrsn. Report? Create Report: No Yes

### 3.2.2.2 Download Files From VIU-20e Into USB Drive

To download (Get) the desired file, press ENTER until the desired file is shown, select YES, and the file will be downloaded into the USB Drive.

Get Vital MCF < VIU? Get File: No Yes  
 Get Vital CFG < VIU? Get File: No Yes  
 Get Non-Vital CFG < VIU? Get File: No Yes  
 Get RC2 Key < VIU? Get File: No Yes  
 Get PTC CFG XML < VIU? Get File: No Yes  
 Get CDL File? Get File: No Yes

### 3.2.2.3 Upload Files From USB Drive Into VIU-20e



#### CAUTION

DO NOT REMOVE POWER FROM THE UNIT WHEN THE MESSAGE "PLEASE WAIT. DO NOT REMOVE POWER FROM UNIT" APPEARS. IF POWER IS REMOVED BEFORE THE TRANSFER IS COMPLETE, THE UNIT WILL REMAIN UNCONFIGURED AND NOT RETURN TO OPERATION.

To upload (Put) the desired file, press ENTER until the desired file is shown, select YES, and the file will be uploaded into the USB Drive.

- Put Vital MCF > VIU? Select File: No Yes
- Put Vital CFG > VIU? Select File: No Yes
- Put Mstr Exec > VIU? Select File: No Yes
- Put Slv Exec > VIU? Select File: No Yes
- Put N-V CFG > VIU? Select File: No Yes
- Put N-V Exec > VIU? Select File: No Yes
- Put RC2 Key > VIU? Select File: No Yes
- Put PTC CFG XML > VIU? Select File: No Yes
- Put CDL File? Get File: No Yes

- **Example 1: Upload Vital MCF From USB Drive Into VIU-20e**

Insert the USB drive containing the Vital MCF into the front panel USB port.

The first item in the USB menu appears on the front panel display.

Using the up (▲) or down (▼) arrow key on the front panel keypad, scroll through the menu to PUT VITAL MCF > VIU?

Use the left (◀) or right (▶) arrow key to display YES, then press the Enter key.

The operation will pause while the VIU-20e builds the file list.

If the USB drive contains more than one of the file type selected, the right arrow symbol (▶) will appear to the right of the file name. Press the right (▶) arrow key to scroll through the list of available files until the desired file name is displayed.

Press the Enter key.

Following successful upload of the MCF, the menu will advance to the next item.

Scroll to EXIT USB MENU?

Select YES, then press Enter to exit the USB menu.

The procedure for uploading MEFs, configuration files, and the RC2 Key is similar to the one provided in Example 1.

### 3.3 VIU-20E CONFIGURATION

The VIU-20e must be configured for the local installation. Certain configuration parameters are entered using the PC-based DT Utility program while others are entered through the VIU-20e Web browser interface. These configuration parameters and the method of configuration are discussed in Section 6 and Section 7 of this manual.

### 3.4 VIU-20E OPERATING STATES

The VIU-20e operating states consist of the following:

**Initial State:** This is the VIU-20e initial power-up state during which the VIU-20e performs its power-up self-test routine to validate the hardware, Executive software, MCF and corresponding MCF CRC, and the vital configuration using the Unique Check Number (UCN). Once the power-up self-test has been completed, the unit will transition to an Un-configured State if there is a problem with the configuration such as one of the following:

- MCF CRC is incorrect
- UCN is incorrect
- ATCS address for VIU-20e is not set correctly
- ACSES Railroad Line Number parameter is not set
- VIU-20e resets to default values

If each of the configuration items listed above passes validation, the VIU-20e will transition to the Fully Operational state.

**Un-Configured State:** In this state the VIU-20e is installed but not configured correctly. It will successfully complete its power-up self-tests but will not send out any vital messages or respond to any vital messages. It will respond, however, to input from the front panel keypad, messages from the VIU-20e Web browser interface and to messages from the DT Utility program to allow for local configuration of operating parameters. The Main menu will display an asterisk (\*) to indicate that a diagnostic message is present. The Diag menu will show the reason the VIU-20e is unconfigured, and whether it is a vital configuration problem. For example, a status message at the top level might say: "VTL STATE IN SESSION. UNCONFIGURED, SLV HLTH BAD".

**Fully Operational State:** In this state, the VIU-20e vital parameters are configured and have passed validation check.



#### CAUTION

FULLY OPERATION STATE DOES NOT GUARANTEE THAT THE CONFIGURATION PARAMETER VALUES ARE IN ACCORDANCE WITH THE OFFICE PLAN. FOR EXAMPLE, EVEN THOUGH THE TOP LEVEL MAY SAY "VTL STATE IN SESSION. CONFIGURED, SLV HLTH GOOD", FURTHER VALIDATION SHOULD STILL BE PERFORMED BEFORE PUTTING THE VIU UNIT IN SERVICE.

**Shutdown State:** In this state, the VIU-20e is not receiving or transmitting vital messages and presents no visual indications.



### 3.5 CONFIGURATION VERIFICATION AT STARTUP

On startup, the VIU-20e validates its configuration by verifying the following:

- The MCF is valid.
- The MCF CRC matches the MCF.
- The correct UCN is entered.

**WARNING****WARNING**

**WHEN THE VIU-20e MCF IS DEVELOPED, ANY SAFETY CRITICAL USER CONFIGURABLE ITEMS MUST BE IDENTIFIED BY THE DESIGNER AND MUST BE MARKED AS UCN PROTECTED TO PROHIBIT UNAUTHORIZED CHANGES.**

**CAUTION****CAUTION**

UPON A NEW UNIT INSTALLATION, MODIFICATION, DISARRANGEMENT OF WIRING TO THE UNIT, OR ANY CHANGE REQUIRING THE CREATION OF A NEW OR MODIFIED MCF, A MINIMUM VERIFICATION TEST MUST BE PERFORMED AS EXPLAINED IN APPENDIX A.

**NOTE****NOTE**

When vital configuration changes are made in the MCF, a new UCN must be calculated and entered into the VIU to validate the integrity of the changes. The UCN is calculated using a special version of the DT Utility Program (see Section 4).

If the MCF is valid, has the correct CRC, the vital configuration parameters are set and the correct UCN is entered, then the VIU-20e goes into the **Fully Operational** state. If any of these checks fail, the VIU-20e goes into the Un-Configured state. This will be indicated by a vital status message scrolling on the bottom row of the front panel display.

**NOTE****NOTE**

The status message is refreshed with each complete cycle of the displayed information and may take approximately 2 minutes to cycle completely and update the message.

When the VIU-20e is in the Un-Configured state, it does not send out any VIU-20e vital messages or respond to any VIU-20e vital messages. It does, however, respond to input via the front panel keypad and to messages from the DT Utility program or Web browser interface.

### 3.6 GPS TIME REFERENCE

The VIU-20e can be configured to receive a time reference from SNTP. In the absence of SNTP time information, the VIU-20e is capable of maintaining its internal clock time so that the drift from GPS time does not exceed +/- 2000 ms within a 24 hour period.

### 3.7 MULTIPLE VIU-20ES IN A SYSTEM

In larger interlockings, multiple VIU-20es may be required to monitor all of the inputs from all the signals and switches. In this case, additional VIU-20e units can be used to monitor the inputs. These units may be configured in the application program (MCF) to send the input states to a master VIU-20e unit. The master VIU-20e unit could then consolidate the messages and create the ATCS Encoder Response messages to send to the on-board system.

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## SECTION 4

### VIU-20e SETUP

#### 4.0 VIU-20E SETUP

**⚠ WARNING****WARNING**

RAILROADS OR AGENCIES ARE RESPONSIBLE FOR ENSURING ONLY PROPERLY TRAINED AND/OR AUTHORIZED PERSONNEL HAVE ACCESS TO THE VIU-20e. PROGRAM CHANGES MUST BE PERFORMED IN ACCORDANCE WITH RAILROAD PROCEDURES. VERIFY THAT VIU-20e HAS ALL PROPER COMPONENTS AND IS PROGRAMMED AS SPECIFIED BY THE RAILROAD'S OR AGENCY'S APPROVED WIRING OR INSTALLATION DIAGRAM. FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE OPERATION OF THE SIGNAL SYSTEM. AFTER INSTALLATION OF A UNIT, OR WHENEVER A CHANGE IS MADE TO THE SOFTWARE (TO INCLUDE MOVING AND/OR COPYING THE ECD) OR THE CONFIGURATION, THE INSTALLATION SHOULD BE FULLY OPERATIONALLY TESTED TO ENSURE SAFETY. SYSTEM OPERATION MUST BE VERIFIED PRIOR TO PLACING SYSTEM IN SERVICE OR FOLLOWING PROGRAMMING, HARDWARE CHANGES, OR WIRING CHANGES.

#### 4.1 INTRODUCTION

After a VIU-20e is installed in the field, the unit(s) must be configured for the specific site. This section provides general setup information plus typical procedures for system setup. Sections 7 and 8 of this document cover the use of the DT Utility program and the VIU-20e Web browser user interface for setting vital and non-vital parameters. Appendix A provides minimum guidelines for verification testing a VIU-20e unit (see following Warning).

**⚠ WARNING****WARNING**

INCORRECT ENTRY OF VITAL CONFIGURABLE PARAMETERS WILL LEAD TO UNSAFE FUNCTIONING OF THE VIU-20e UNIT. THE VITAL FIELD CONFIGURABLE PARAMETERS MUST BE VERIFIED FOR CORRECTNESS BEFORE THE EQUIPMENT IS PLACED IN SERVICE.

**⚠ WARNING****WARNING**

WHEN THE VIU-20e MCF IS DEVELOPED, ANY SAFETY CRITICAL USER CONFIGURABLE ITEMS MUST BE IDENTIFIED BY THE DESIGNER AND MUST BE MARKED AS UCN PROTECTED TO PROHIBIT UNAUTHORIZED CHANGES.

## 4.2 SOFTWARE LOAD AND CONFIGURATION SEQUENCE

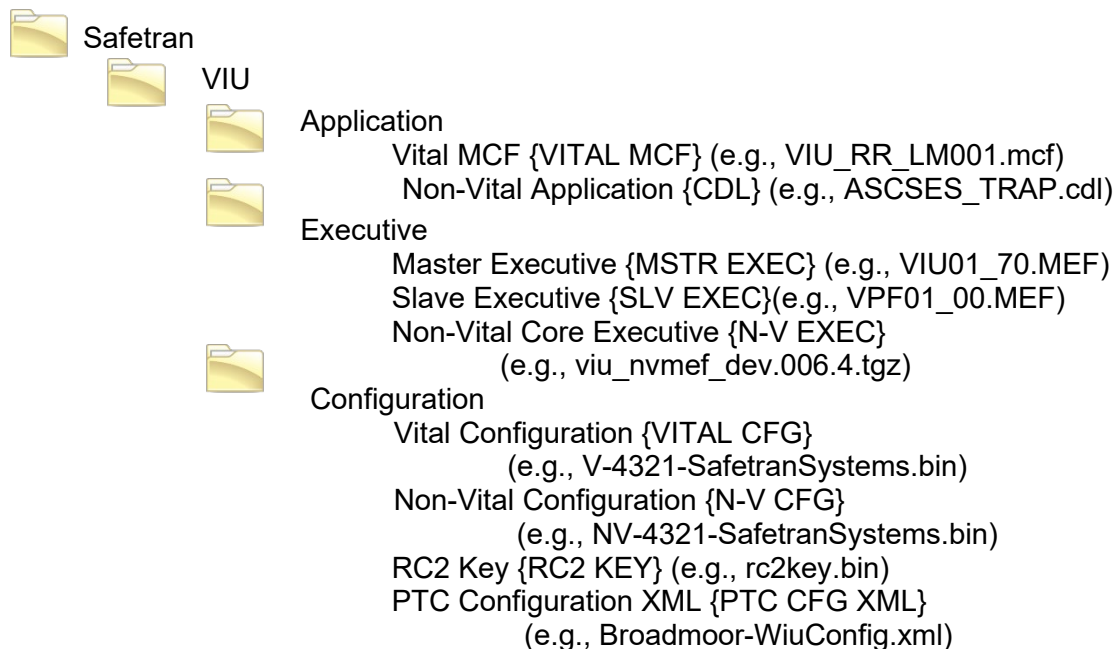
The VIU-20e comes from the factory with the MEFs and default configuration files installed. Following initial power up and successful boot up of the VIU-20e, an application-specific MCF can be uploaded via the USB port located on the front panel. That procedure is described in the following paragraph. Throughout the procedure the user will be directed to upload software to the VIU-20e from a USB drive. Ensure that the USB drive file structure and file type locations are as indicated Figure 4-1 below.

The file structure on the USB drive must have the following format. The VIU-20e will look in specific folders for each file type. Folder names and relationships are exact, file names (those listed within the parenthesis with e.g.,) are for example only.

### NOTE

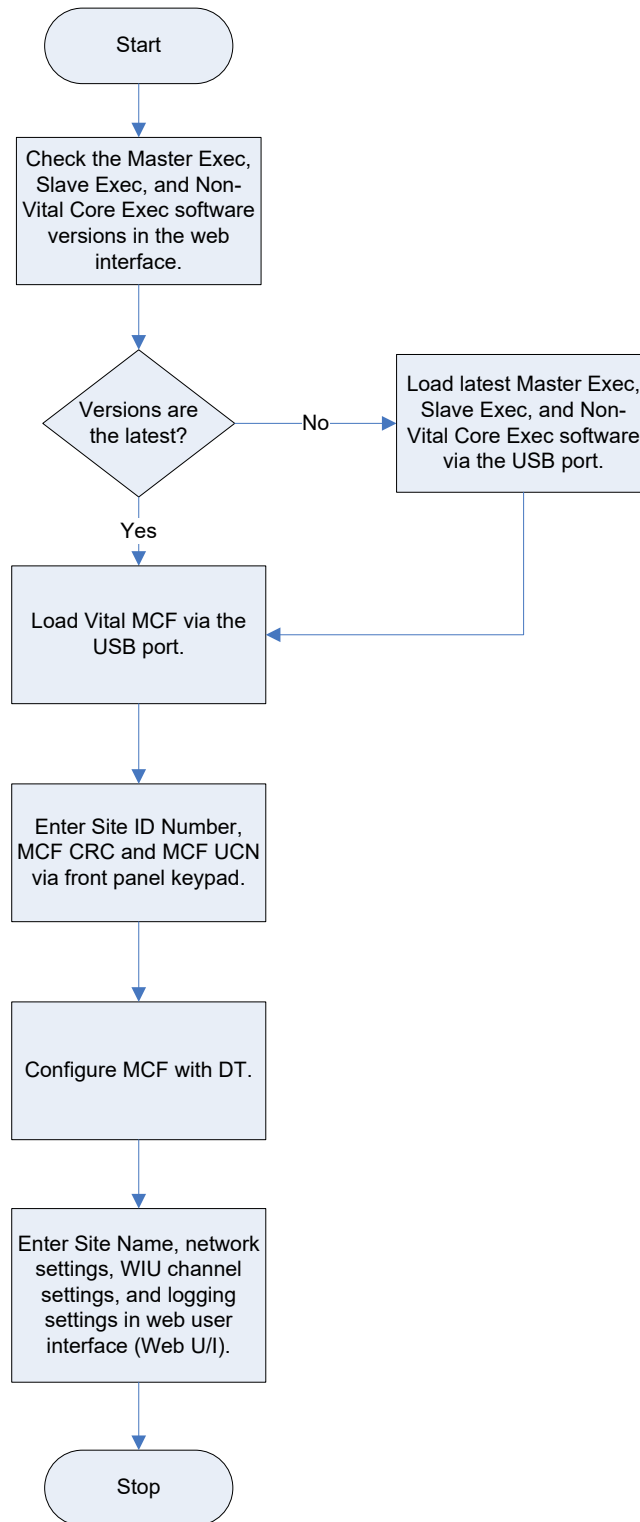
### NOTE

The application referred to within this chapter is specific to this example only. Other applications could or would have different connections.



**Figure 4-1 Example USE Drive File Structure**

Figure 4-2 indicates the order in which software should be loaded and at what points the vital and non-vital parameters should be configured for a normal VIU-20e installation. If multiple VIU-20es are involved, apply the same process to each unit.



**Figure 4-2 VIU Software Load & Configuration Sequence**

### 4.3 PROCEDURE FOR CALCULATING A NEW UCN

The procedure for calculating a new UCN is provided below. This is generally an office procedure, but will be useful if vital parameter changes become necessary once units are in operation.



#### WARNING

**CHANGING VITAL PARAMETERS REQUIRES CALCULATION OF A NEW UCN FOR THE MODIFIED MCF. THIS SHOULD ONLY BE PERFORMED BY AUTHORIZED PERSONNEL. THE LATEST VERSION OF THE DT UTILITY PROGRAM WHICH IS EQUIPPED WITH THE UCN CALCULATOR MUST BE USED FOR THIS PURPOSE.**

**USER CONFIGURABLE ITEMS MUST BE UCN PROTECTED TO PROHIBIT UNAUTHORIZED CHANGES.**

1. From the USB menu, download the MCF to a USB drive.
2. Transfer the MCF from the USB drive to the PC hard drive.
3. Make sure that the PC is NOT connected to the VIU-20e.
4. Launch the DT Utility program.
5. Click the **PROG** (program) button at the top of the DT screen.
6. Click the **NEW** button at the top of the DT screen.
7. Locate the MCF just copied from the USB drive.
8. Select and open that MCF. The DT MAIN PROGRAM menu is displayed.
9. Select SITE Configuration from the menu.
10. Select ATCS SIN from the SITE configuration menu.
11. Enter the SIN for the VIU-20e being configured (record this for later use).
12. Click the **APPLY** button.
13. Click the **CLOSE** button.
14. Click the **PROG** button and then make all necessary parameter changes.
15. When changes are complete, click the **CFG FILE** button at the top of the DT screen.
16. Select **Save Configuration** from the drop down menu.
17. Save the file with a new name.
18. Click the **CFG FILE** button.
19. Select **View Program** from the drop down menu.
20. Select Location and SIN from the Program Report screen.
21. Verify that the SIN is correct.
22. Click the **NEXT** button at the top of the DT screen.
23. Record displayed MCF CRC and Calculated UCN (these will be needed in the field).
24. Click the **CLOSE** button.
25. Click the **CLOSE** button again.

## SECTION 5

### ACSES INTERFACE APPLICATION

#### 5.0 ACSES INTERFACE APPLICATION

##### 5.1 INTRODUCTION

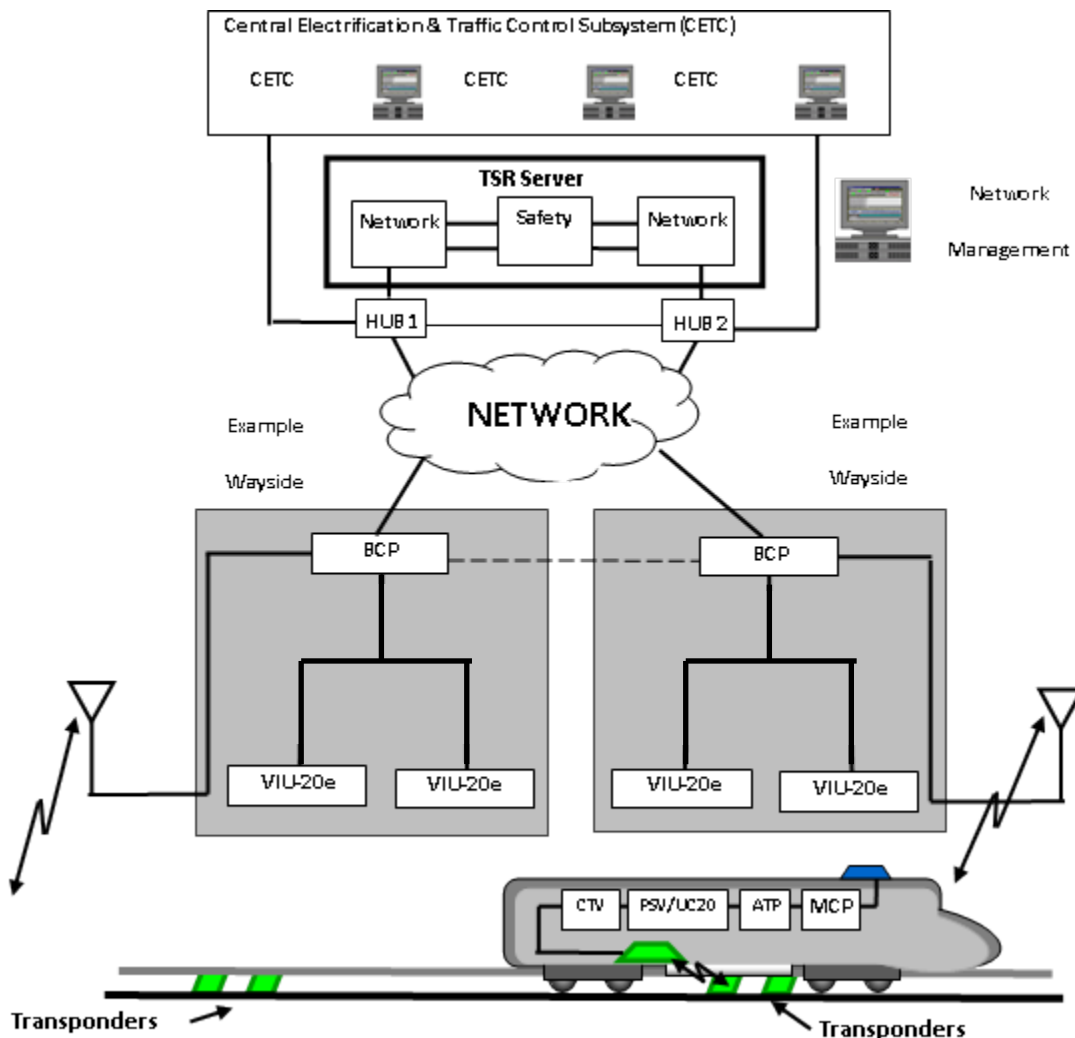
The ACSES application can monitor signal status (Go/Stop) and C signal status for up to 8 signals. Up to 32 routes can be configured with the application using any of the enabled signals. The application allows for the configuration of signals at either one end or both ends of a route. These unique routes are formed by configuring switch positions for up to 8 switches.

##### NOTE

##### NOTE

The number of routes available is a function of how the MCF is written (refer to project specific information). The VIU-20e supports up to a maximum of 32 routes

A basic ACSES system block diagram is shown in Figure 5-1.



**Figure 5-1 VIU-20e Monitoring Switches and Signals in an Interlocking**

## 5.2 HOW I/O IS ASSIGNED

The way in which the inputs for monitoring switches, signal status, and C Signals are assigned depends upon how the specific VIU-20e MCF is written (refer to specific project documentation for this information).

When a signal is enabled without a C signal, it uses a single input for the Go/Stop signal status information. When a signal is enabled with a C signal, an additional input is needed for the C signal status information, so the signal uses two inputs in total.

Each switch needs two inputs for the normal and reverse information. The first switch input is for the normal position and the second input is for the reverse position. The number of switches does not need to be configured, as they are automatically assigned to the remaining available inputs on a unit, up to the maximum number of switches.

If there are more signal and switch inputs than can be handled by the 20 vital inputs on a single VIU-20e, additional VIU-20es can be added via an Ethernet LAN.

## 5.3 APPLICATION OPERATION

The routes configured in the application are selected by the switch position inputs. If a switch exists, but is not configured in a route, any normal/reverse inputs from that switch are ignored when the route is selected. More than one valid route can be selected simultaneously, but there should only be one valid route per signal selected at the same time. When a valid route for a signal is selected, the VIU-20e will transmit a Type 22 (LoMA) or Type 23 message (no LoMA) for that signal. When a signal does not have a valid route or there is an input problem on a signal, the VIU-20e will transmit a Type 24 (Encoder error) message.

**NOTE****NOTE**

This behavior is part of the VIU-20e MCF (refer to the specific project documentation for exact details).



## SECTION 6

### DIAGNOSTIC TERMINAL (DT) UTILITY PROGRAM

#### 6.0 DIAGNOSTIC TERMINAL (DT) UTILITY PROGRAM



#### WARNING

INCORRECT ENTRY OF VITAL CONFIGURABLE PARAMETERS WILL LEAD TO UNSAFE FUNCTIONING OF THE VIU-20e UNIT. THE VITAL FIELD CONFIGURABLE PARAMETERS MUST BE VERIFIED FOR CORRECTNESS BEFORE THE EQUIPMENT IS PLACED IN SERVICE.

#### 6.1 INTRODUCTION

Diagnostic Terminal (DT) Utility is a Siemens developed Windows® based utility program designed to run on a laptop PC. The DT provides a user interface that allows for local configuration of certain vital and non-vital VIU-20e parameters, plus diagnostic tools that can be used to isolate VIU-20e system problems (see Section 9).

#### 6.2 DT TO VIU-20E INTERFACE

The DT can be interfaced to the VIU-20e by one of the following means:

- Primary method - an Ethernet LAN connection from the host PC Ethernet port to the **Laptop (Ethernet)** port on the VIU-20e front panel. Alternatively, the host PC Ethernet port can be connected to either Ethernet Port 1 or Port 2 located on top of the VIU-20e.
- Another method is a straight 9-pin female to 9-pin male cable connected between the host PC serial port and the 9-pin, RS-232 **Laptop (Serial)** port on the VIU-20e front panel.

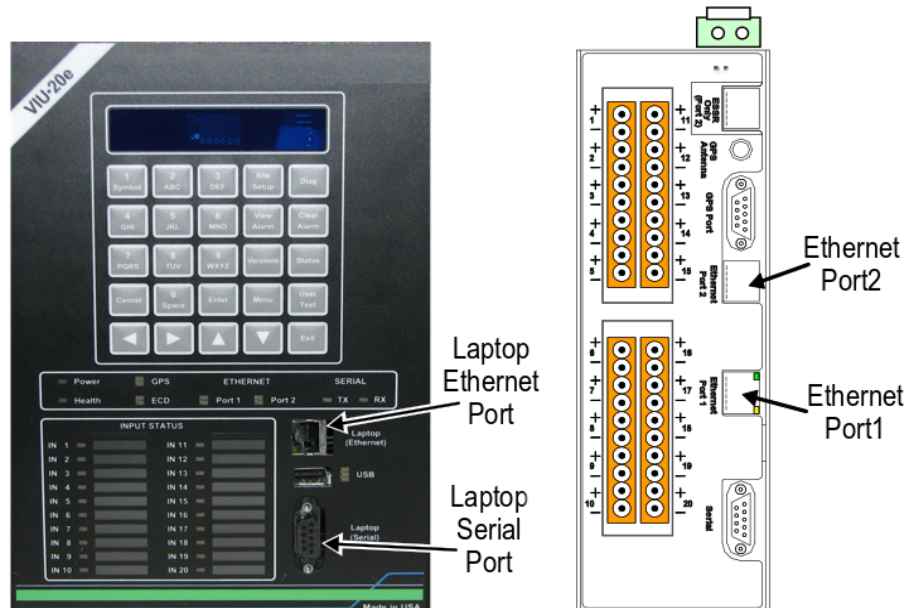


Figure 6-1 VIU-20e Front Panel Laptop PC Interface Connectors

### 6.3 PROGRAM STARTUP

Before launching the DT Utility program, verify that the following conditions are met:

- The PC is connected to the VIU-20e as described in paragraph 6.2.
- The VIU-20e is powered up.

Launch the DT Utility either from the PC Programs list or from a desk-top icon if present.

#### 6.3.1 Startup Sequence

The DT Utility establishes a connection to the VIU-20e, checks the installed VIU-20e files, and then downloads the current VIU-20e configuration information. A progress bar appears at the bottom of the screen during the download process (Figure 6-2). Status messages appear in the message box at the right bottom of the screen. The **IP Connecting** message is displayed only if the PC is interfaced to the VIU-20e via the Ethernet port.

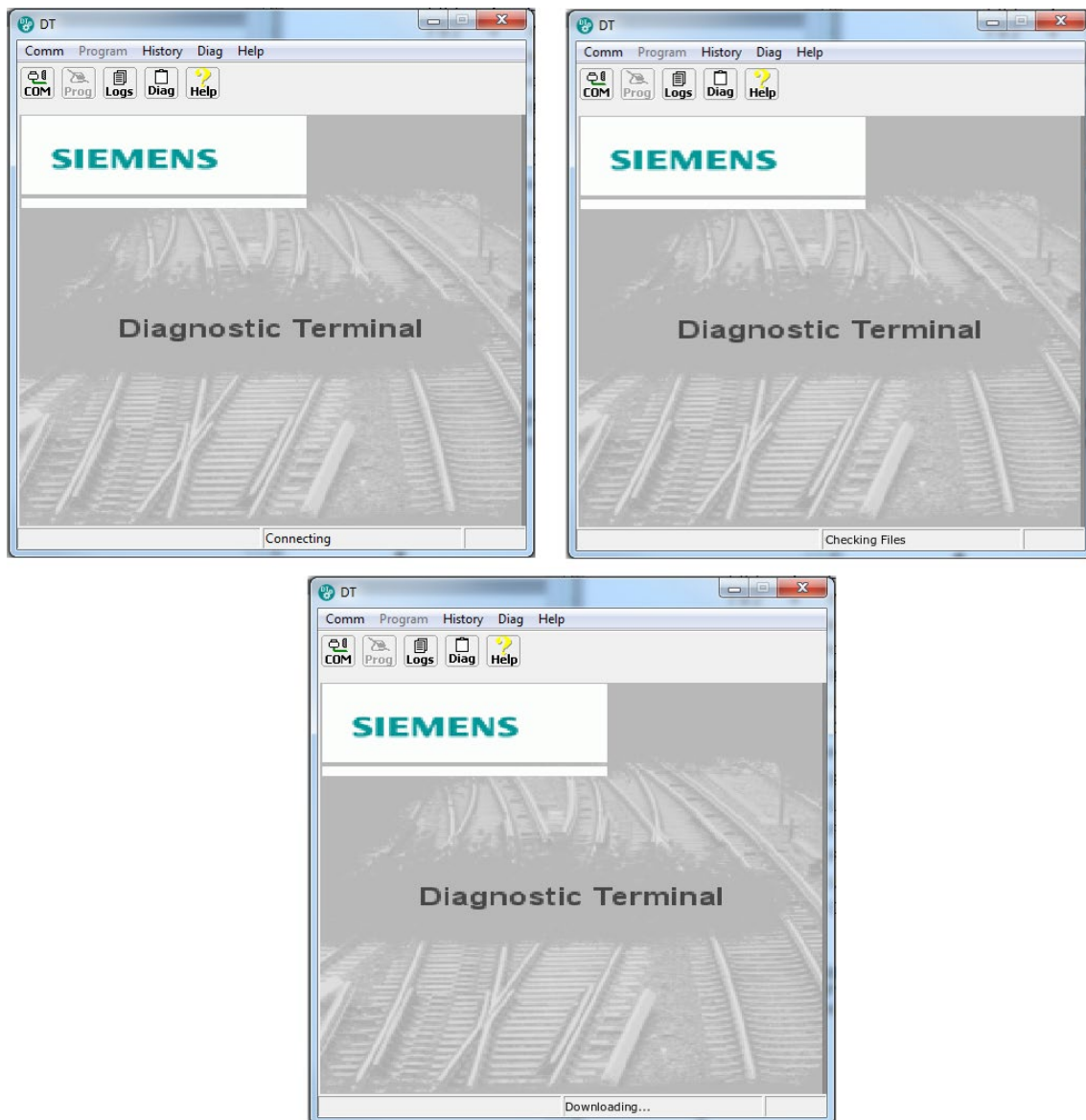


Figure 6-2 DT Utility Program Startup Screens

If the DT Utility was already running prior to connecting the PC to the VIU-20e, click on the **COMM** button at the top of the screen to display the communications drop down menu. Select **Connect** from the drop down menu to initiate a data connection between the DT Utility and the VIU-20e (Figure 6-3). See paragraph 6.6.1 for DT port setup.

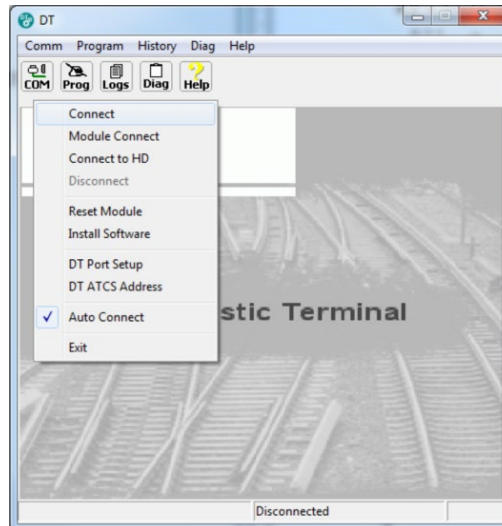


Figure 6-3 COMM Drop Down Menu

#### 6.4 INPUT STATUS OVERVIEW SCREEN FOR VIU-20E

Once the DT Utility has successfully established its connection with the VIU-20e, **Ready** is displayed in the lower right hand message box and an overview of the VIU-20e input status is displayed. Note that at the top of the DT Utility screen the Site ID Number [SIN] or ATCS address of the attached VIU-20e is displayed. See Figure 6-4.

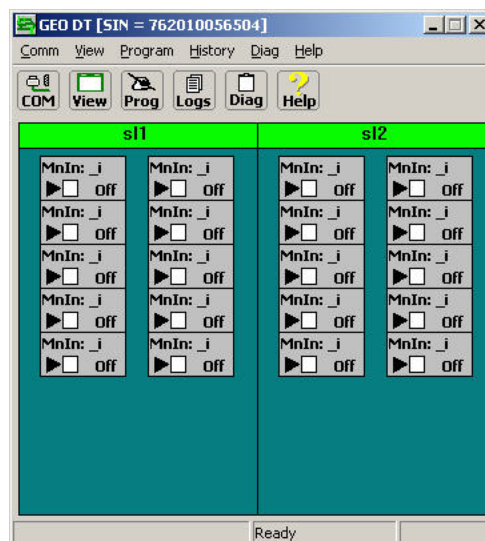


Figure 6-4 DT Input Status Overview Screen for VIU-20e

The input status overview screen provides a quick indication of the current VIU-20e health and input status. See Figure 6-5.

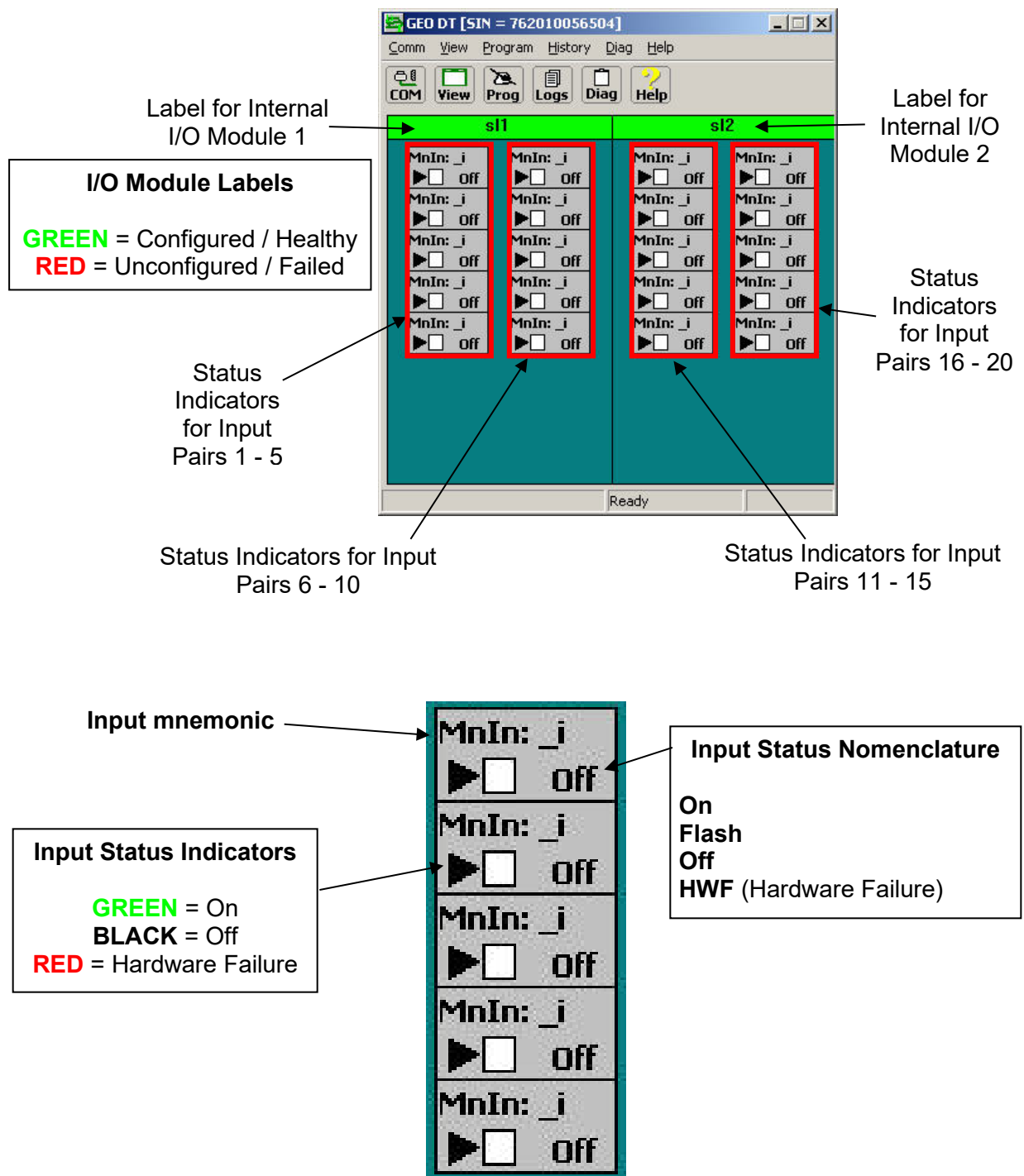
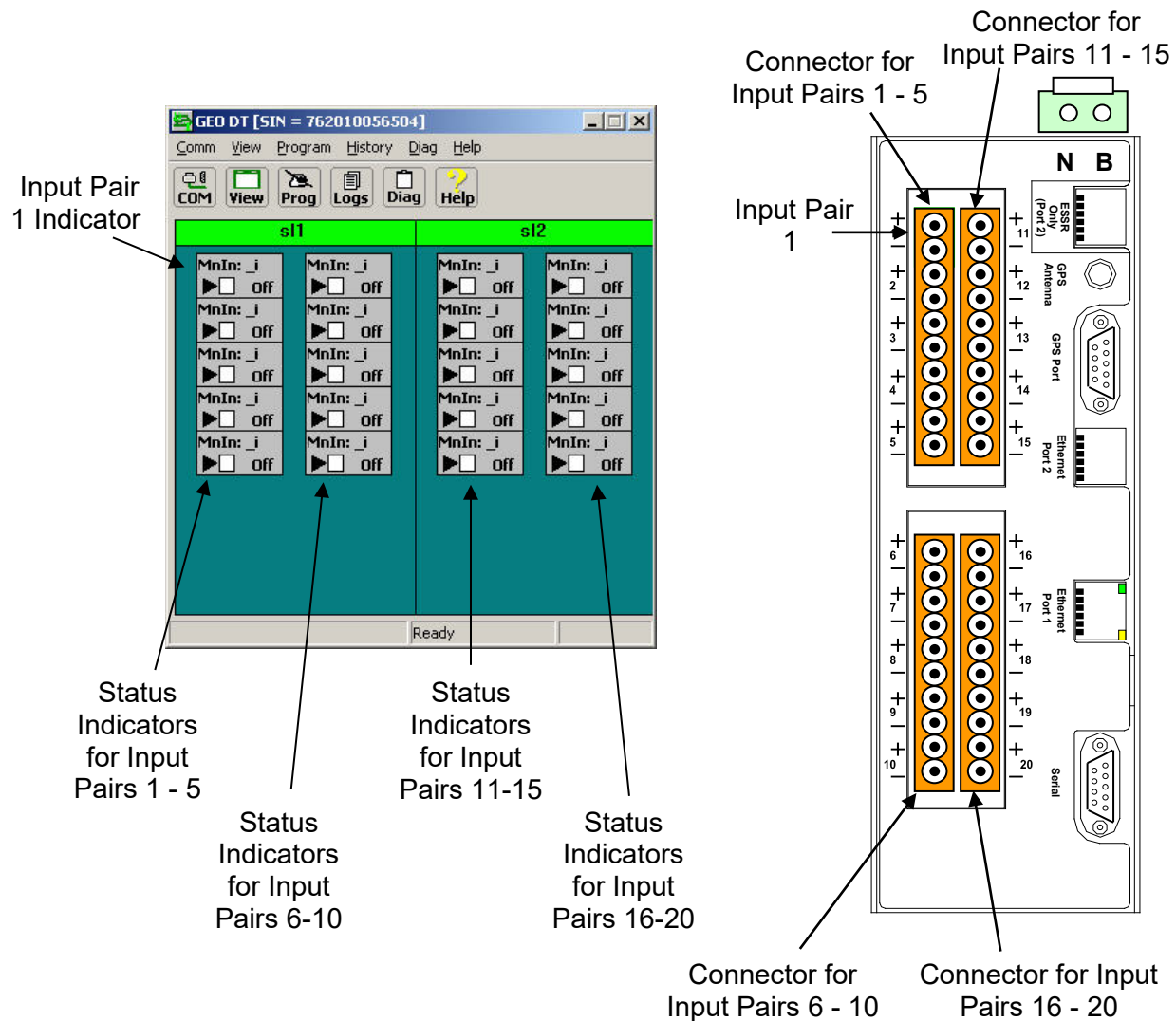


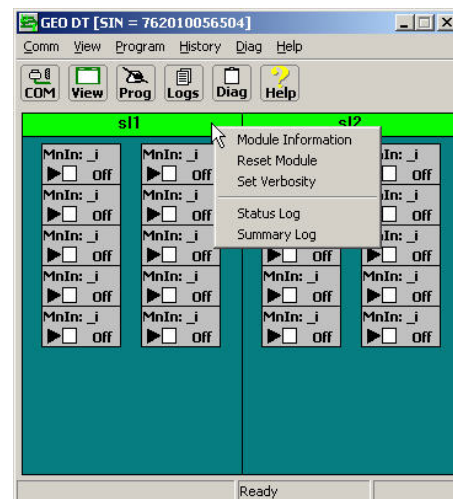
Figure 6-5 Input Status Screen Indicator Descriptions



**Figure 6-6 DT Status Screen Indicators to Physical Connectors**

Right-click on the I/O Module label to display the module drop-down menu. Select items from the menu to view or perform the following (Figure 6-7):

- View Specific Module information
- Reset Module
- Set verbosity (control of amount of information saved to the log)
- View Status Log
- View Summary Log



**Figure 6-7 I/O Module Drop-Down Menu**

## 6.5 STATUS SCREEN BUTTON DESCRIPTIONS & MENUS

The function buttons at the top of the Input Status Screen provide access to submenus. Use these submenus to access specific information about the connected VIU-20e or to perform actions that affect the connected VIU-20e. The function button and submenu hierarchy is shown in Figure 6-8.

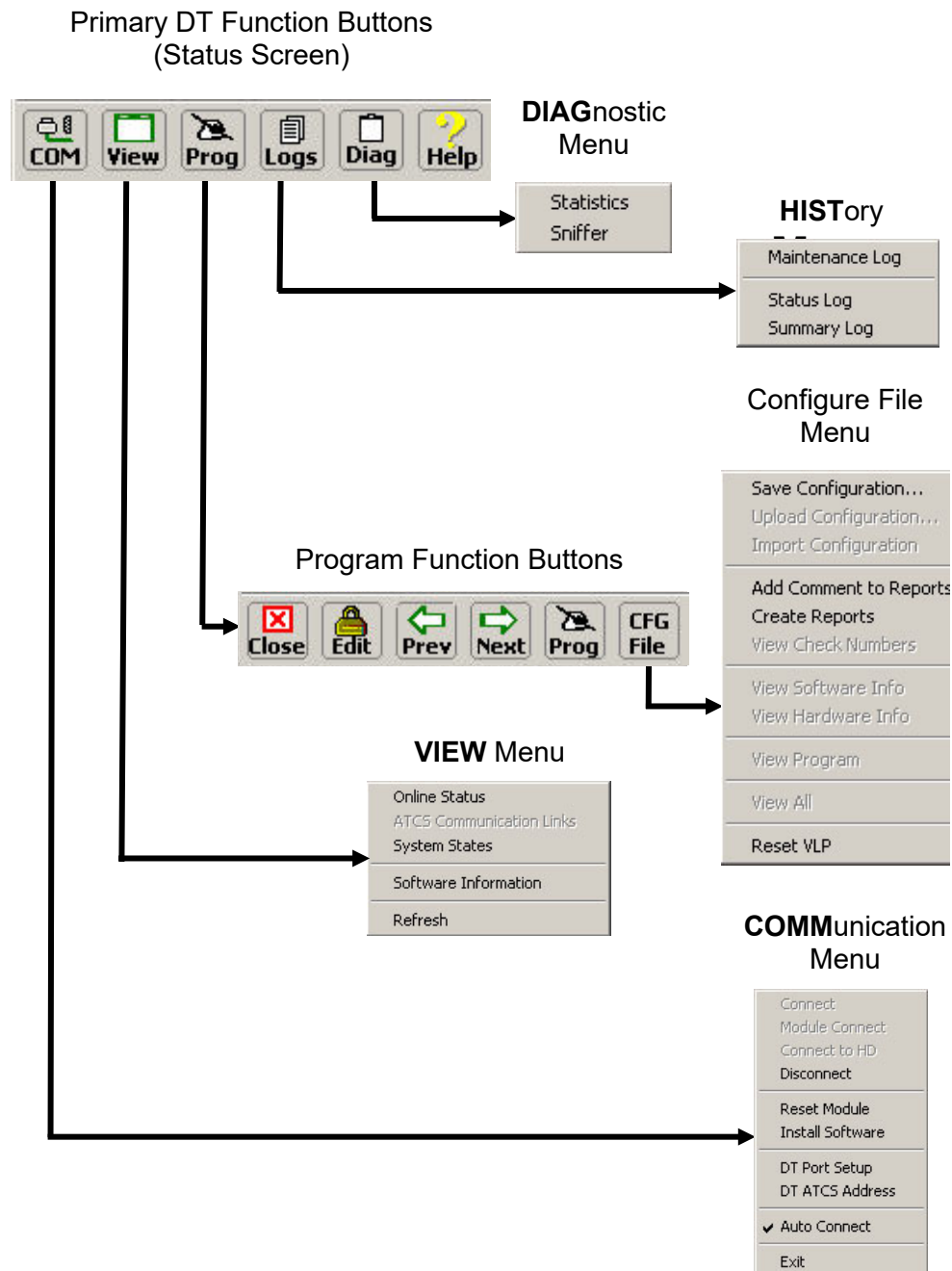


Figure 6-8 DT Function Button and Menu Hierarchy



## 6.6 COMM (COMMUNICATIONS) BUTTON MENU

Click on the **COMM** (Communications) button at the top of the Input Status Screen to display the communications drop-down menu.

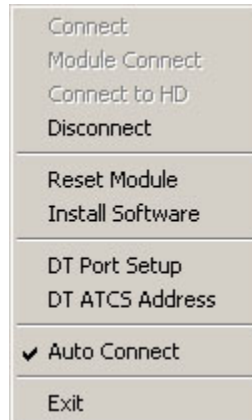
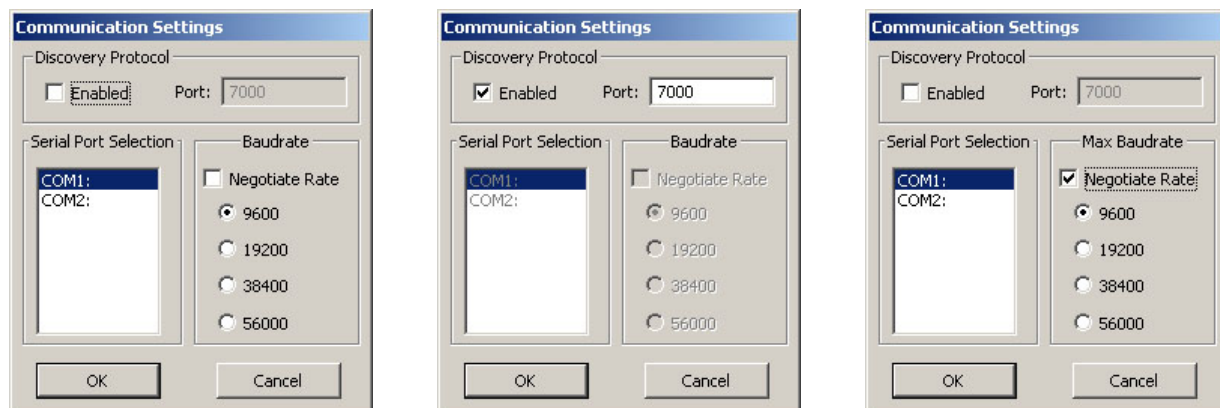


Figure 6-9 Communications Drop-Down Menu

### 6.6.1 Port Setup

Select **DT Port Setup** from the drop-down menu to display the Communications Settings dialog box (Figure 6-10).



A

B

C

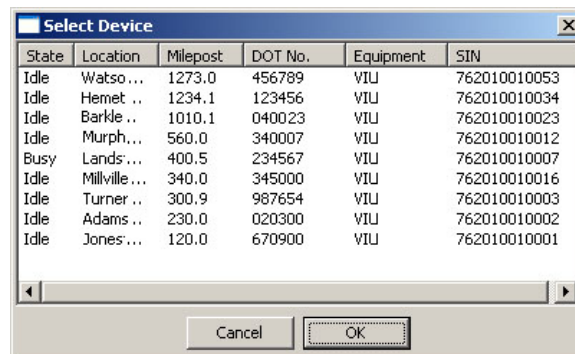
Figure 6-10 DT Communications Settings Dialog Box

When communicating with the VIU-20e via a serial port, use this screen to configure the baud rate of the selected PC communications port (Figure 6-10A).

If several VIU-20es are connected to a Local Area Network (LAN), connect the PC to this network and then select the **Discovery Protocol Enabled** check box (Figure 6-10B).

The **Negotiate Rate** function is for another application of the DT. If the check box next to the Negotiate Rate label is checked as shown in Figure 6-10C, deselect it.

The DT will locate each VIU-20e on the LAN and present them in a list (Figure 6-11). Select the desired VIU-20e from the list and click the OK button. This screen refreshes approximately every 15 seconds.

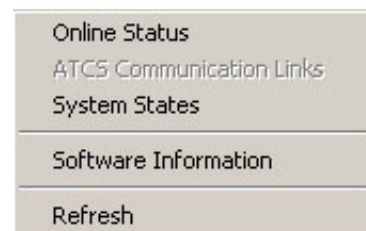


State	Location	Milepost	DOT No.	Equipment	SIN
Idle	Watso...	1273.0	456789	VIU	762010010053
Idle	Hemet ..	1234.1	123456	VIU	762010010034
Idle	Barkle ..	1010.1	040023	VIU	762010010023
Idle	Murph...	560.0	340007	VIU	762010010012
Busy	Lands...	400.5	234567	VIU	762010010007
Idle	Millville...	340.0	345000	VIU	762010010016
Idle	Turner ..	300.9	987654	VIU	762010010003
Idle	Adams ..	230.0	020300	VIU	762010010002
Idle	Jones...	120.0	670900	VIU	762010010001

**Figure 6-11 List of Networked VIU-20e Devices**

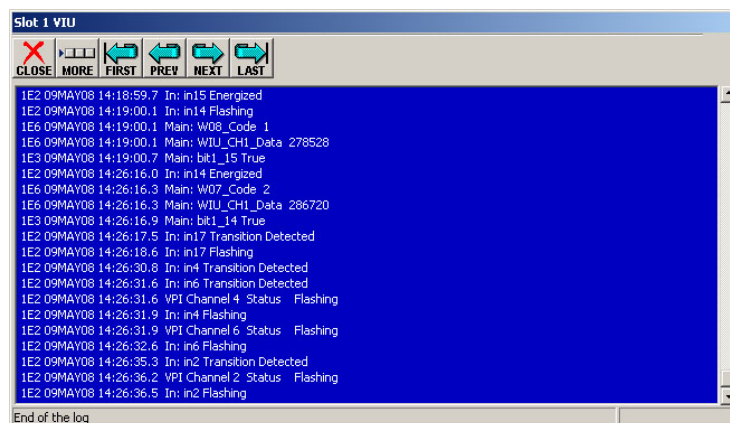
## 6.7 VIEW BUTTON MENU

Click the **VIEW** button at the top of the Input Status Screen to display the View drop-down menu.



### 6.7.1 On-Line Status

Select the **On-line Status** function from the View drop-down menu to view the internal VIU-20e status log in real-time. This listing only includes events for the current DT session (Figure 6-12).



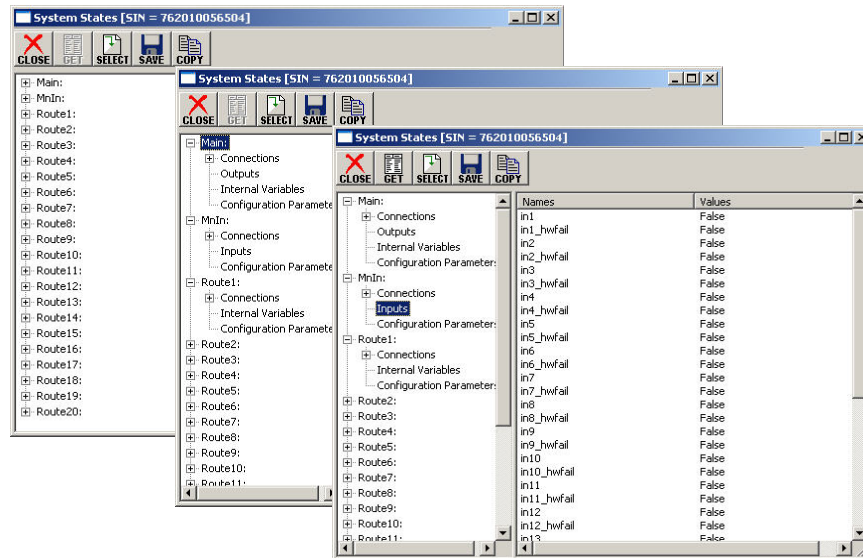
**Figure 6-12 Real-Time View of VIU-20e Status Log**



## 6.7.2 System States

Select **System States** from the **View** drop-down menu to view the current status of each VIU-20e vital input. On the initial System States screen:

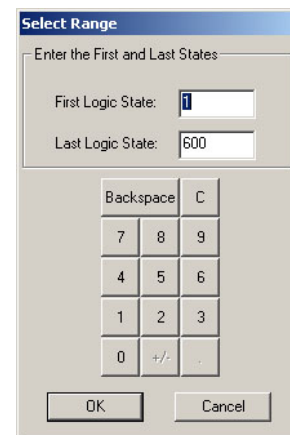
1. Select the “+” symbol next to a name to expand its directory.
2. Select **Inputs**.
3. Click the **GET** button at the top of the screen to display the input states.



**Figure 6-13 Viewing Input States Using System States Function**

To view the logic states for a range of inputs:

1. Click the **SELECT** button at the top of the System States screen to display the Select Range dialog box Figure 6-14.
2. Enter the number of the first and last logic states to be viewed.
3. Click the **OK** button.



**Figure 6-14 Logic State Select Range Dialog Box**

When viewing the Input Logic States Display there are three logic states for each input:

- The first logic state represents the On/Off status of the input: 1 = On, 0 = Off.
- The second logic state represents the flash function: 1 = Flashing, 0 = Not Flashing.
- The third logic state represents the hardware fail status: 1 = Failed, 0 = Not Failed

**NOTE****NOTE**

The 1 logic state corresponds to a 'True' statement and the 0 logic state corresponds to a 'False' statement on the System States screen shown in Figure 6-15.

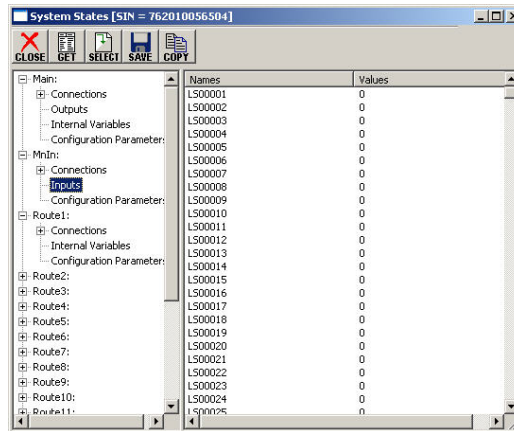


Figure 6-15 Input Logic States Display

### 6.7.3 Software Information

Select **Software Information** from the **View** drop-down menu to view information about the currently installed MCF and MEF (Executive).

MEF Version

MCF Name

MCF CRC

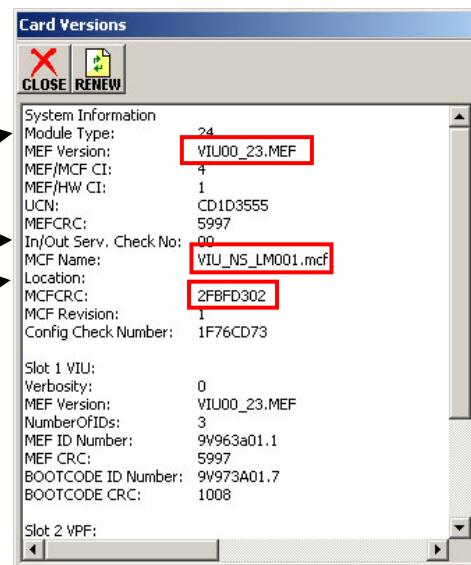


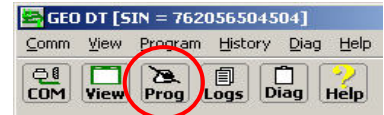
Figure 6-16 Software Information Screen

**NOTE****NOTE**

The software information presented on this display applies to vital components only. Use the Web browser user interface to view complete software information.

## 6.8 PROG (PROGRAM) BUTTON MENU

Click the **PROG** (Program) button at the top of the Input Status Screen to display the **MAIN PROGRAM menu** (Figure 6-17).



Select an item from the menu to display the associated DT screen. This menu provides access to the configurable parameter screens.

### 6.8.1 Online and Offline Display Screens

Note that Figure 6-17A is displayed when the DT is online (connected to a VIU-20e) as indicated by “Property Browser” in the title bar, and Figure 6-17B is displayed when running the DT offline (not connected to a VIU-20e) as indicated by “Office Configuration Editor” in the title bar.

There are a few instances where a parameter or function can only be configured offline using the Office Configuration Editor (OCE) - for example, calculating a UCN. In such cases the special function will only appear in the offline Office Configuration Editor screen.

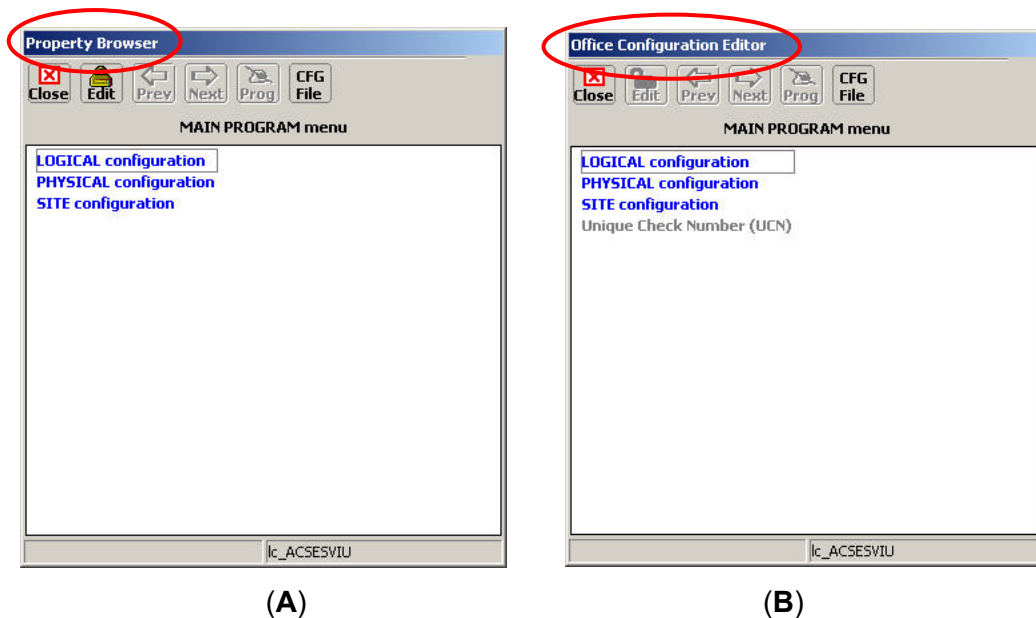


Figure 6-17 MAIN PROGRAM Menu Screen

### 6.8.2 Changing Locked Configuration Parameters

The parameters preceded by a right angle bracket (>) are vital parameters. The current values for these parameters are displayed in gray text. These parameters may be reset in the field using the DT utility after unlocking the configuration parameters.

To unlock the configuration parameters, click the **Edit** button at the top of the screen (Figure 6-18). A prompt is displayed indicating that unlocking the parameters will place the system in a restrictive state and that a new UCN is required to make the system operational (Figure 6-19). Click the **Yes** button to unlock the parameters. When unlocked, the parameters displayed in gray text change to green.

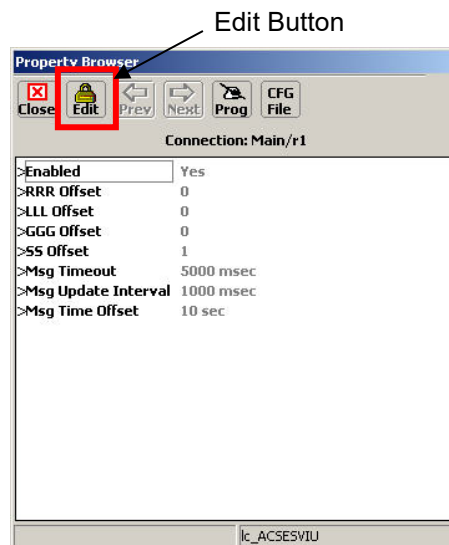


Figure 6-18 Edit Button Location

#### NOTE

#### NOTE

Refer to Section 4 for instructions on how to calculate a new UCN.

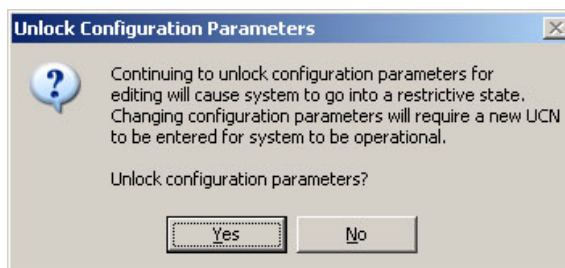


Figure 6-19 Unlock Configuration Parameters Prompt

#### WARNING

#### WARNING

PARAMETERS DISPLAYED WITH A RIGHT ANGLE BRACKET (>) TO THE LEFT OF THE PARAMETER NAME ARE VITAL PARAMETERS WHICH ARE PART OF THE UCN. CHANGING THESE PARAMETERS WHILE CONNECTED TO THE VIU-20e PUTS THE VIU-20e IN AN UNCONFIGURED STATE. EDIT MODE IS USED TO CHANGE THE VITAL PARAMETERS, AFTER WHICH A NEW UCN MUST BE ENTERED. THE NEW UCN SHOULD BE PROVIDED BY OFFICE OR DESIGN PERSONNEL.

### 6.8.3 LOGICAL Configuration

Select the **LOGICAL Configuration** function from the MAIN PROGRAM menu screen to view the LOGICAL configuration screen (Figure 6-20).

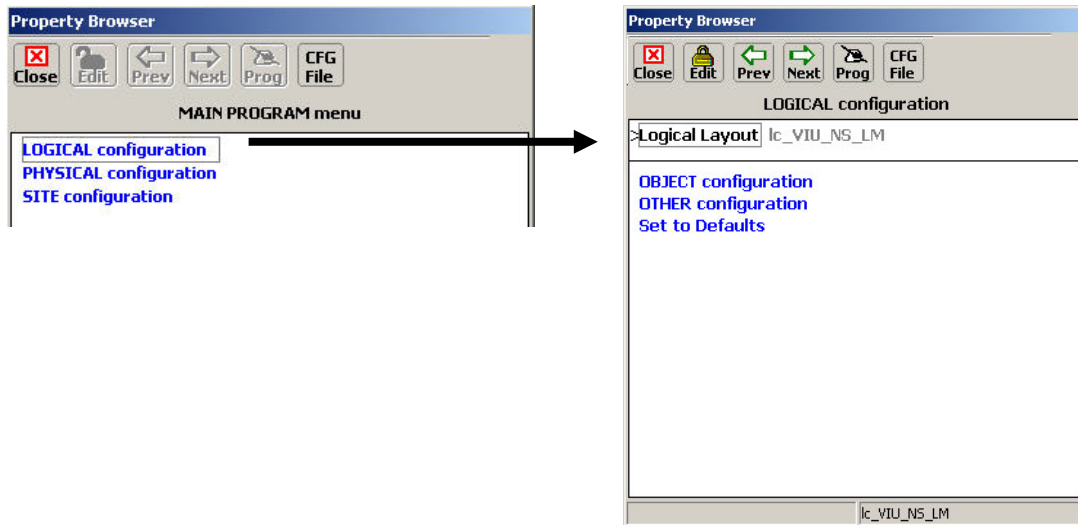


Figure 6-20 LOGICAL Configuration Screen

#### 6.8.3.1 Logical Layout

The Logical Layout is a template consisting of a set of objects, the connections between them and the list of I/O that is to be activated for this application. These items are defined in the MCF.

If more than one Logical Layout template is available, select the desired template in the top list box and then select the **Update** button.

This parameter is UCN protected. To modify it, select the **EDIT** button to enable the edit mode. The value will be displayed green when edit mode is enabled.

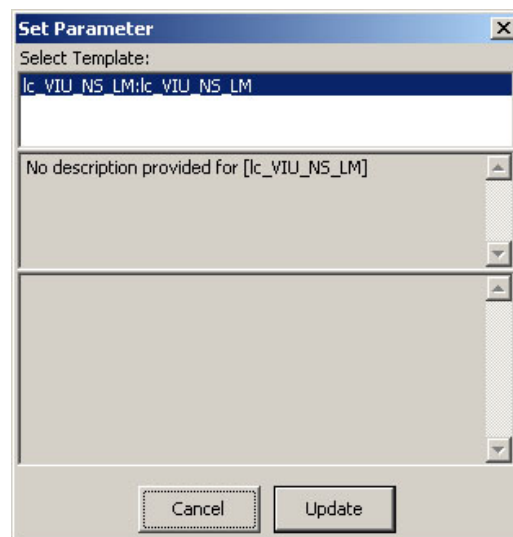


Figure 6-21 Logical Layout Selection Screen

### 6.8.3.2 OBJECT Configuration

*Path: MAIN PROGRAM menu > LOGICAL configuration > OBJECT configuration.*

Select **OBJECT configuration** from the LOGICAL configuration screen to display the OBJECT configuration screen (Figure 6-22).

#### NOTE

#### NOTE

The screens in the following figures in Object Configuration section are for example only and may vary depending on the VIU-20e MCF used.

This screen shows links to the program pages for the 'main' object and the first 15 routes. If more than 15 routes are used, press the **Next** button to get to continuation pages.

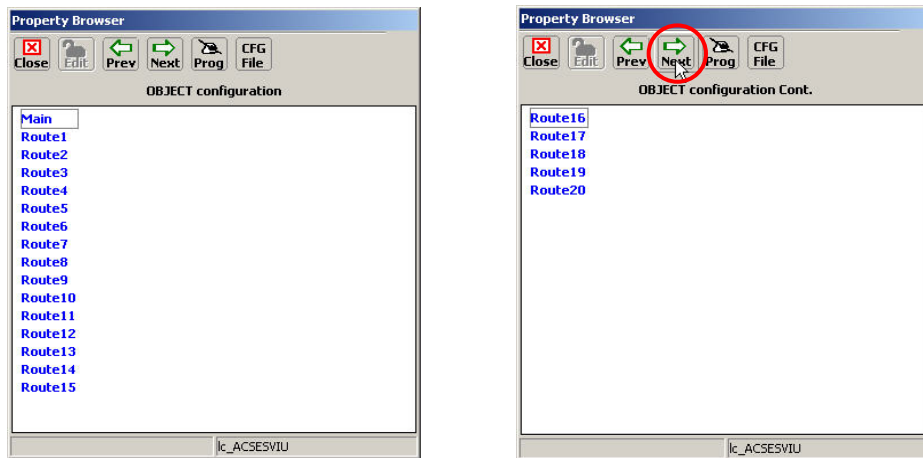
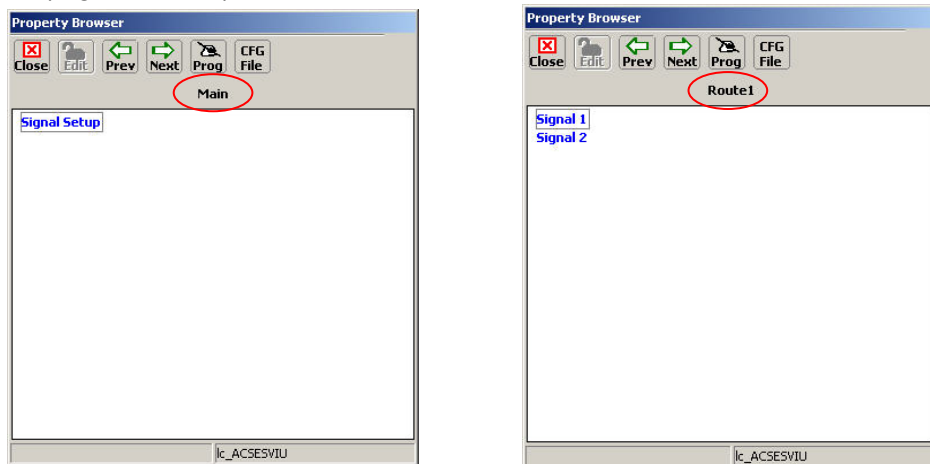


Figure 6-22 OBJECT Configuration Screens

- **Signal Setup Selection**

Selecting Signal Setup from the **Main** screen displays the Main Signal Setup Layout (Figure 6-23A), while selecting Signal 1 or Signal 2 from a **Route#** screen displays the Route# Signal# Layout screen (Figure 6-23B).



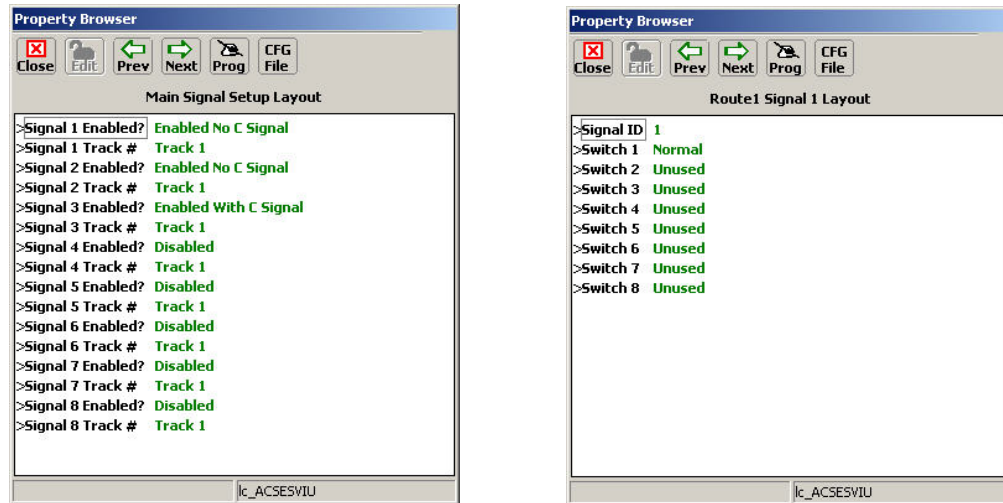
(A)

(B)

Figure 6-23 Signal Setup Selection Screens

Note that clicking the **Previous/Next** arrows cycles through the available layouts from Main through the last Route# in a continuous loop.

Clicking on an unlocked configuration parameter (green text) brings up a **Set Parameter** dialog box as shown in the examples of Figure 6-24.



(A) (B)  
Figure 6-24 Signal and Switch Layout Screens

#### On the Main Signal Setup Layout screen

- Configure which signals are used and whether they have C Signals or not.
- Configure which track the signal is associated with.

#### On the Route 1 Signal 1 Layout

- Configure the ID of the signal at one end of the route 1configure the positions (normal/reverse) of all the switches required for this route to be selected.

#### On the Route 1 Signal 2 Layout

- Configure the ID of the signal at the other end of the route 1, leave set to No Signal, if there is no signal at the opposite end.
- Configure the positions (Normal/Reverse) of all the switches required for this route to be selected.

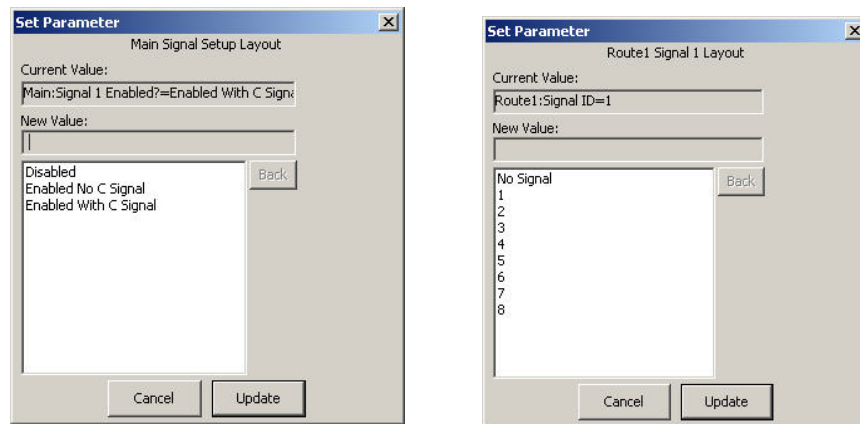
Follow the above steps for all required routes.



- **Main and Route# Signal Layout – Set Parameter Screens**

The examples in Figure 6-25 show two possible **Set Parameter** dialog boxes. Both examples provide a pre-programmed list of parameters to choose from. If applicable, the **New Value** field will be enabled and a numerical value or text label can be entered there.

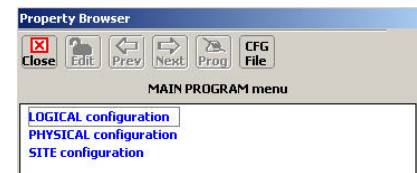
A possible third style dialog box (not shown) may appear allowing input via a keypad-type screen. To set a parameter, click on the desired selection/enter a value in the New Value field, then click the **UPDATE** button.



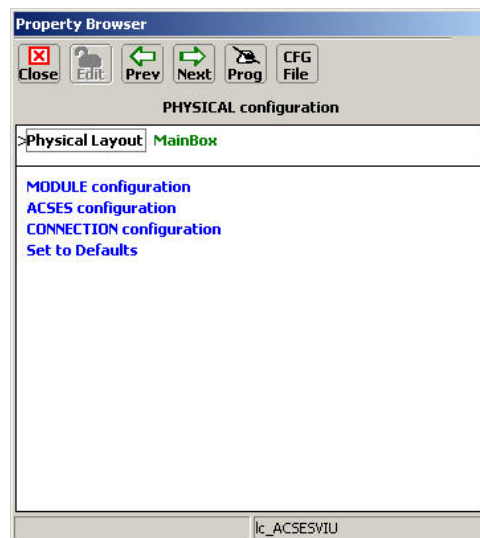
**Figure 6-25 Signal Set Parameter Dialog Boxes (examples)**

#### 6.8.4 PHYSICAL Configuration

Select the **PHYSICAL Configuration** function from the MAIN PROGRAM menu screen to view the PHYSICAL configuration screen (Figure 6-26).



A list of physical configuration options is displayed. These options are described in the following paragraphs.



**Figure 6-26 PHYSICAL Configuration Screen**



#### 6.8.4.1 Physical Layout

The Physical Layout selection (see Figure 6-26) is a template describing the physical content of the associated object. For example, the MainBox object is the main VIU-20e.

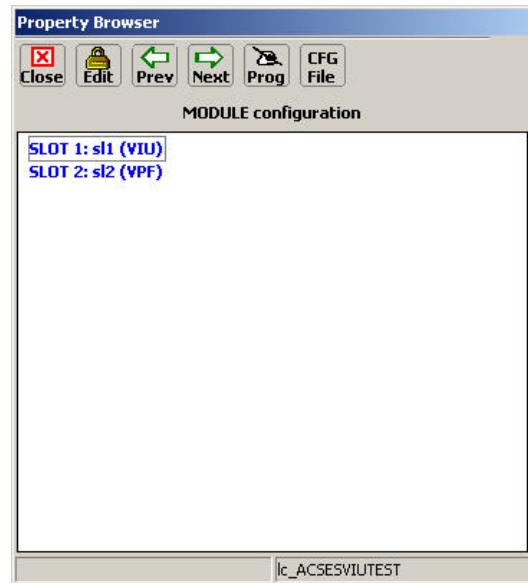
The Physical Layout file for this object defines the types of circuits installed in the main VIU-20e. Click the MainBox (green text) to select a different template (e.g. Remote). The contents of these files are defined in the MCF.

#### 6.8.4.2 MODULE Configuration

*Path: MAIN PROGRAM menu > PHYSICAL configuration > MODULE configuration.*

Select **MODULE configuration** from the PHYSICAL configuration screen to display the MODULE configuration screen (Figure 6-26).

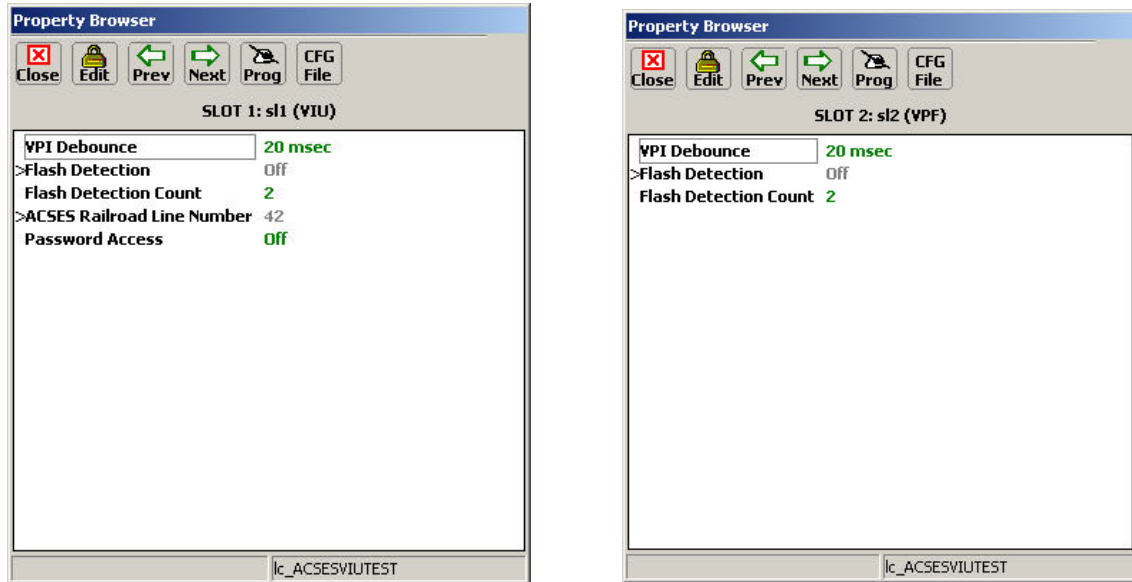
From the list of internal I/O modules, select a module to view its configurable parameters. Depending on the module selected, one of two screens is displayed (Figure 6-27).



**Figure 6-27 MODULE Configuration Screen**

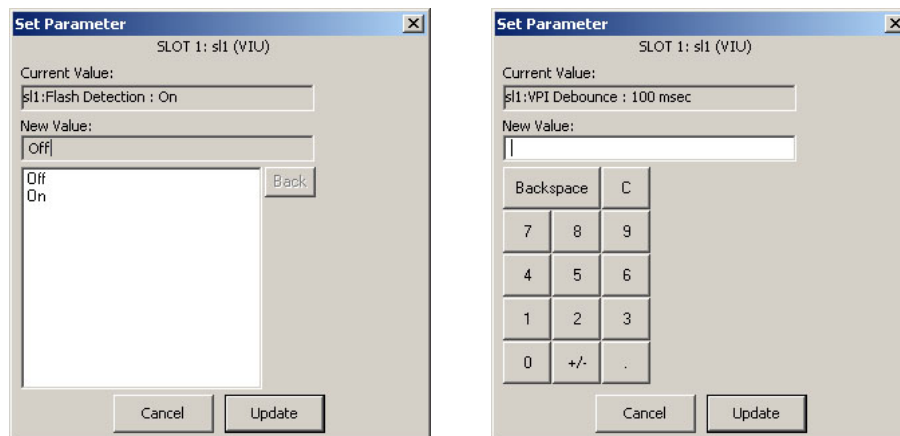
**NOTE****NOTE**

These internal modules are not removable or serviceable. They are groups of circuits associated with the vital I/O connectors and are labeled as shown here for reference only.



**Figure 6-28 Slot 1 VIU & Slot 2 VPF Module Configuration Screens**

The setting for each of these configurable parameters falls into one of two categories; a numerical value or an “On/Off” option. The **Set Parameter** screens for both parameter types are shown in Figure 6-29. After entering the number or selecting the option, click the **UPDATE** button to activate the new setting.



**Figure 6-29 Typical Set Parameter Screens**

- **VPI Debounce (Slot 1 VIU & Slot 2 VPF)**

The VPI Debounce function is a global setting that is applied to all vital inputs serviced by this internal I/O module. It sets the period of time a level change must be present on an input before it can be considered a “Change-of-State.”

Valid VPI Debounce range: **20** to **200** ms (default is **20** ms).

- **Flash Detection (Slot 1 VIU & Slot 2 VPF)**

The Flash Detection function is used to configure the physical inputs to detect whether a level that cycles on and off on the input represents a flashing input. Valid options are: **On**, **Off** (default = **Off**).

**NOTE****NOTE**

For ACSES applications, this function should be set to off.

When flash detection is on, a new energized / de-energized state will not be reported until it has persisted for 1 second.

**NOTE****NOTE**

This function is UCN protected.

- **Flash Detection Count (Slot 1 VIU & Slot 2 VPF)**

The Flash Detection Count setting determines how many “half cycles” are required on the input before the software determines that the level on the input represents a flashing signal.

Valid Flash Detection Count values: **2** to **8** (default is **3**).

- **ACSES Railroad Line Number (Slot 1 VIU Only)**

The ACSES Railroad Line Number (Range = 0-255) provides ACSES with the ability to handle chaining on different Railroads and their lines. This needs to be set to the appropriate value according to the plans. If it is left at 0, the VIU-20e will go into the unconfigured state.

**NOTE****NOTE**

The ACSES Railroad Line Number is not the same as the ATCS Railroad number.

- **Password Access (Slot 1 VIU Only)**

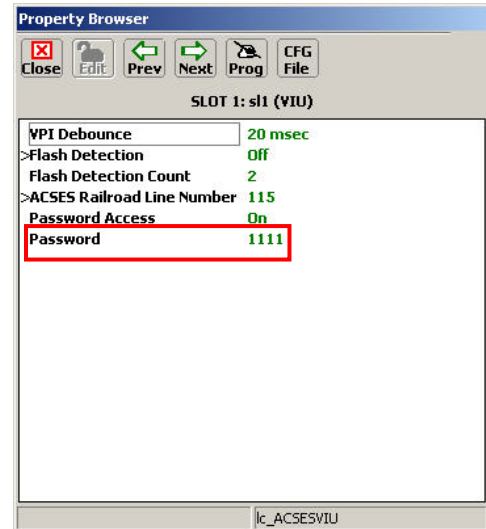
The internal I/O module for slot 1 also controls password access for changing VIU-20e parameters. The Password Access function determines whether or not a password is required.

Password Access options: **On** = password required, **Off** = no password required (default is **Off**).

- **Password (Slot 1 VIU Only)**

If the Password Access function is set to **On**, an additional password function is displayed (Figure 6-30). This is the actual password. The default password is 1111.

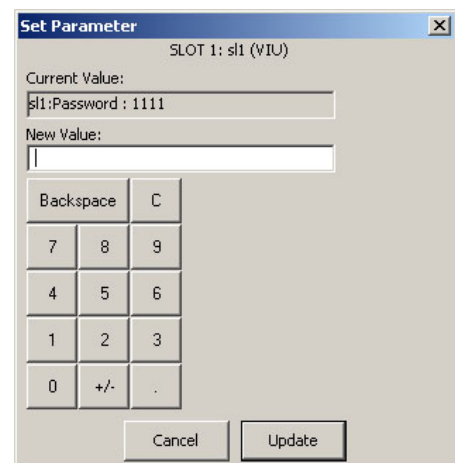
To change the password, click on the green numbers to the right of the word **Password** (1111 in Figure 6-30). The Set Parameter dialog box for changing the password is displayed (Figure 6-31).



**Figure 6-30 Password Enabled**

Enter the new password consisting of any four numbers from 1 to 9 plus 0. Click the **Update** button to save the new password. After exiting the programming function, the password will be required to access any of the programming functions as long as the password function is enabled.

Valid password number range: **1111 to 9999**



**Figure 6-31 Password - Set Parameter Dialog Box**

#### 6.8.4.3 ACSES Configuration

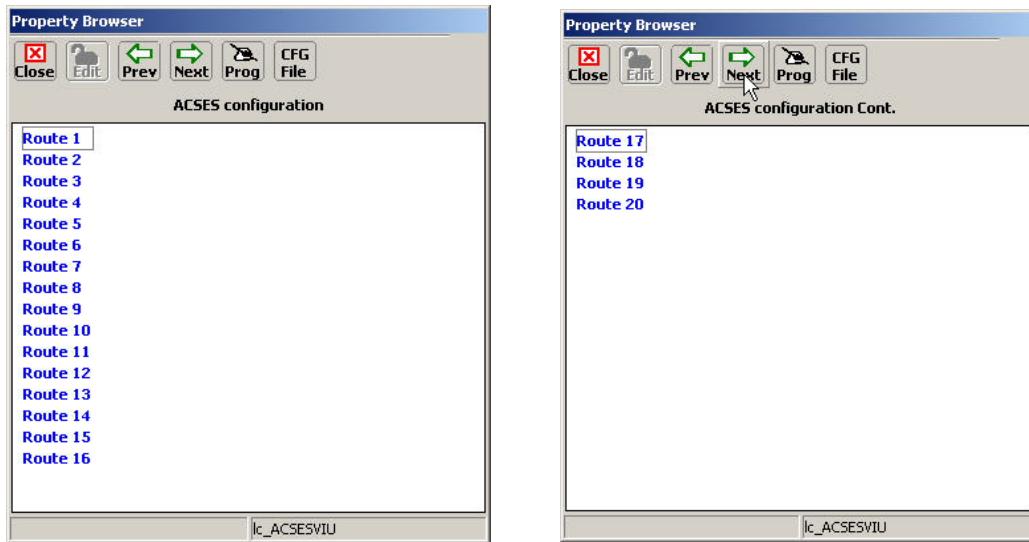
*Path: MAIN PROGRAM menu > PHYSICAL configuration > ACSES configuration.*

Select **ACSES configuration** from the PHYSICAL configuration screen to display Routes 1-16 on the ACSES configuration screen (Figure 6-32). To select Routes 17-20, press the **Next** button. If more than 16 routes are used, press the Next button to get to continuation pages.

Click on a Route number to open its corresponding Property Browser (Figure 6-33).

**NOTE****NOTE**

The screens in the following figures in the Object Configuration section are for example only and may vary depending on the VIU-20e MCF used.

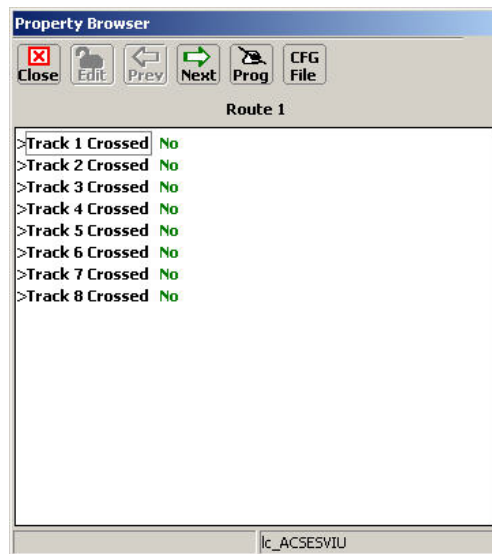


**Figure 6-32 ACSES Configuration - Route Selection Screen**

- **Track # Crossed**

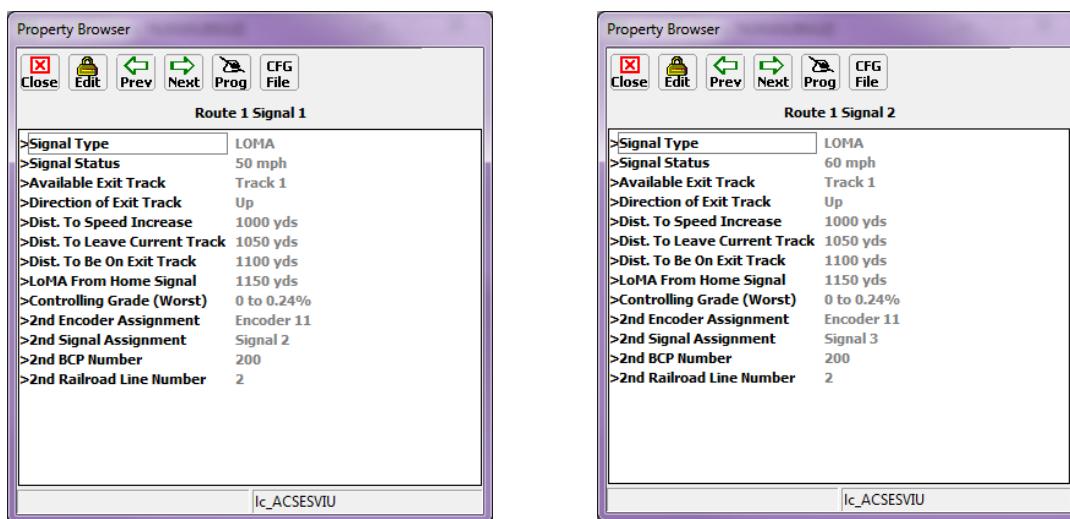
This screen is used to define the tracks the train will cross between the entrance track. Select **Yes** for each track crossed by the route.

To change a setting on this screen, click on the corresponding green text to bring up the **Set** Parameter dialog box. Select **Yes** or **No** as applicable, then click the UPDATE button.



**Figure 6-33 ACSES Configuration - Route Setup Screen**

Click the **Next** arrow to proceed to the Signal setup Property Browser (Figure 6-34). The signal settings are discussed in the following paragraphs.



**Figure 6-34 ACSES Configuration - Signal Setup Screen**

- **Signal Type**

This property is used to define whether the signal for this route is a LoMA or a No LoMA signal. When the Signal Type is set to LoMA, the following properties need to be configured.

- **Signal Status**

**Signal Status** = signal is a stop or at better than stop. If better than stop the radio sends the maximum speed for the train based on the route within the limits of the interlocking and any permanent speed restrictions at the exit of the interlocking.

- **Available Exit Track**

**Available Exit track** identifies the track the train will exit the interlocking on, based on the current switch alignment.

- **Direction of Exit Track**

**Direction of Exit Track** indicates whether the exit track is in the up or down direction.

- **Dist. To Speed Increase**

**Distance to speed increase** is the distance at which the Signal Status speed will be released by the OBC. Typically corresponds to the length of the interlocking. This distance is actually referenced to the PTS target point provided to the OBC for the home signal from the actual home signal insulated joints. The OBC will apply the civil speed based on the route (Signal Status speed) starting from the PTS target and ending at this distance from the PTS target. The distance is entered in Yards.

- **Dist. To Leave Current Track**

**Distance to Leave Current Track** defines the distance from the home signal (distance is actually referenced to the PTS target point provided to the OBC for the home signal from the actual home signal insulated joints) to the midpoint of the diverging track for a crossover and to the facing point or trailing point of the switch for a turn out based on the status of the switches in the interlocking. The onboard system uses this data to determine the point at which to enforce TSRs on the track the train is diverging to. The distance is entered in Yards.

- **Dist. To Be On Exit Track**

**Distance to be on Exit Track measured from previous distance** = the distance from diverge point distance defined above to the point the train enters the exit track (midpoint of the crossover or facing or training point of the switch for turnouts). The total distance from the home signal to the point where the train enters the exit track can be calculated by adding this distance to the distance in the previous word. The onboard system uses this data to determine the point at which TSRs on the track the train is diverging from can be released. The distance is entered in Yards.

When the signal type is set to **LoMA** (Refer to Figure 6-34), the properties described above must be configured, as well as the following properties.

- **LoMA From Home Signal**

**LoMA From Home Signal** is the distance from the entrance home signal (distance is actually referenced to the PTS target point provided to the OBC for the home signal ~ 100 feet from the actual home signal insulated joints) to the home signal of the next interlocking (next PTS target). The distance is entered in Yards.

- **Controlling Grade (Worst)**

**Controlling Grade (Worst)** is the worst case controlling grade between the current and next interlocking. It is the minimum upgrade or maximum downgrade existing between two closely spaced interlockings.

- **2nd Encoder Assignment**

**2nd Encoder Assignment** is the Encoder to be contacted at the next interlocking based on the train route through the 1<sup>st</sup> interlocking.

- **2nd Signal Assignment**

**2nd Signal Assignment** is the home signal to be contacted at the next interlocking based on the train route through the 1st interlocking.

- **2nd BCP Number**

**2nd BCP Number** is the Radio Address, GGG number of the BCP to be contacted at the next interlocking, based on the train route through the 1st interlocking.

- **2nd Railroad Line Number**

**2<sup>nd</sup> Railroad Line Number** is ACSES Railroad/Line Number for the next interlocking, based on the train route through the 1st interlocking.



#### 6.8.4.4 CONNECTION Configuration

*Path: MAIN PROGRAM menu > PHYSICAL configuration > CONNECTION configuration.*

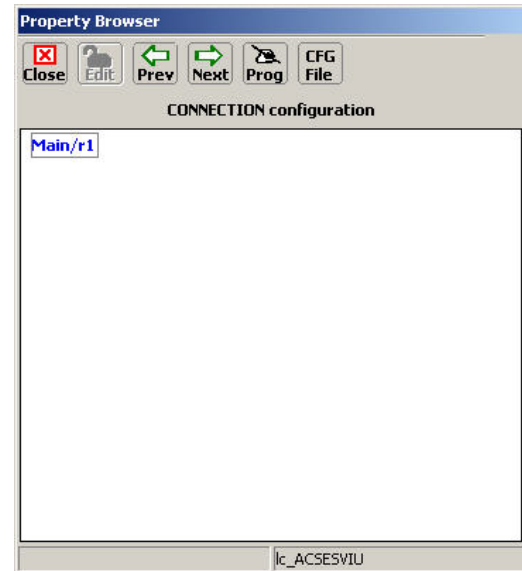
These screens are used to configure the properties needed for the Vital ATCS connection between two VIU-20e modules. The connection names are for example only actual names will vary depending on the MCF used.

Click **CONNECTION configuration** on the PHYSICAL configuration screen to bring up the Main/r1 configuration screen (Figure 6-35).

The item listed on this screen represents the connection name in the MCF for the geographic messaging link of the Remote VIU-20e.

r1 = remote VIU 1

Click on **Main/r1** to bring up the Main/r1 configuration screen (Figure 6-36).

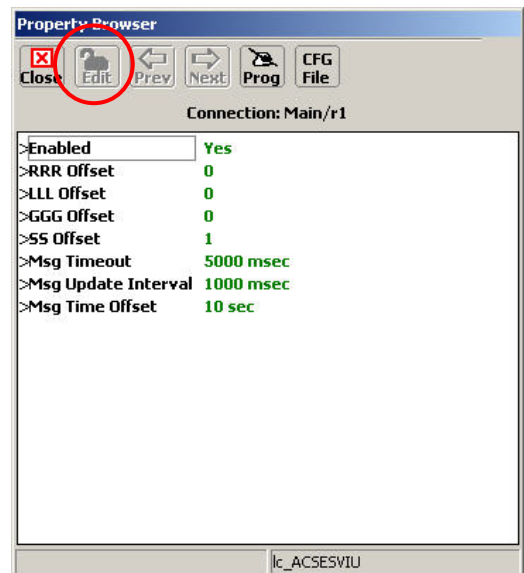


**Figure 6-35 CONNECTION Configuration Screen**

These parameters are all UCN protected. To modify these parameters, click the **Edit** button to unlock the configuration parameters. When complete, enter the new UCN number as directed.

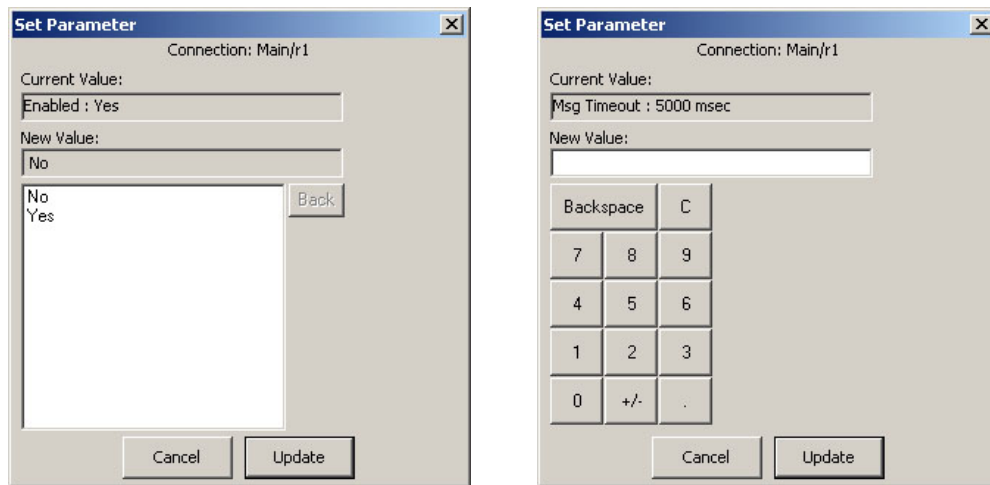
The settings for each of these configurable parameters fall into one of two categories; numerical value or a listed option. Typical Set Parameter screens for both parameter types are shown in Figure 6-37.

Each of the Connection parameters is discussed in the following paragraphs.



**Figure 6-36 CONNECTION: Main/r1 Screen**

After entering the number or selecting the option, click the **Update** button to activate the new setting.



**Figure 6-37 Typical Connection Links Parameter Screens**

- **Enabled**

Select to **Yes** to enable the connection between two VIU-20es.

Enabled options: **Yes / No** (default – none set).

- **RRR Offset**

This parameter sets the ATCS address railroad number offset. This offset is the difference between the Remote VIU-20e railroad number and the railroad number of the Local VIU-20e.

RRR Offset range: **-999 to 999** (default – not set).

- **LLL Offset**

This parameter sets the ATCS address line number offset. This offset is the difference between the Remote VIU-20e line number and the line number of the Local VIU-20e.

LLL Offset range: **-999 to 999** (default – not set).

- **GGG Offset**

This parameter sets the ATCS address group number offset. This offset is the difference between the Remote VIU-20e group number and the group number of the Local VIU-20e.

GGG Offset range: **-999 to 999** (default – not set).

- **SS Offset**

This parameter sets the ATCS address subnode offset. This offset is the difference between the Remote VIU-20e subnode and the subnode of the Local VIU-20e.

SS Offset range: **-99 to 99** (default – not set).

- **Msg Timeout**

This parameter sets the period of time the Local VIU-20e will wait for a valid message from the Remote VIU-20e. If a message is not received within the timeout period, the Remote VIU-20e is logged as being in the most restrictive state.

Msg Timeout range: **1000 to 60000 msec** (default – not set).

- **Msg Update Interval**

This parameter sets the interval between repeat messages transmitted from the Remote VIU-20e to the Local VIU-20e. Messages are sent immediately if a change of input state occurs at the Slave VIU-20e.

Msg Update Interval range: **400 to 30000 msec** (default – not set).

- **Msg Time Offset**

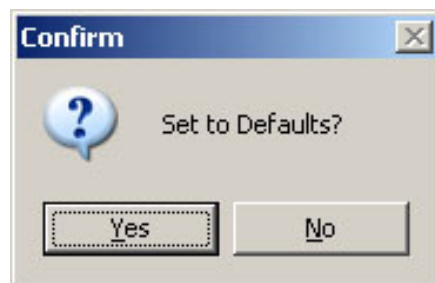
This parameter sets the length of time the Local VIU-20e will wait for a message before classifying it as a stale message.

Msg Time Offset range: **5 to 30 sec** (default – not set).

- **Set to Defaults**

*Path: MAIN PROGRAM menu > PHYSICAL configuration > Set to Defaults.*

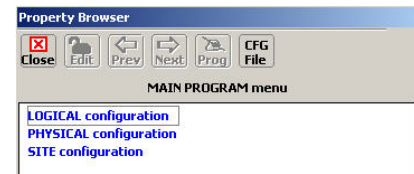
Prior to programming a VIU-20e for the first time, or following installation of a new MCF, set the VIU-20e configuration parameters to their default settings. Select **Set to Default** on the PHYSICAL configuration screen (Figure 6-26). A prompt is displayed asking the user for confirmation to proceed (Figure 6-38).



**Figure 6-38 Set Parameters to Default Prompt**

### 6.8.5 SITE Configuration

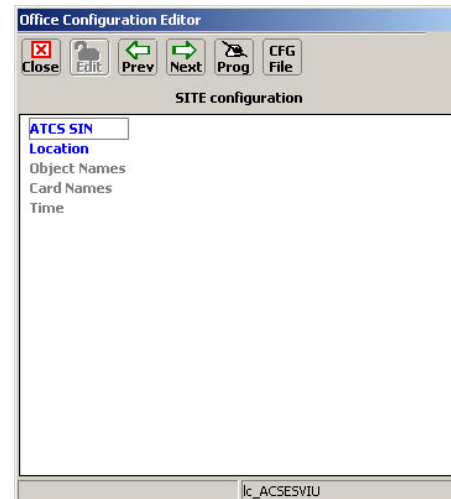
Select the **SITE Configuration** function from the MAIN PROGRAM menu screen to view the SITE configuration screen (Figure 6-38).



Note that Figure 6-38A is displayed when the DT is online (connected to a VIU-20e) as indicated by “Property Browser” in the title bar, and Figure 6-38B is displayed when running the DT offline (not connected to a VIU-20e) as indicated by “Office Configuration Editor” in the title bar.



(A)



(B)

Figure 6-39 SITE Configuration Screens

#### 6.8.5.1 Object Names

Select **Object Names** on the SITE configuration screen to display the Object Name Editor dialog box (Figure 6-40).

Use this editor to create unique names for objects used in the MCF. After entering the name using the PC keyboard, click the **APPLY** button.

In this example the names assigned are:

**Main** = Main VIU

**Rem1** = Remote VIU

To reset the name to the default name, click the **Reset to Default** button.

When finished, click the **CLOSE** button to return to the SITE configuration screen.



Figure 6-40 Object Name Editor

### 6.8.5.2 Card Names

Select **Card Names** on the SITE configuration screen to display the Card Name Editor dialog box (Figure 6-41).

Use this editor to create unique names for the internal I/O modules, if desired. After entering a name using the PC keyboard, click the **APPLY** button.

To reset a name to the default name, select the name from the list and then click the **Reset to Default** button.

When finished, click the **CLOSE** button to return to the SITE configuration screen.



Figure 6-41 Card Name Editor

## 6.9 LOGS / HISTORY BUTTONS

Click the **Logs** button at the top of the Input Status Screen, or the **History** menu on the toolbar to display the Log drop-down menu. This menu provides access to several history logs. These logs are in addition to the Event Log and Diagnostic Log maintained by the VIU-20e, and are described in the following paragraphs.



### 6.9.1 Maintenance Log

Select **Maintenance Log** from the History drop down menu to display the Maintenance Log screen. The VIU-20e Maintenance Log (Figure 6-42) contains the following types of information:

- Changes in VIU-20e operational status
- Parameter changes
- User entered maintenance notes

Each entry in the log is date and time stamped. The log is maintained in the DT install directory on the PC. If more than one VIU-20e is accessed via a network, the Maintenance Log will be common to all VIU-20es.

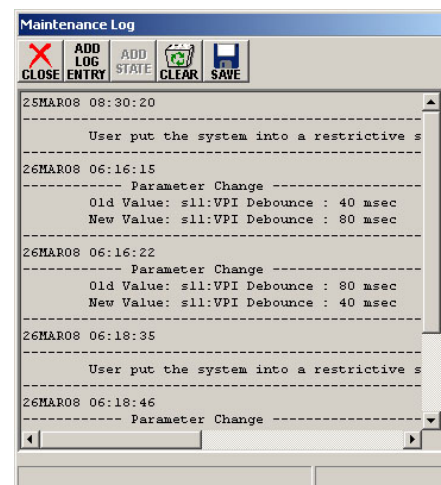


Figure 6-42 Maintenance Log Screen

### 6.9.2 Status Log

Select **Status Log** from the History drop down menu to display the status log screen. The VIU-20e status log (Figure 6-43) is a record of all VIU-20e system events and is primarily a diagnostic tool. The log contains entries from both the master and slave I/O circuit logs. These logs are lost when VIU-20e power is cycled.

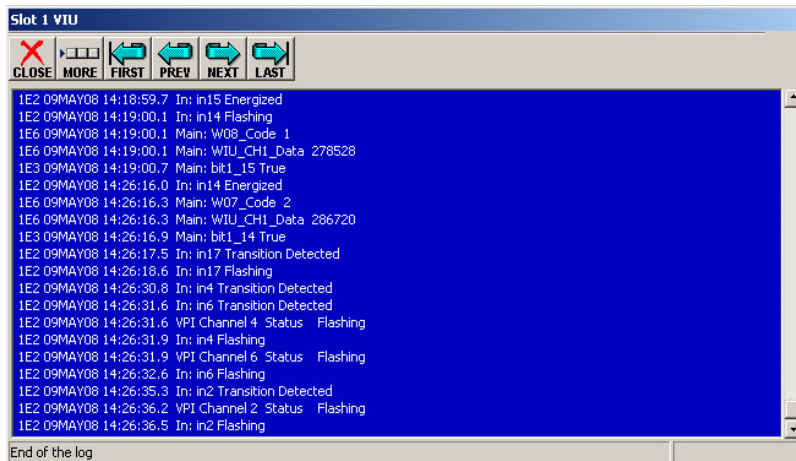


Figure 6-43 Status Log Screen

### 6.9.3 Summary Log

Select **Summary Log** from the History drop down menu to display the summary log screen. The VIU-20e summary log (Figure 6-44) is a summary of significant events from the status log. It also includes error events. This log is primarily a diagnostic tool. These logs are lost when VIU-20e power is cycled.

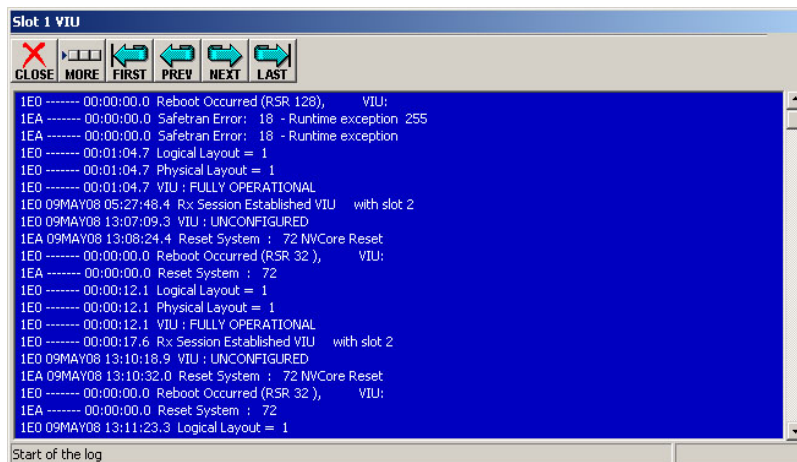


Figure 6-44 Summary Log Screen

## 6.10 DIAG (DIAGNOSTICS) BUTTON

Please refer to Section 9 for a discussion of the Diag button menu and the diagnostic functions it provides.

## 6.11 HELP BUTTON

The Help button displays the Diagnostic Terminal copyright information and version number. After viewing the information click the OK button.

## 6.12 USING THE OCE TO CREATE CONFIGURATION FILES

The DT can be used to create configuration files for the VIU-20e that are then loaded into the VIU-20e to set the MCF configuration parameters. To begin this process, first open the DT, select the **Prog** button, then the **New** button.

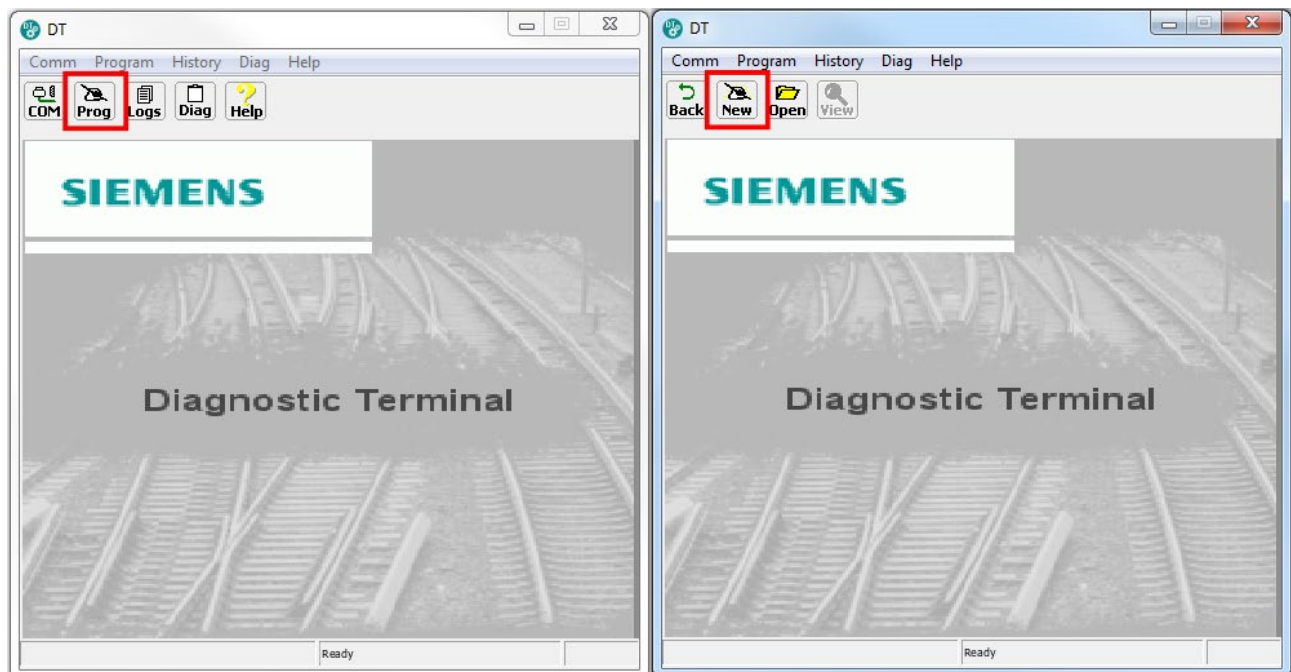
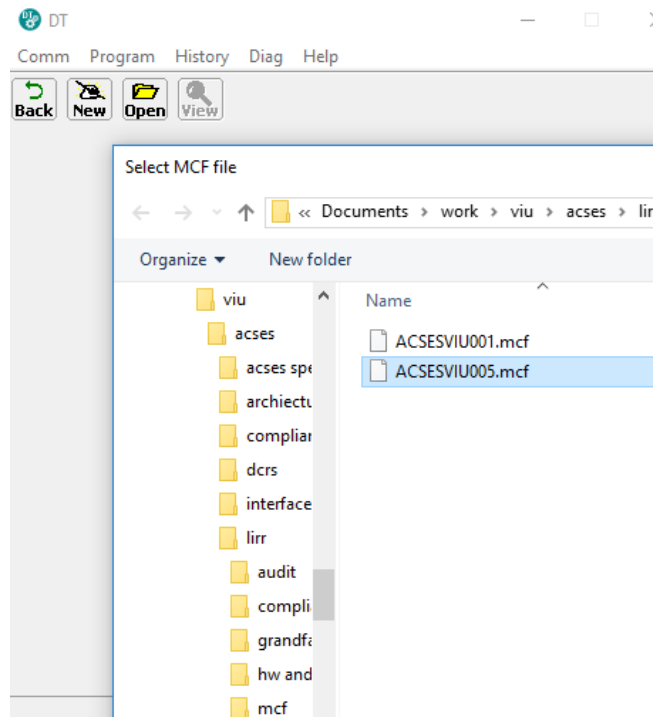


Figure 6-45 Opening an MCF

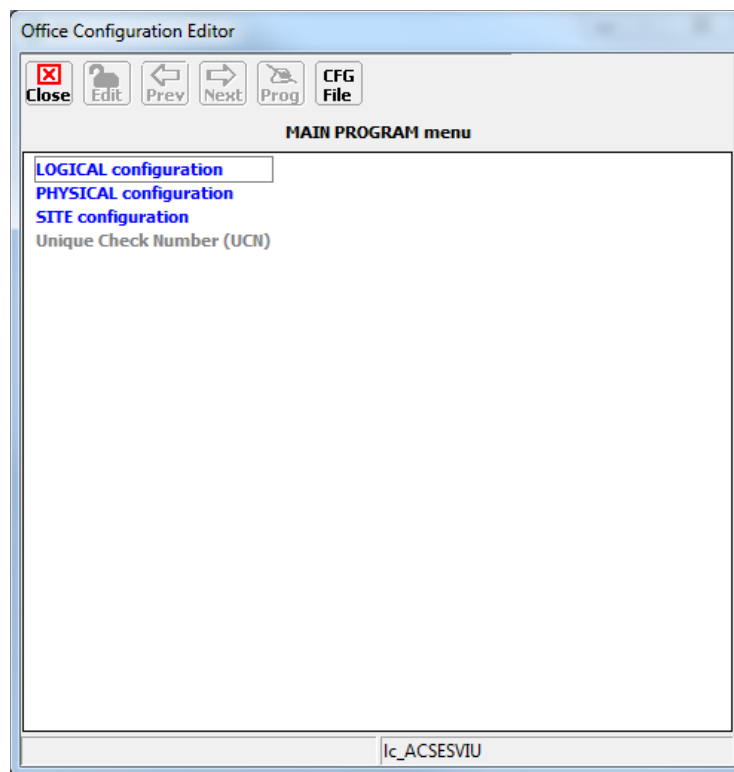


Then select the MCF to be used as illustrated in Figure 6-46.



**Figure 6-46 Select MCF**

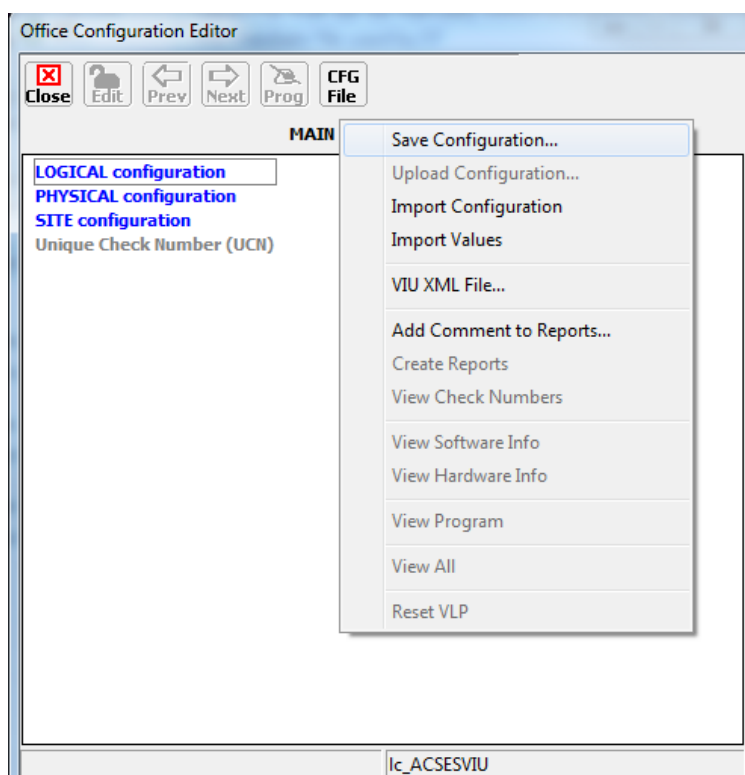
The DT will then open the Office Configuration Editor screen as shown in Figure 6-47.



**Figure 6-47 Main Program Menu Screen**



From this point, the parameters can be set individually as described in Section 6.8  
To save the configuration, press the CFG File>Save Configuration button, then enter the name of the file, and select **Save**.



**Figure 6-48 Save Configuration**

The DT will create the following:

**Table 6-1 Configuration File List**

{name}.BIN	This is the file can be put onto a USB and loaded into the VIU to set it configuration
{name}.pac	not used in VIU-20e
{name}.val.xml	Values file that can be manually edited and used to create other configurations
{name}.xml	intermediate file used by DT
{name}.hwinfo.txt	not used when creating configurations
{name}.program.txt	Text file containing program values (same as program.txt), UCN, CCN
{name}.SWInfo.txt	not used when creating configurations
{name}.SysConfig.txt	Text file containing program values (same as program.txt), UCN, CCN
{name}.ucn.txt	File containing just the UCN

If many different configurations are to be created, it may be desirable to automate the creation of these using other tools. The DT supports importing configuration settings using an xml file as the input.

The {name}.val.xml shown in the Table 6-1 can be used as a template for this. To obtain this, first save the configuration, then retrieve the val.xml file. The xml file contains a tag for each screen name and each parameter on each screen, an example is shown in Figure 6-49.



```

<Configuration>
  <SIN>762010010004</SIN>
  <Page name="MAIN PROGRAM menu"/>
  <Page name="LOGICAL configuration">
    <Parameter longname="Logical Layout" value="lc_ACSESVIU"/>
  </Page>
  <Page name="OBJECT configuration"/>
  <Page name="OBJECT configuration Cont.1"/>
  <Page name="OBJECT configuration Cont.2"/>
  <Page name="Main"/>
  <Page name="Main Signal Setup Layout">
    <Parameter longname="Signal 1 Enabled?" value="Enabled With C Signal"/>
    <Parameter longname="Signal 1 Track #" value="Track 2"/>
    <Parameter longname="Signal 2 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 2 Track #" value="Track 1"/>
    <Parameter longname="Signal 3 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 3 Track #" value="Track 1"/>
    <Parameter longname="Signal 4 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 4 Track #" value="Track 1"/>
    <Parameter longname="Signal 5 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 5 Track #" value="Track 1"/>
    <Parameter longname="Signal 6 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 6 Track #" value="Track 1"/>
    <Parameter longname="Signal 7 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 7 Track #" value="Track 1"/>
    <Parameter longname="Signal 8 Enabled?" value="Disabled"/>
    <Parameter longname="Signal 8 Track #" value="Track 1"/>
  </Page>
  <Page name="Select"/>
  <Page name="Select Auxiliary Input 1-16 Layout">
    <Parameter longname="Input 1 Unit" value="Disabled"/>
    <Parameter longname="Input 2 Unit" value="Disabled"/>
    <Parameter longname="Input 3 Unit" value="Disabled"/>
  </Page>
</Configuration>

```

**Figure 6-49 xml Parameter Tags**

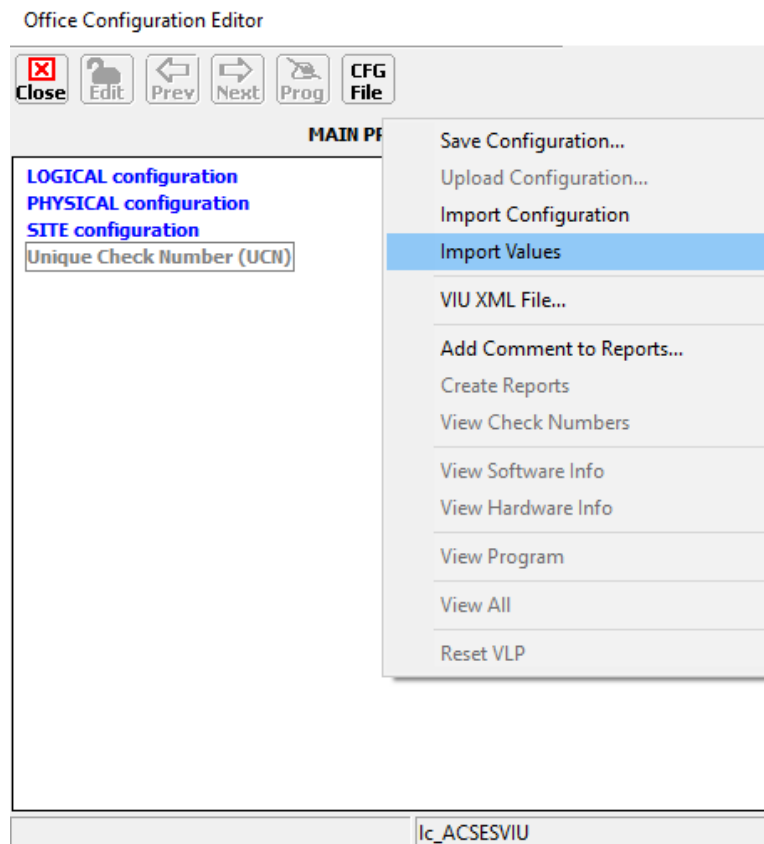
If the file is manually edited or automatically generated, the longname field must match the names exactly from this file, and the value must match exactly the values allowed in the MCF. These values can be seen by editing a parameter in the DT and looking at the available selection.

#### NOTE

#### NOTE

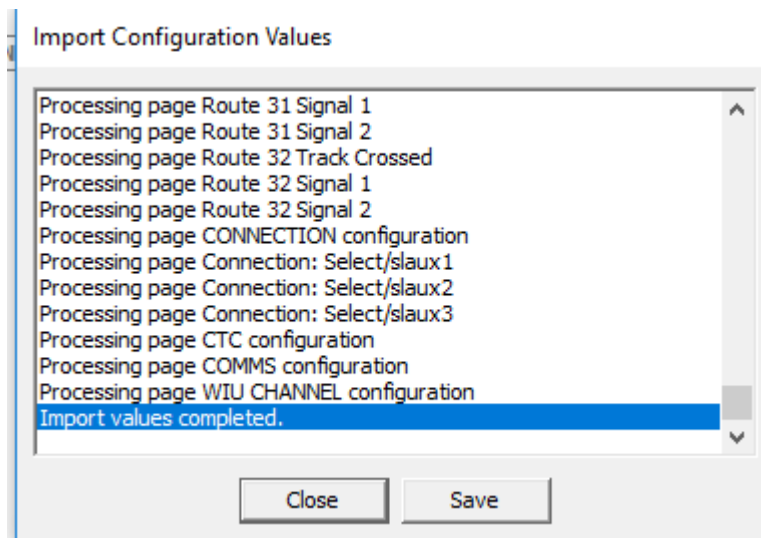
Not all pages need to be present in the .val.xml file to be imported. Not all parameters need to be present in the .val.xml file to be imported. Parameters not included will be kept at their default values.

To import the .val.xml file, select **CFG File > Import Values**.



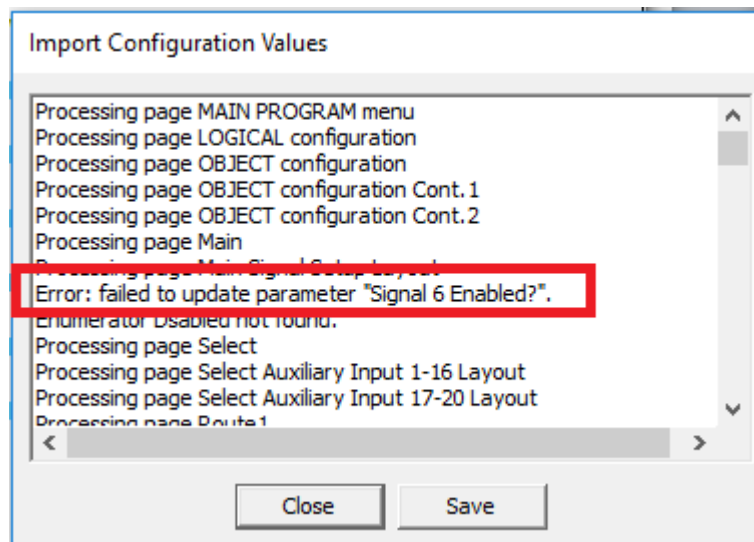
**Figure 6-50 Import Values**

Then select the file to be imported. The DT will show each page and parameter imported.



**Figure 6-51 Imported Parameters**

If the file being imported contains errors, such as “Values not found,” “Pages not found,” “Invalid xml syntax,” etc. the DT will indicate the failure in the list. See Figure 6-52 for example.



**Figure 6-52 Import Error Example**

The user needs to check this list carefully to ensure there are no errors. This can be done by pressing **Save**, which will allow the import report to be saved to a text file, then the user can search for: **Error**.

Once the file has been imported, press the **Close** button to close the import window, then press the **Prog** button to go back up to the top menu.

**NOTE**

**NOTE**

It is recommended that the user does a file comparison of the source xml file and the new .val.xml generated by the save to ensure that all their changes are included.

**WARNING**

**WARNING**

**THE DT IS A NON-VITAL PROGRAM RUNNING ON A NON-VITAL WINDOWS OPERATING SYSTEM. IT IS RECOMMENDED THAT ALL SAFETY RELATED DATA BE VALIDATED BY:**

- 1. THOROUGHLY REVIEWING ALL CONFIGURATION DATA GENERATED BY THE DT.**
- 2. AFTER THE BIN FILE, GENERATED BY THE OCE DT, IS LOADED INTO THE VIU, THE USER SAVES THE CONFIGURATION USING A DT RUNNING ON A DIFFERENT COMPUTER THAN THE ONE USED TO GENERATE THE ORIGINAL FILE, AND COMPARES THE PROGRAM REPORT WITH THE PROGRAM REPORT GENERATED BY THE ORIGINAL OCE.**

## SECTION 7

### VIU-20e WEB BROWSER USER INTERFACE

#### 7.0 VIU-20E WEB BROWSER USER INTERFACE

##### 7.1 INTRODUCTION

The VIU-20e Web browser user interface will run on Windows Explorer (version 9), Google Chrome, and on Mozilla Firefox browser (version 2). The Web browser user interface allows local or remote configuration of certain VIU-20e non-vital parameters, plus access to the Event and Diagnostic logs that can be used to isolate VIU-20e system problems (see Section 8 – Maintenance and Troubleshooting).

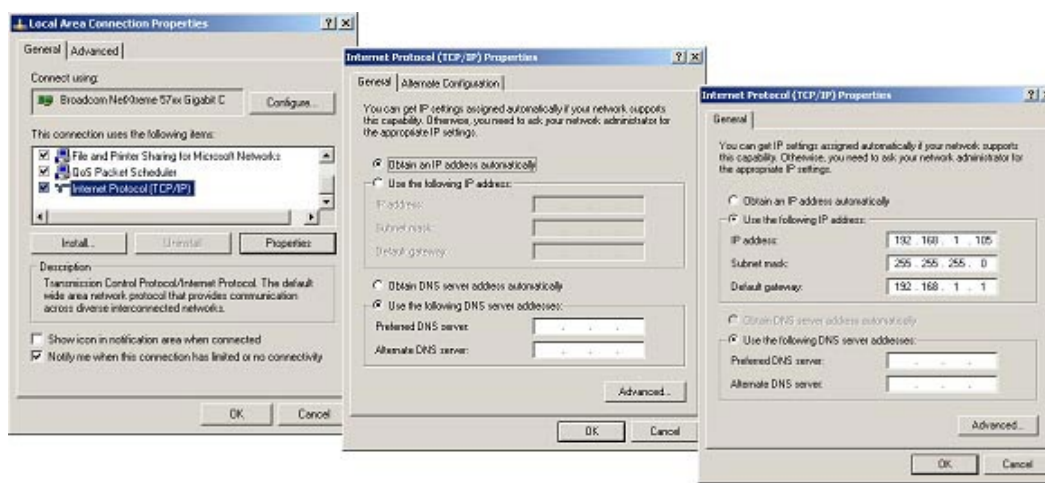
##### 7.2 LAUNCHING THE VIU-20E WEB BROWSER

###### NOTE

**NOTE**  
Railroad or agency guidelines may require IT support and/or authorization prior to changing computer settings.

##### 7.2.1 User Computer Setup

Setting up a computer to connect with the VIU-20e follows standard fundamental LAN protocol. The User Ethernet Port defaults as a DHCP Server. Setting the computer as a DHCP client will enable the VIU-20e to assign the computer an IP address. The user can also manually set up the computer's TCP/IP properties (e.g. IP address 192.168.1.105, subnet as 255.255.255.0) to connect with the VIU-20e as shown in the figure below. The example shown is for Windows XP and varies between Windows versions (Vista, Windows 7, and Windows 8). This procedure is NOT necessary unless the intent is to set up the laptop Ethernet port to something other than a default configuration.



06-19\_WEBUI\_CONNECT  
02-19-10

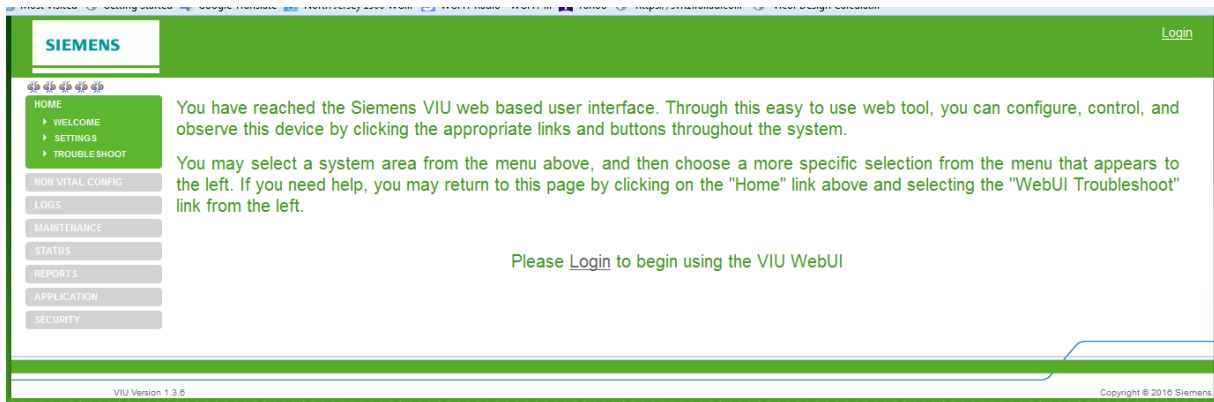
**Figure 7-1 Establishing WEB U/I Setup Parameters**

If the PC is not already connected to the VIU-20e, using an RJ-45 terminated Ethernet cable connect between the PC Ethernet port and the **Laptop (Ethernet)** port on the VIU-20e front panel. This connection can also be made remotely through an Ethernet network connection to the VIU-20e.

Launch a web browser on the PC. On the URL line enter the IP address of the connected VIU-20e (Figure 7-2). If this is a new VIU-20e the default IP address is 192.168.1.100 and the network mask is 255.255.255.0.



**Figure 7-2 Internet Explorer URL Line**

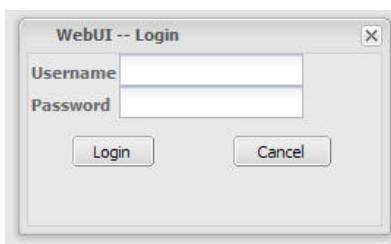


**Figure 7-3 VIU-20e Web Browser Login Screen**

Select **Login** either in the upper right corner or the center of the login screen (Figure 7-3). Enter the username and password when prompted (Figure 7-4). Click the **Login** button.

- Default user name: admin
- Default password: admin

These entries are case sensitive.



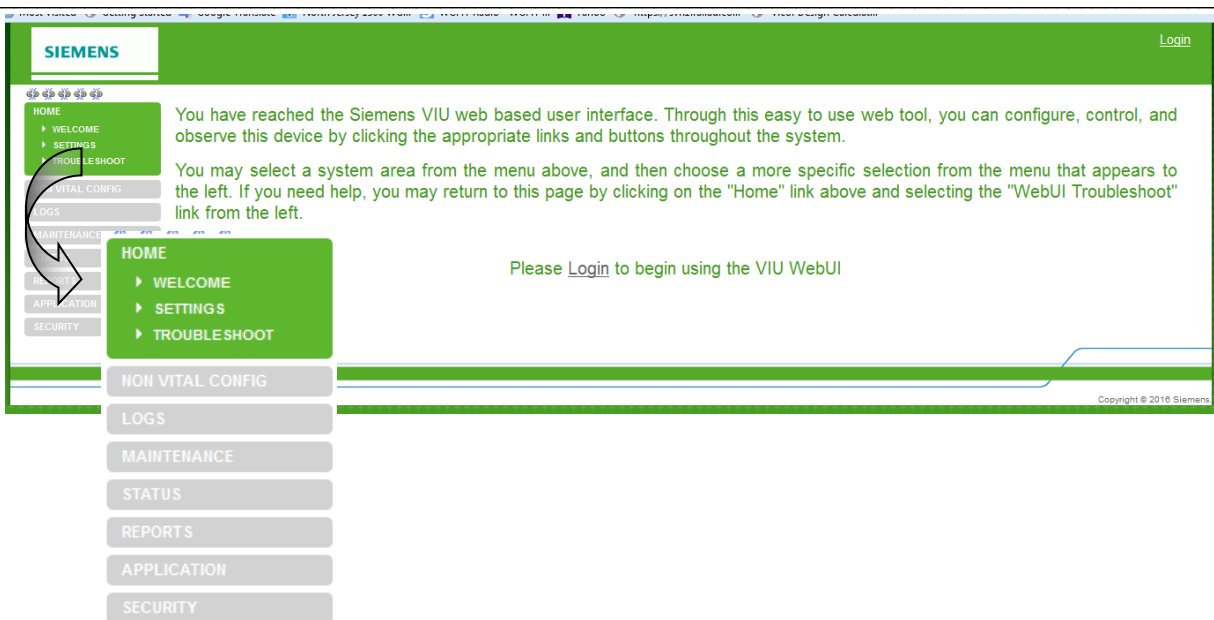
**Figure 7-4 Web Browser Login Dialog Box**

The Welcome screen is displayed (Figure 7-5).

**NOTE**

**NOTE**

For optimum viewing, display the Web browser window in full screen.



**Figure 7-5 Web Browser Welcome Screen and Main Menu**

## 7.2.2 Web Browser Icons

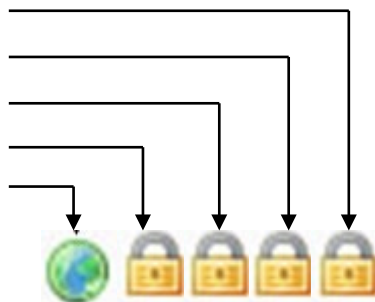
In the upper left corner of the screen, below the Siemens logo, is a row of five icons. When the Web browser is first opened, these icons appear as broken links as shown below. If you hover the cursor over these links, a help message appears indicating that you are not currently logged into the VIU-20e.



**Figure 7-6 Web Browser Initial Icons**

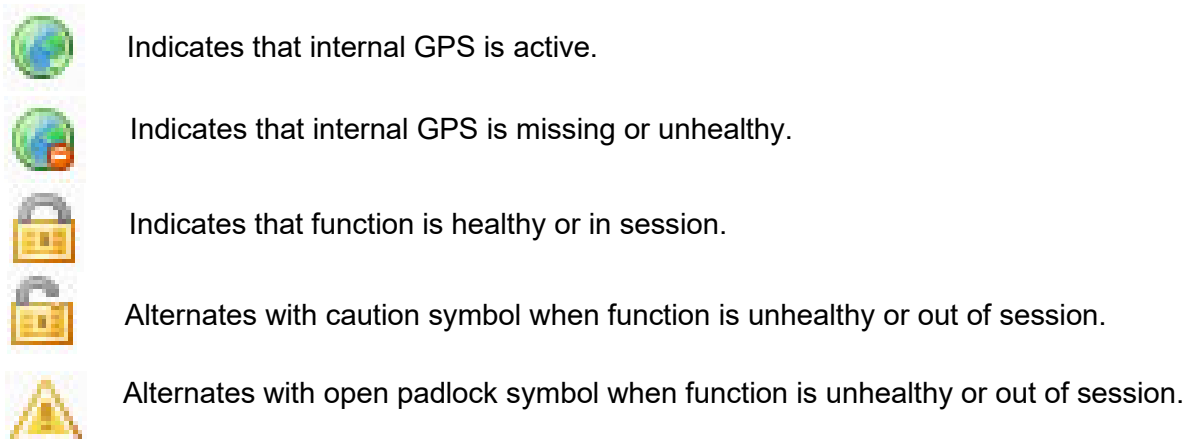
After login, these icons will change appearance depending on system status. From left to right the icons indicate the following status:

- Vital Core Session
- Vital Core Status
- Vital Slave Session
- Non Vital Core Health
- GPS Slave status



**Figure 7-7 Status Icons**

Hovering the cursor over an icon identifies the function indicated and the current status of that function. The following icons illustrate some of the status indications.



**Figure 7-8 Icon Definitions**

Each screen is provided with a standard set of edit buttons for manipulating the parameters.



**Figure 7-9 Standard VIU-20e Non-Vital Parameter Update Buttons**

- The Refresh button refreshes the current parameter value displays.
- The Default button sets the parameters to the default values.

If either Refresh or Default is selected the Save and Discard buttons are enabled.



**Figure 7-10 Standard VIU-20e Non-Vital Parameter Update Confirmation Buttons**

- The Save button saves the current parameter values to the VIU-20e unit.
- The Discard button returns the parameter values to what they were before the change.

Several parameters accessible from the Web browser are vital parameters (Site's ATCS Address, MCF CRC). The text fields for these parameters are normally grayed out (disabled). The screen containing these parameters (Site Info) has an **Edit Mode** button to the right of the standard edit buttons.



**Figure 7-11 Standard VIU-20e Vital Parameter Update Buttons**



When the vital edit mode is selected, the **Edit Mode** button changes to **Reboot**, the text fields for the vital parameters are enabled and a lightning bolt icon appears to the right of the globe icon at the top of the screen. The Vital Core Status and Vital Slave Session icons will also alternate between the unlocked padlock and the caution symbol while in vital edit mode.



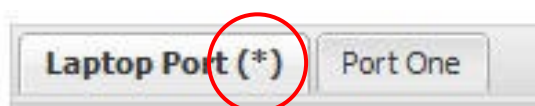
Lightning bolt icon

**Figure 7-12 Edit Mode Reboot Indicator**

After changing the vital parameters, the system must be rebooted by selecting the **Reboot** button. The **Reboot** button will reboot the vital core only, not the entire system. A reboot is the only way to remove the VIU-20e from Edit Mode. When the reboot button is pressed, a command is given to the Vital Core requesting a reboot which removes the VIU-20e from Edit Mode.

Following a reboot, the lightning bolt icon is removed from the screen.

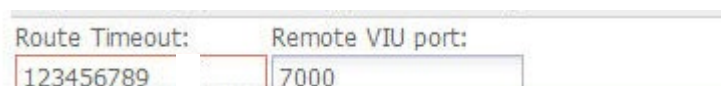
Several screens contain multiple tabs for the parameters. If a parameter value is changed on a tab and another tab is selected without saving the new value, the tab with the unsaved change will display an asterisk (\*) to the right of the tab name. After the values are saved, the asterisk goes away.



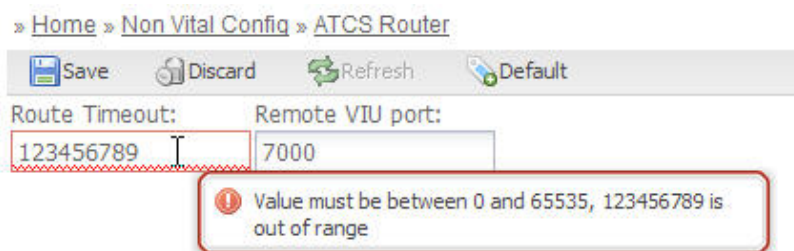
**Figure 7-13 Value Change Rendering Indicator**

If an invalid entry is made in a data field and the **Save** button is pressed, the data field will be outlined in red and the save process will be halted.

Hover the cursor over the data field with the bad entry and a message will appear explaining the limits for the entry.



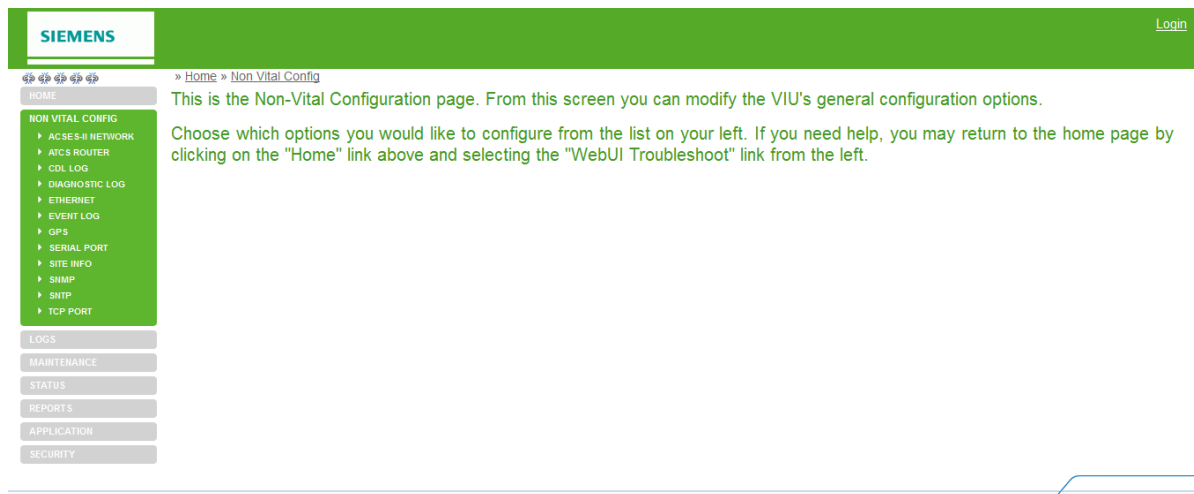
**Figure 7-14 Invalid Entry Highlighted**



**Figure 7-15 Invalid Entry Explanation Window**

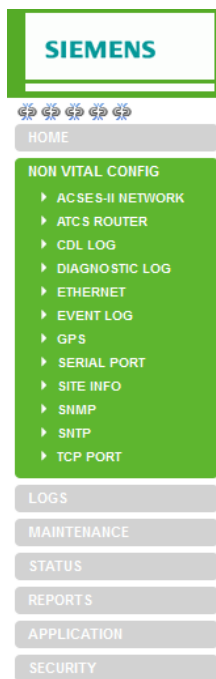
### 7.3 ACCESSING NON-VITAL CONFIGURATION PARAMETERS

Select Config from the main menu at the left side of the screen to display the Config screen (Figure 7-16).



**Figure 7-16 Non-Vital Configuration Screen**

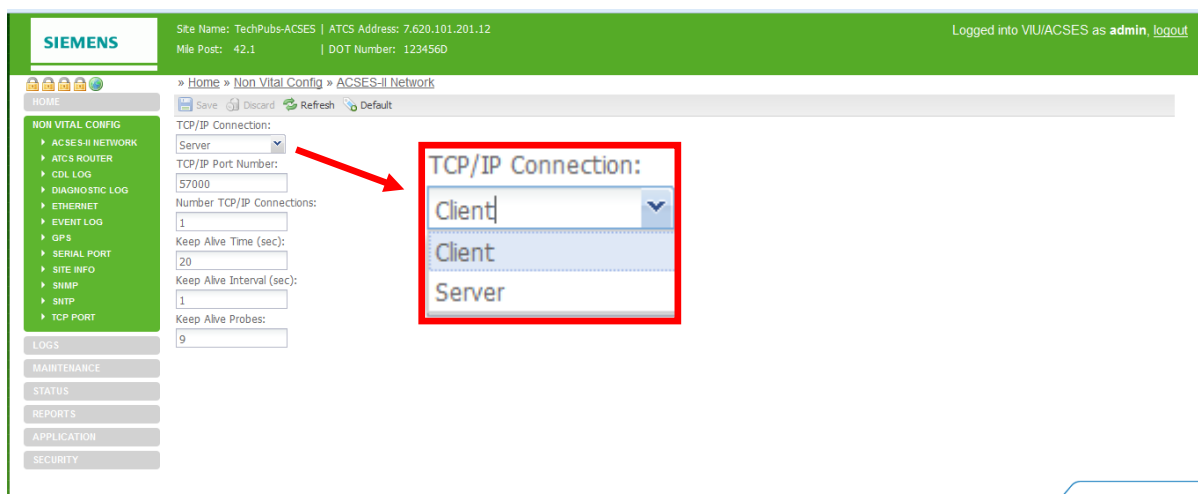
On the initial Non-Vital Configuration screen, select the desired parameter group from the Config submenu (Figure 7-17).



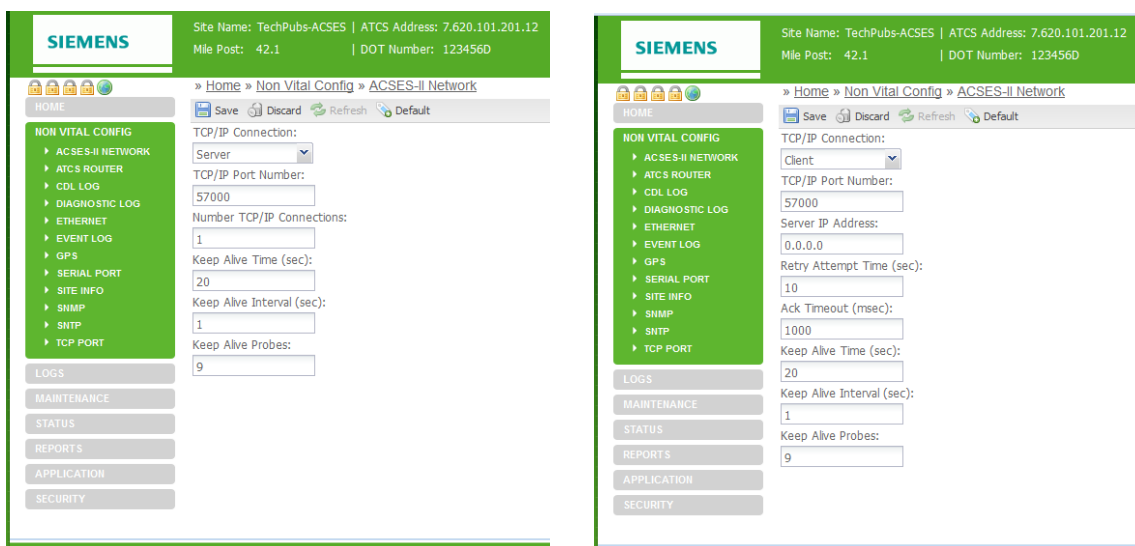
**Figure 7-17 Non-Vital Configuration Submenu**

### 7.3.1 ACSES II Network

The ACSES II Network configuration screens are shown in Figure 7-18 and Figure 7-19.



**Figure 7-18 ACSES II Network Configuration Submenus**



**Figure 7-19 ACSES II Network TCP/IP Server and Client Parameters**

#### 7.3.1.1 TCP/IP Connection

This is used to select whether the VIU is acting as a client or server.  
TCP/IP Connection range: Client or Server (default is Client).

#### 7.3.1.2 TCP/IP Port Number

This is the Port number used by the TCP/IP.

TCP/IP Port Number range: 1024-65535 (default is 57000).

### **7.3.1.3 Number of TCP/IP Connections**

When the VIU is configured as a server, this is used to specify how many clients can be connected at one time.

Number of TCP/IP Connections range: 1 or 2 (default is 1).

### **7.3.1.4 Server IP Address**

When the VIU is configured as a client, this is used to specify the IP address of the server to connect to.

Server IP address range: 0.0.0.0 to 255.255.255.255 (default is 0.0.0.0).

### **7.3.1.5 Retry Attempt Time (sec)**

When the VIU is configured as a client, this is used to specify the time between retrying the connection attempts.

Retry Attempt Time range 1 to 120 (default is 0s).

### **7.3.1.6 Ack Timeout (msec)**

When the VIU is configured as a client, this is used to specify the timeout after an attempt to establish the connection to the server.

Ack Timeout range 100 to 10,000ms (default is 1000ms).

### **7.3.1.7 Keep Alive Timer (sec)**

This is used to specify the time between the last data packet sent and the 1st keep alive TCP/IP probe messages.

Keep Alive Timer range 1 to 7200 (default is 20).

### **7.3.1.8 Keep Alive Interval (sec)**

This is used to specify the time between the keep alive probes.

Keep Alive Interval range 1 to 100 (default is 1).

### **7.3.1.9 Keep Alive Probes**

This is used to specify the number of unacknowledged keep alive probes to send before considering the connection dead and notifying the application layer.

Keep Alive Probes range 1 to 20 (default is 9).

Note: The Linux implementation of TCP/IP in the VIU-20e only allows for 10s worth of keep alive probes at the end of the keep alive process. So it is recommended to set the keep alive probes and keep alive interval such that:

'keep alive probes' \* 'keep alive interval' <= 10s

The time to detect the lost connection will be:

'keep alive interval' + 'keep alive probes' \* 'keep alive interval'

## **7.3.2 ATCS Router Configuration**

The ATCS Router configuration screen is shown in Figure 7-20.

### 7.3.2.1 Route Timeout

The VIU-20e internally keeps a routing table that maps ATCS addresses to IP addresses. Each route table entry has a timer that will expire if no traffic is heard from that address within the Route Timeout setting.

Route Timeout range: **0 - 65535** seconds (default is **7500** seconds).

### 7.3.2.2 Remote VIU-20e Port

This entry is the UDP port number used for the exchange of ATCS messages on the LAN.

The UDP port number range: **0 - 65535** (default is **7000**).



Figure 7-20 ATCS Router Configuration Screen

### 7.3.3 CDL Log Configuration

The CDL Log configuration screen is shown in Figure 7-21.

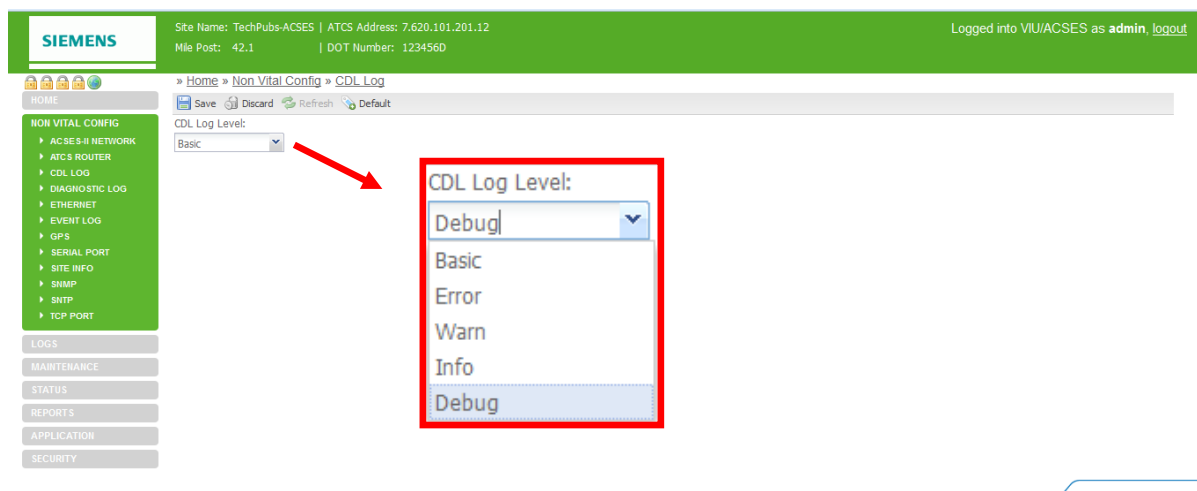


Figure 7-21 CDL Log Configuration Screen

### 7.3.3.1 CDL Log Level

Use this setting to determine the type of events to be entered in the CDL Log. If set to Debug, every event will be logged. If set to Error, only Error events are logged.

CDL Log Level options: **Basic, Error, Warn, Info, Debug** (default is Debug).

## 7.3.4 Diagnostic Log Configuration

The Diagnostic Log configuration screen is shown in Figure 7-22.

### 7.3.4.1 Server IP

When one or more VIU-20es are operating on a network, each VIU-20e can be configured to forward all events over the network to a “consolidated logger”. The logger will maintain all of the events for every reporting VIU-20e. The logger can be another VIU-20e.

To configure each VIU-20e to send the Diagnostic Log entries to the logger, enter the IP address of the logger in the Server IP dialog box.

Server IP: **valid IP address** (default is **0.0.0.0**).

### 7.3.4.2 Diagnostic Log Verbosity

Use this setting to determine the type of events to be entered in the Diagnostic Log. If set to Debug, every event will be logged. If set to Error, only Error events are logged.

Diagnostic Log Verbosity options: **Error, Warning, Info, Debug** (default is Info).

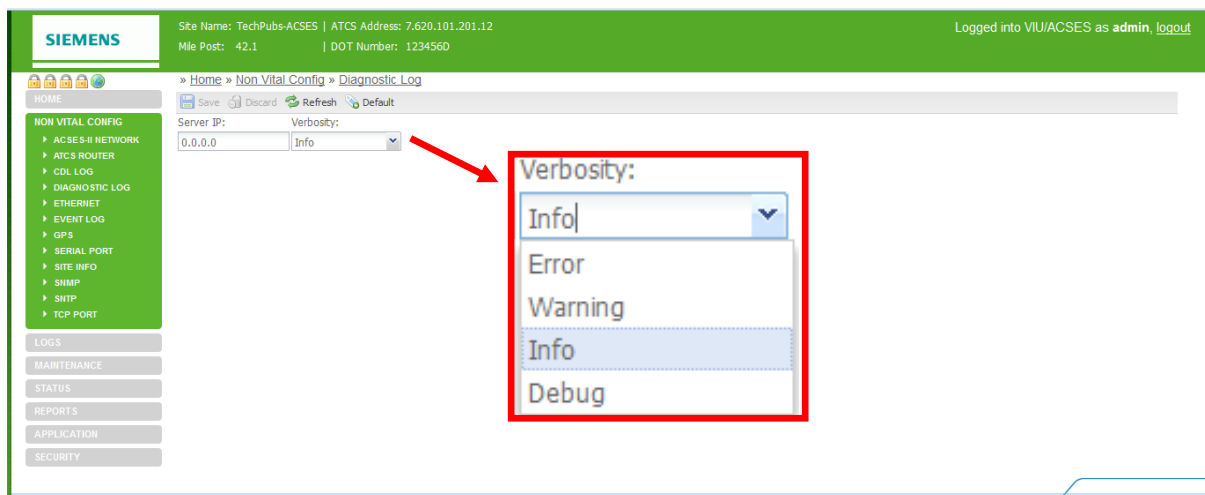


Figure 7-22 Diagnostic Log Configuration Screen

### 7.3.5 Ethernet Configuration

The Ethernet configuration screen allows address and network configuration settings to be made for the three Ethernet ports on the VIU-20e (Figure 7-23). These include the Laptop Ethernet port on the front panel and Ethernet ports 1 and 2 on the top of the unit (Figure 7-24). A separate tab is provided on this screen for each port.

#### NOTE

#### NOTE

The VIU-20e Ethernet ports are all independently addressable each can be set with its own IP address. The IP address must be on different subnets, i.e. if IP address is aaa.bbb.ccc.ddd then each Ethernet port must have a difference in the aaa.bbb.ccc part of the IP address.

#### 7.3.5.1 DHCP Configuration (Laptop tab)

Select whether the Laptop port will be a DHCP-configured server, DHCP-configured client or disabled.

Laptop DHCP Configuration options: DHCP **Server Enabled**, DHCP **Client Enabled**, DHCP **Disabled** (default is DHCP **Server Enabled**).

#### 7.3.5.2 Laptop IP (Laptop tab)

Enter the Laptop port IP address.

Laptop IP range: **0.0.0.0 – 255.255.255.255** (default is **192.168.1.100**).

#### 7.3.5.3 Laptop Gateway (Laptop tab)

Enter the Laptop port gateway address.

Laptop Gateway address range: **0.0.0.0 – 255.255.255.255** (default is **192.168.1.1**).

#### 7.3.5.4 Laptop Network Mask (Laptop tab)

Enter the Laptop port network mask.

Laptop Network Mask range: **0.0.0.0 – 255.255.255.255** (default is **255.255.255.0**).

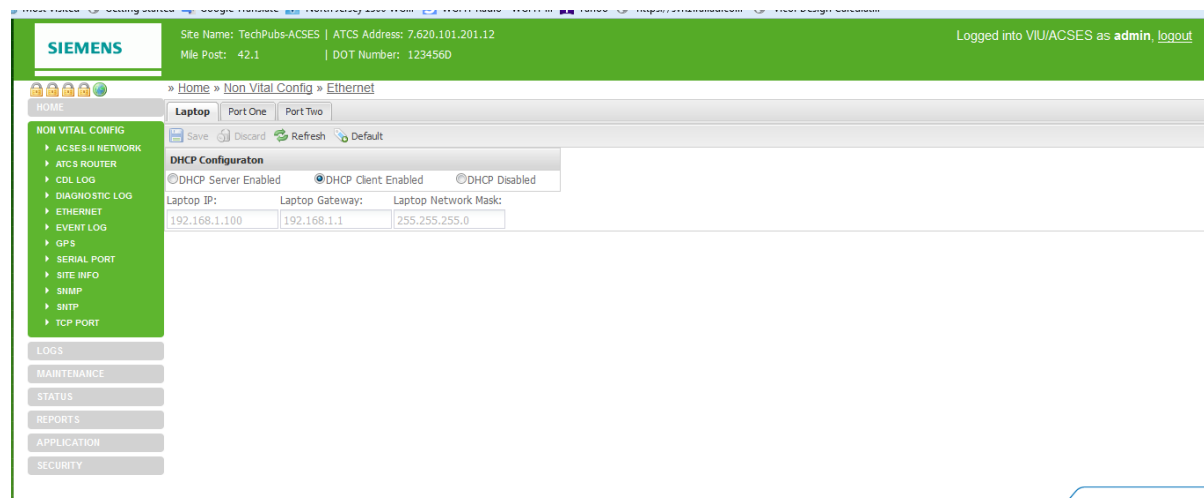


Figure 7-23 Ethernet Configuration Screen (Laptop Tab)

### 7.3.5.5 DHCP Client Enabled (Port One tab)

Select whether the Port 1 DHCP client is enabled.

Port 1 DHCP Client Enabled options: **checked**, **not checked** (default is **checked**).

### 7.3.5.6 IP (Port One tab)

Enter the Port 1 IP address.

IP range: **0.0.0.0 – 255.255.255.255** (default is **192.168.2.100**).

### 7.3.5.7 Gateway (Port One tab)

Enter the Port 1 gateway address.

Gateway address range: **0.0.0.0 – 255.255.255.255** (default is **192.168.2.1**).

### 7.3.5.8 Network Mask (Port One tab)

Enter the Port 1 network mask.

Network Mask range: **0.0.0.0 – 255.255.255.255** (default is **255.255.255.0**).

### 7.3.5.9 DHCP Client Enabled (Port Two tab)

Select whether the Port 2 DHCP client is enabled.

Port 2 DHCP Client Enabled options: **checked**, **not checked** (default is **checked**).

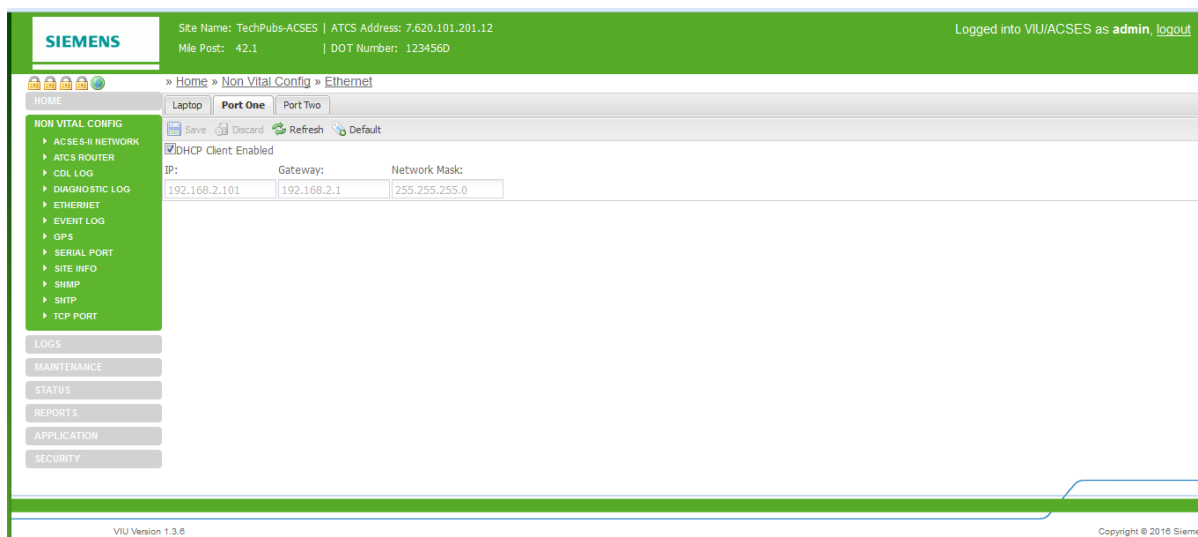


Figure 7-24 Ethernet Configuration Screen (typical of Port One & Port 2 Tabs)

### 7.3.5.10 IP (Port Two tab)

Enter the Port 2 IP address.

IP range: **0.0.0.0 – 255.255.255.255** (default is **192.168.3.100**).



### 7.3.5.11 Gateway (Port Two tab)

Enter the Port 2 gateway address.

Gateway address range: **0.0.0.0 – 255.255.255.255** (default is **192.168.3.1**).

### 7.3.5.12 Network Mask (Port Two tab)

Enter the Port 2 network mask.

Network Mask range: **0.0.0.0 – 255.255.255.255** (default is 255.255.255.0).

## 7.3.6 Event Log Configuration

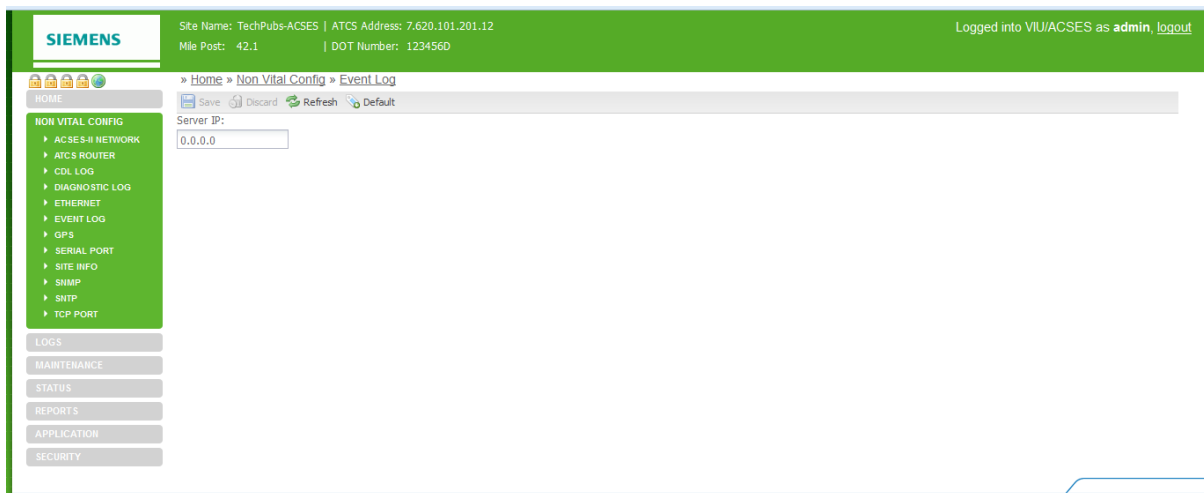
The Event Log configuration screen is shown in Figure 7-25.

### 7.3.6.1 Server IP

When one or more VIU-20es are operating on a network, each VIU-20e can be configured to forward all events over the network to a “consolidated logger”. The logger will maintain all of the events for every reporting VIU-20e. The logger can be another VIU-20e.

To configure each VIU-20e to send the Event Log entries to the logger, enter the IP address of the logger in the Server IP dialog box.

Server IP: **valid IP address** (default is **0.0.0.0**).



**Figure 7-25 Event Log Configuration Screen**

### 7.3.7 GPS Configuration

Use this screen to set the time source to be received from an SNTP client, an external serial port or disabled (Figure 7-26).

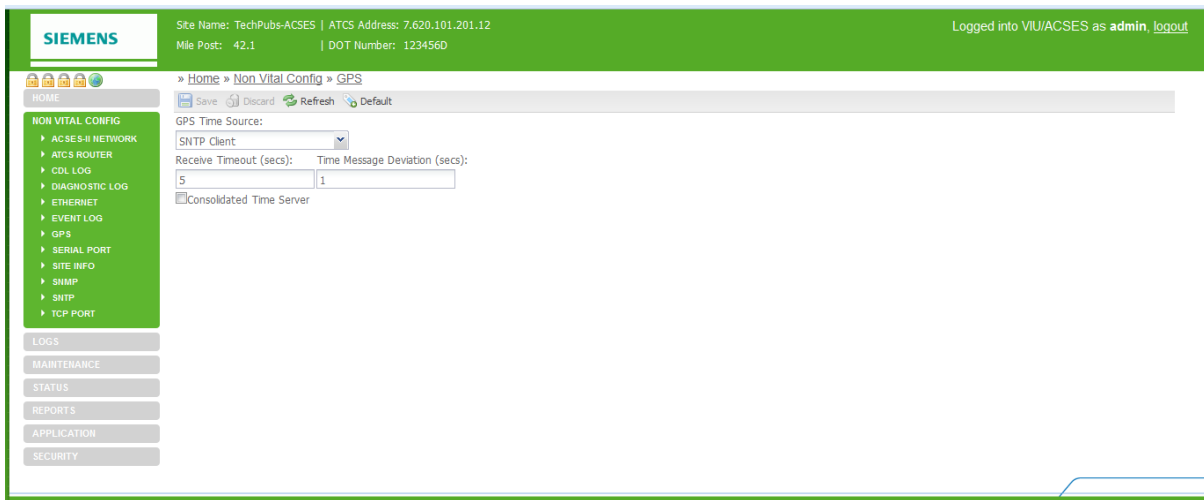


Figure 7-26 GPS Configuration Screen

#### 7.3.7.1 GPS Time Source

This drop-down selection menu (Figure 7-27) provides options available for the GPS to capture the current time and date.

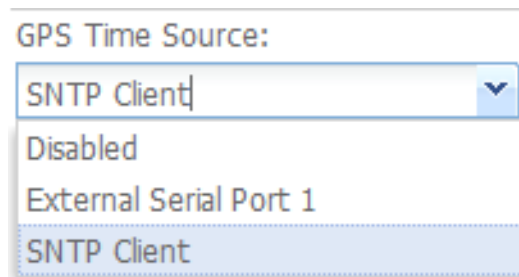


Figure 7-27 GPS Time Source Selection Menu

- **Disabled**

When this option is selected, the internal GPS receiver in the VIU-20e is disabled and no date and time information is expected.

- **External Serial Port 1**

When this option is selected, the internal GPS receiver in the VIU-20e is ignored and an external GPS receiver using NMEA 0183 format data is connected to the VIU-20e's top serial interface.

- **SNTP Client**

When this option is selected, the internal GPS receiver in the VIU-20e is ignored and current time and date information is provided via SNTP.

### 7.3.7.2 Receive Timeout (secs)

If the VIU-20e does not receive a valid NMEA data stream or time message within the “Receive Timeout” number of seconds, it will declare the GPS status bad. For the internal GPS receiver, this will only occur if the internal receiver or circuit board malfunctions. For an external GPS receiver this will occur if the GPS-to-VIU-20e cable is unplugged.

Receive Timeout range: **0** (off) – **86400** seconds (24 hours) in increments of 1 second (default = **5** seconds).

#### NOTE

#### NOTE

The following functions (**7.3.8.3 through 7.3.8.10**) not used in VIU-20e ACSES applications, therefore configuration parameters on these functions should be left at the default values.

### 7.3.7.3 Time Message Deviation (secs)

If the Time/date received in the GPS NMEA data stream differs from the internal VIU-20e clock by an amount equal to or greater than the Time Difference setting in seconds, the VIU-20e will set its internal clock to the time/date in the GPS data. Otherwise, the VIU-20e will not adjust its clock. (See Note Page 7-15).

Time Difference range: **0 – 3** seconds (default = **1** second).

### 7.3.7.4 Consolidated Time Server (checkbox)

When this box is checked, the VIU-20e becomes a Consolidated Time Server. If the VIU-20e has a GPS time source – either an external GPS receiver or SNTP -- the VIU-20e will issue time and date information via Ethernet to all other VIU-20es once every hour. This allows VIU-20es which are co-located at a site to require only one external time source.

One VIU-20e may be configured to be Consolidated Time Server to all other VIU-20es, provided the other VIU-20es do not already have an active GPS source for time and date. If a VIU-20e is configured to be a Consolidated Time Source and has an active GPS receiver (either internal, external, or via Ethernet) the VIU-20e will ignore time and date messages sent by any other VIU-20es that are configured as Consolidated Time Sources. (See Note Page 7-15).

### 7.3.8 Serial Port Configuration

The Serial Port configuration screen allows port settings to be made for the two serial ports on the VIU-20e. These include the Laptop serial port on the front panel and Serial Port One on top of the unit. A separate tab is provided on this screen for each port (Figure 7-28).

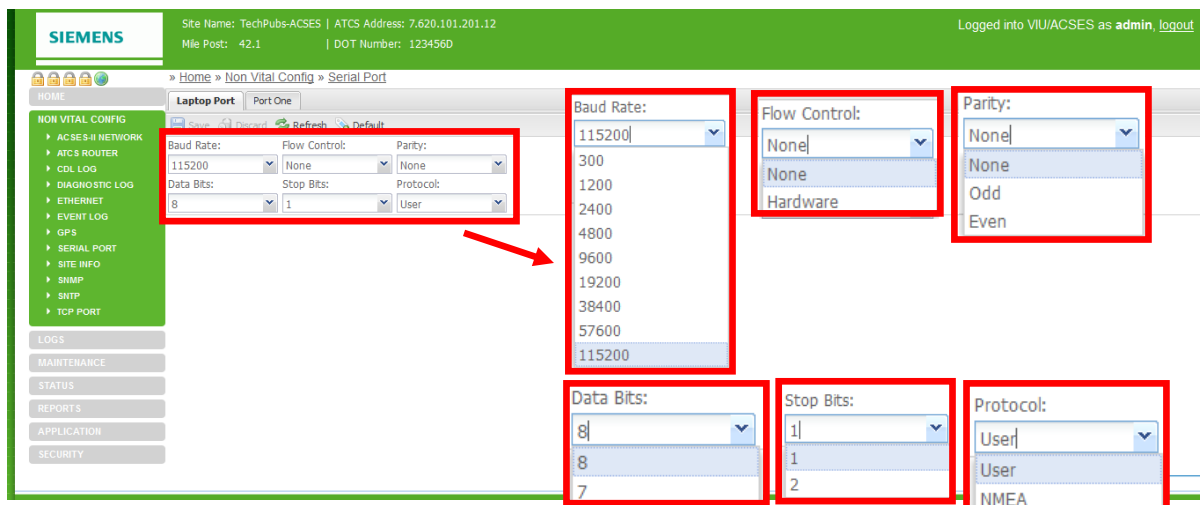


Figure 7-28 Serial Port Configuration Screen (Laptop Tab)

#### 7.3.8.1 Baud Rate (Laptop tab)

Select the baud rate for the Laptop Serial port.

Laptop Serial Port Baud Rate options: **300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200** (default is **9600**).

#### 7.3.8.2 Flow Control (Laptop tab)

Select the baud rate for the Laptop Serial port.

Laptop Serial Port Flow Control options: **None, Hardware** (default is **None**).

#### 7.3.8.3 Parity (Laptop tab)

Select the parity setting for Laptop Serial port.

Laptop Serial port Parity options: **None, Odd, Even** (default is **None**).

#### 7.3.8.4 Data Bits (Laptop tab)

Select the data bit setting for Laptop Serial port.

Laptop Serial port Data Bit options: **7, 8** (default is **8**).

#### 7.3.8.5 Stop Bits (Laptop tab)

Select the stop bit setting for Laptop Serial port.

Laptop Serial port Stop Bit options: **1, 2** (default is **1**).

#### 7.3.8.6 Protocol (Laptop tab)

Select the Protocol setting for Laptop Serial port.

Laptop Serial port Protocol options: **User**, **NMEA** (default is **User**).

#### 7.3.8.7 Baud Rate (Port One tab)

Select the baud rate for Serial Port One.

Serial Port One Baud Rate options: **300**, **1200**, **2400**, **4800**, **9600**, **19200**, **38400**, **57600**, **115200** (default is **9600**).

#### 7.3.8.8 Flow Control (Port One tab)

Select the baud rate for the Serial Port One.

Serial Port One Flow Control options: **None**, **Hardware** (default is **None**)

#### 7.3.8.9 Parity (Port One tab)

Select the parity setting for Serial Port One.

Serial Port One parity options: **None**, **Even**, **Odd** (default is **None**).

#### 7.3.8.10 Data Bits (Port One tab)

Select the data bit setting for Serial Port One.

Serial Port One Data Bit options: **7**, **8** (default is **8**).

#### 7.3.8.11 Stop Bits (Port One tab)

Select the stop bit setting for Serial Port One.

Serial Port One Stop Bit options: **1**, **2** (default is **1**).

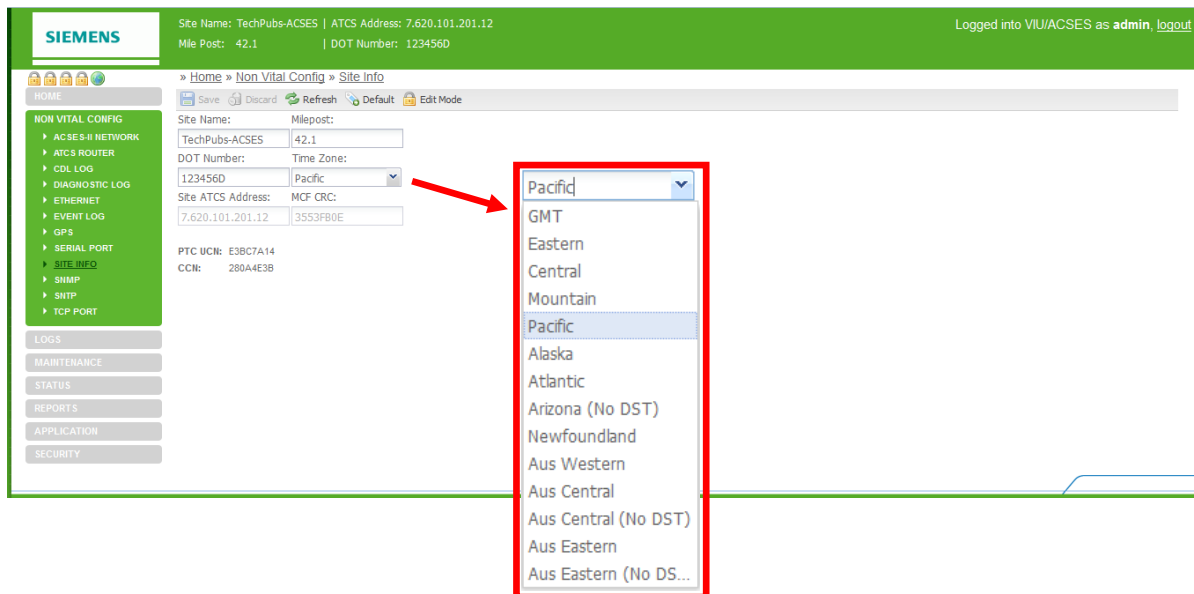
#### 7.3.8.12 Protocol (Port One tab)

Select the protocol setting for Serial Port One.

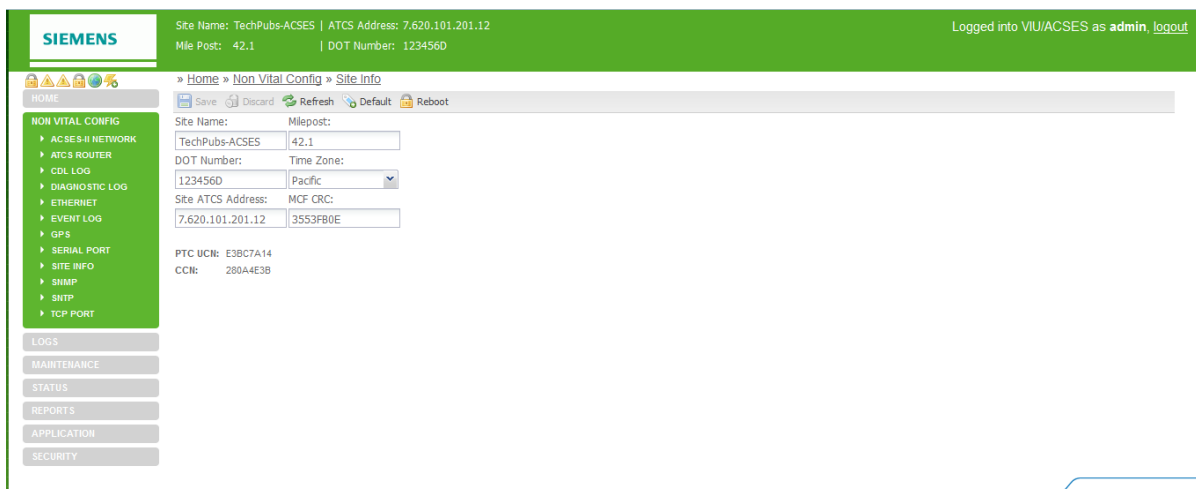
Serial Port One protocol options: **None**, **NMEA** (default is **None**).

### 7.3.9 Site Info Configuration

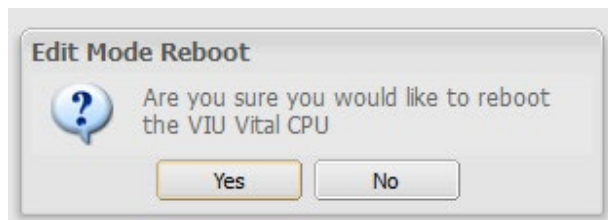
The Site Info screen (Figure 7-29) provides fields for entering a site name, the mile post number and DOT number for the VIU-20e wayside location. It also allows selection of the local time zone. This screen contains two vital parameters that can only be changed after selecting the Edit Mode (Figure 7-30). When finished with Edit Mode, the Vital Core must be rebooted to remove the VIU-20e from the Edit Mode (Figure 7-31). This reboots the Vital Core only, and not the entire VIU-20e.



**Figure 7-29 Site Info Configuration Screen – Edit Mode Locked**



**Figure 7-30 Site Info Configuration Screen – Edit Mode Unlocked**



**Figure 7-31 Site Info Edit Mode Reboot Prompt**

### 7.3.9.1 Site Name

Enter a name for the VIU-20e location. The VIU-20e will also report the string in the sysName variable via SNMP.

Site Name range: Up to 20 characters (default is **Siemens Systems**).

### 7.3.9.2 Milepost

Enter the milepost number at the VIU-20e location. The VIU-20e will also report the string in the sysLocation variable via SNMP.

Milepost range: Up to 10 characters (default is **000.0**).

### 7.3.9.3 DOT Number

Enter the DOT Number for the VIU-20e location.

DOT Number range: Up to 7 characters (default is **000000A**).

### 7.3.9.4 Time Zone

Enter the time zone that the VIU-20e site is located in.

Time Zone options: **GMT, Eastern, Central, Mountain, Pacific, Alaska, Atlantic, Arizona, Newfoundland, Aus Western, Aus Central, Aus Central (No DST), Aus Eastern, Aus Eastern (No DST)** (default is **Eastern**).



**WARNING**

#### WARNING

**VERIFY THAT VIU-20e IS PROGRAMMED AS SPECIFIED BY THE RAILROAD OR AGENCY WITH THE CORRECT MCFCRC, UCN, ATCS SITE IDENTIFICATION NUMBER (SIN). FAILURE TO DO SO MAY LEAD TO INCORRECT OR UNSAFE INDICATIONS ON THE VIU-20e.**

### 7.3.9.5 Site ATCS Address

Site ATCS Address is one of the vital parameters. Edit Mode must be selected before a change can be made. When done, the correct UCN must be entered and the Vital Core rebooted to remove the VIU-20e from Edit Mode (this reboots the Vital Core only, and not the entire VIU-20e).

Site ATCS Address range: **7.000.000.000.00 – 7.999.999.999.99** (default is **7.620.100.100.03**).

### 7.3.9.6 MCF CRC

MCF CRC is one of the vital parameters. Edit Mode must be selected before a change can be made and the vital CPU must be rebooted in order to get out of Edit Mode. This reboots the vital CPU only and not the entire VIU-20e.

The MCF CRC is determined by the MCF contents.

### 7.3.9.7 Additional Data

The Site Info screen also reports the following values: PTC Unique Check Number (UCN), and Configuration Check Number (CCN). These values are only reported here, and cannot be edited on this screen.

**NOTE****NOTE**

The PTC UCN is not used in VIU-20 ACSES applications.

### 7.3.10 SNMP

Enter a Destination IP and Port for up to four destinations. Verify the information and click on the **SAVE** button to save any changes or click on the **DISCARD** button to remove any changes and return unsaved field entries to default values. The **REFRESH** button refreshes the screen and the **DEFAULT** button changes all entries to the original factory default values.

The screenshot shows the SIEMENS VIU-20 ACSES web interface. The header is green and contains the SIEMENS logo, site name 'TechPulse-ACSES', ATCS Address '7.620.101.201.12', Mile Post '42.1', DOT Number '1234560', and a login status 'Logged into VIUACSES as admin' with a 'logout' link. The left sidebar has a 'NON VITAL CONFIG' section with links to ACSES NETWORK, ACSES ROUTER, CIL LOG, DIAGNOSTIC LOG, ETHERNET, EVENT LOG, GPS, SERIAL PORT, SITE INFO, SSMC, SNMP, and TCP PORT. The main content area is titled 'SNMP' and shows four destination configuration sections (Destination 1 to 4) with fields for IP and Port. Below these are fields for Community and Contact Info. Buttons for Save, Discard, Refresh, and Default are at the top.

Figure 7-32 SNMP Setup

This is a close-up of the 'Destination 1' configuration section. It contains two input fields: 'Destination 1 IP:' with the value '0.0.0.0' and 'Destination 1 Port:' with the value '162'.

Figure 7-33 SNMP Destination Fields (typical of 4)

#### 7.3.10.1 SNMP Traps

The VIU-20e is compatible with SNMP version 2c or later. SNMP messages sent from the VIU-20e are received in the Back Office. The CDL program defines which alarms are sent.

**NOTE****NOTE**

See Appendix B for the VIU-20e SNMP traps.



**Table 7-1 SNMP Object Identifiers**

SNMP OID	VALUE	DESCRIPTION
deviceType.0	VIU	Defines the type of equipment that sent the SNMP trap. For the VIU, this field will always contain "VIU"
dateTime.0	03-May-2012 18:56:13	Date and Time the system created the alert
siteName.0	CP_Siemens_312	This field contains the Site Name, as set in the VIU configuration settings.
milePost.0	35.2	This field contains the Milepost Number, as set in the VIU configuration settings
spareText2.0		Not used. Reserved for future use.
spareText1.0	2950240fd20218	Not used. Reserved for future use.
alarmPriority.0	4	The priority of the alarm as set by the VIU's CDL logic. This value is specific to each alert (see the CDL manual for the specific CDL program).
alarmClearFlag.0	0	Indicates whether this is the alarm or the corresponding clear for the alarm.
alarmText.0	Alarm Enabled Message	The Alarm text as programmed into CDL logic. This value is specific to each alert (see the CDL manual for the specific CDL program).
alarmID.0	2	The Alarm ID number as programmed in the CDL logic. This value is specific to each alert (see the CDL manual for the specific CDL program).
trapNum.0	3	The Trap Number as programmed in the CDL logic. This value is specific to each alert (see the CDL manual for the specific CDL program).
snmpTrapOID.0	1.3.6.1.4.1.3064.3.20.2.2	The ID of the trap in the unit's MIB. This value is specific to each alert (see the CDL manual for the specific CDL program).

### 7.3.11 SNTP

The VIU-20e is compatible with SNTP version V4 and earlier. SNTP stands for the Simple Network Time Protocol. SNTP is used to synchronize the VIUs to a network time source.

Site Name: TechPubs-ACES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 1234560  
Logged into VIU/ACES as admin, [logout](#)

» Home » Non Vital Config » SNTP

Save Discard Refresh Default

NTP Mode: Unicast

Primary NTP Time Source: pool.ntp.org Backup NTP Time Source:

NTP Multicast address: 0.0.0.0 NTP UDP Port: 123

NTP Polling Rate (min): 1 NTP Wait Time (sec): 120

NTP Mode: Broadcast

Primary NTP Time Source: pool.ntp.org Backup NTP Time Source:

NTP Multicast address: 0.0.0.0 NTP UDP Port: 123

NTP Polling Rate (min): 1 NTP Wait Time (sec): 120

**Figure 7-34 SNTP Configuration Screen**

### 7.3.11.1 NTP Mode

There are two Network Time Protocol Modes (drop-down list): Unicast and Broadcast (multicast).

- **Unicast Time Mode**

In Unicast mode, the VIU requests time from a primary and a backup time server. The user must supply the IP addresses or DNS names of the servers.

- **Broadcast Time Mode**

In Broadcast (multicast) mode, the VIU-20e listens for time updates from any server that is either broadcasting time updates or sending them to a multicast group.

### 7.3.11.2 Primary NTP Time Source

The IP address or DNS name of the primary time server, if in Unicast mode.

Primary NTP Time Source range: valid IP address or DNS name (default = **0.0.0.0**).

### 7.3.11.3 Backup NTP Time Source

The IP address or DNS name of the backup time server, if in Unicast mode.

Backup NTP Time Source range: valid IP address or DNS name (default = **0.0.0.0**).

### 7.3.11.4 NTP Multicast Address

When mode is Broadcast/Multicast and the user wants the VIU-20e to join a specific multicast group for SNTP time updates, that multicast group address is entered here. This address is optional. The VIU-20e will still receive broadcasted time updates if this field is set to 0.0.0.0.

NTP Multicast Address range: valid IP address (default = **0.0.0.0**).

### 7.3.11.5 NTP UDP Port

The UDP port number to use for SNTP messages.

NTP UDP Port range: **0 – 65535** (default = **123**).

### 7.3.11.6 NTP Polling Rate

The NTP Polling Rate determines how often the VIU-20e requests updates from the Time Server, measured in seconds, when in Unicast mode.

NTP Polling Rate range: **0 – 65535** seconds (default = **60** seconds).

### 7.3.11.7 NTP Wait Time

The time period in which the VIU-20e expects to receive a time update when in Broadcast/Multicast mode. If no time update is received, the time source is considered offline.

NTP Wait Time range: **0 – 65535** seconds (default = **120** seconds).

## 7.3.12 TCP Port Configuration

The TCP Port Configuration screen is shown in

The screenshot shows the SIEMENS TCP Port Configuration screen. The top header includes the SIEMENS logo and site information: Site Name: TechPubs-ACES | ATCS Address: 7.620.101.201.12, Mile Post: -42.1, DOT Number: 123456D. The user is logged in as admin. The left sidebar contains navigation links: HOME, NON VITAL CONFIG, LOGS, MAINTENANCE, STATUS, REPORTS, APPLICATION, and SECURITY. The main content area is titled 'TCP Port' and contains the following configuration fields:

DT TCP Port:	VTP TCP Port:	AServer UDP Port:
10075	10076	5361
Route Region One IP:	Route Region Two IP:	
0.0.0.0	0.0.0.0	
Route Maintain Timer:	Route Establish Timer:	
900	20	
Circuit ID:	Office Path Byte:	
0	46	

**Figure 7-35 TCP Port Configuration Screen**

### 7.3.12.1 DT TCP Port

The DT TCP Port setting is the TCP port number used by the VIU-20e to communicate with DT over a TCP/IP network.

DT TCP Port range: **10 – 65535** (default = **10075**).

### 7.3.12.2 VTP TCP Port

The VTP TCP Port setting is the TCP port number used to communicate to the vital office system equipment when sending I/O statuses to the office. This setting is a legacy system and is no longer used for PTC.

VTP TCP Port range: **10 – 65535** (default = **10076**).

### 7.3.12.3 AServer UDP Port

The AServer UDP port setting is the UDP port number used to communicate with the AServer program running in the office. It is also the port number used for route requests with office systems equipment.

AServer UDP Port range: **10 – 65535** (default = **5361**).

### 7.3.12.4 Route Region One IP

Enter the IP address for TCP Route Region One.

Route Region One IP range: valid IP address (default = **0.0.0.0**).

### 7.3.12.5 Route Region Two IP

Enter the IP address for TCP Route Region Two.

Route Region Two IP range: valid IP address (default = **0.0.0.0**).

### 7.3.12.6 Route Maintain Timer

Once a route is established to the office, the VIU-20e will request routes again after this timer expires and the VIU-20e has not received a route update or a message from the office. If no route updates or messages are received, the route is deleted.

Route Maintain Timer range: **10 – 65535** (default = **900**).

### 7.3.12.7 Route Establish Timer

When there is no route present for the office, the VIU-20e will request routes at an interval set in this parameter.

Route Establish Timer range: **10 – 65535** (default = **20** seconds).

### 7.3.12.8 Circuit ID

This is a unique identifier required by the office system used in routing messages to the VIU-20e.

Circuit ID range: **10 – 65535** (default = **0**).

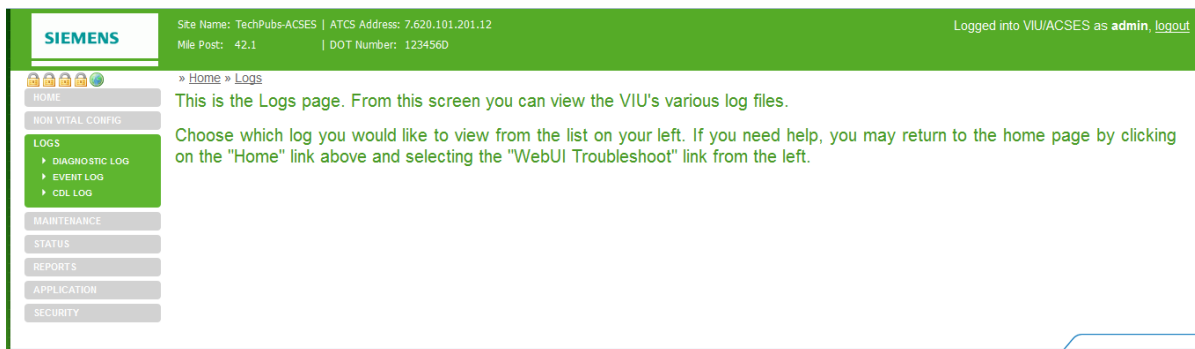
### 7.3.12.9 Office Path Byte

The "Office Path Byte" is included in messages sent to the office system and is used by office system equipment when routing messages sent by the VIU-20e.

Office Path Byte range: **0 – 255** (default = **46**).

## 7.4 VIEWING LOGS

The Web browser user interface provides access to three logs maintained by the VIU-20e: the Diagnostic Log, the Event Log and the CDL Log. To access these logs, select **Logs** from the main menu to display the Logs screen Figure 7-36).



**Figure 7-36 Logs Screen**

On the Logs screen, select the desired log from the Logs submenu at the left side of the screen.

### 7.4.1 Diagnostic Log

The Diagnostic Log first displays in the basic view (Figure 7-37). Buttons provided at the top of the log display allow the user to view the first event in the log, the last event in the log and to progress through the log one event at a time using **Next** and **Previous** buttons. A button is also provided to download the entire log contents to a PC.

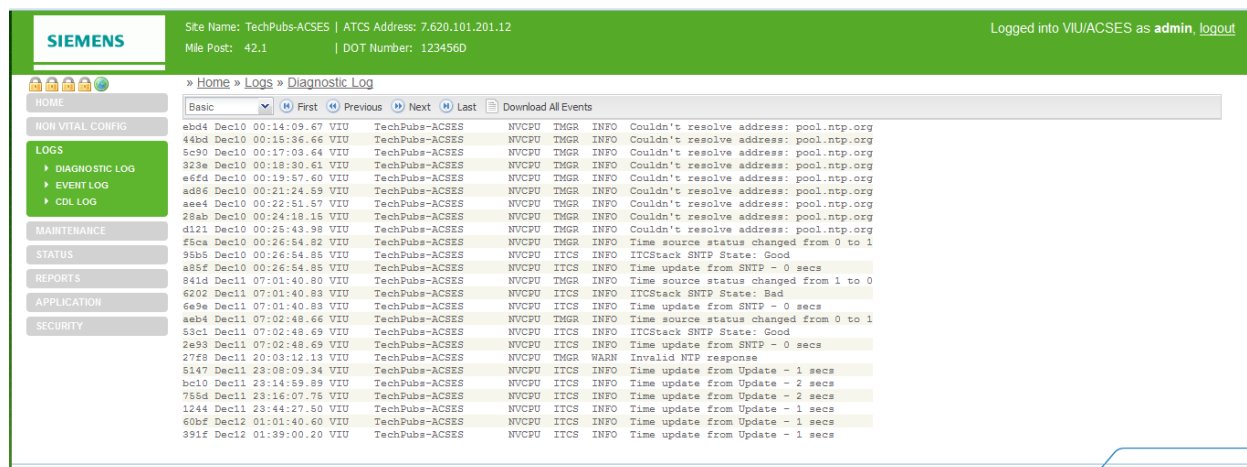


Figure 7-37 Diagnostic Log – Basic View

When the Download All Events button is selected, a prompt queries to open or save the log file.

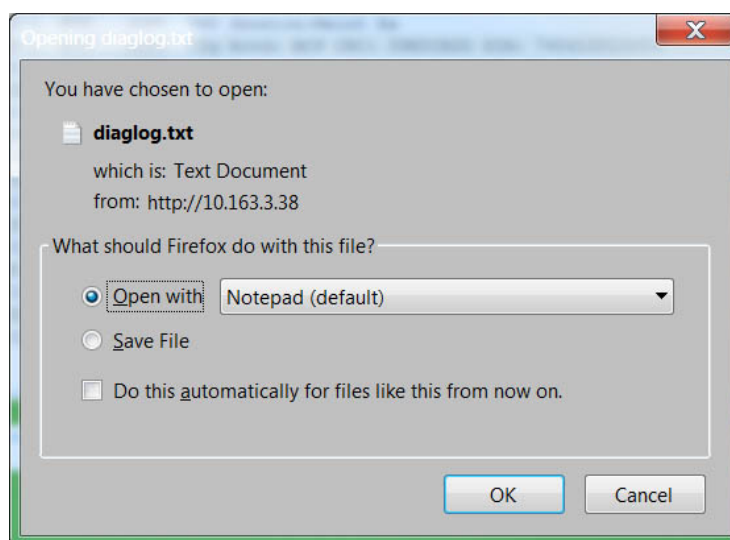
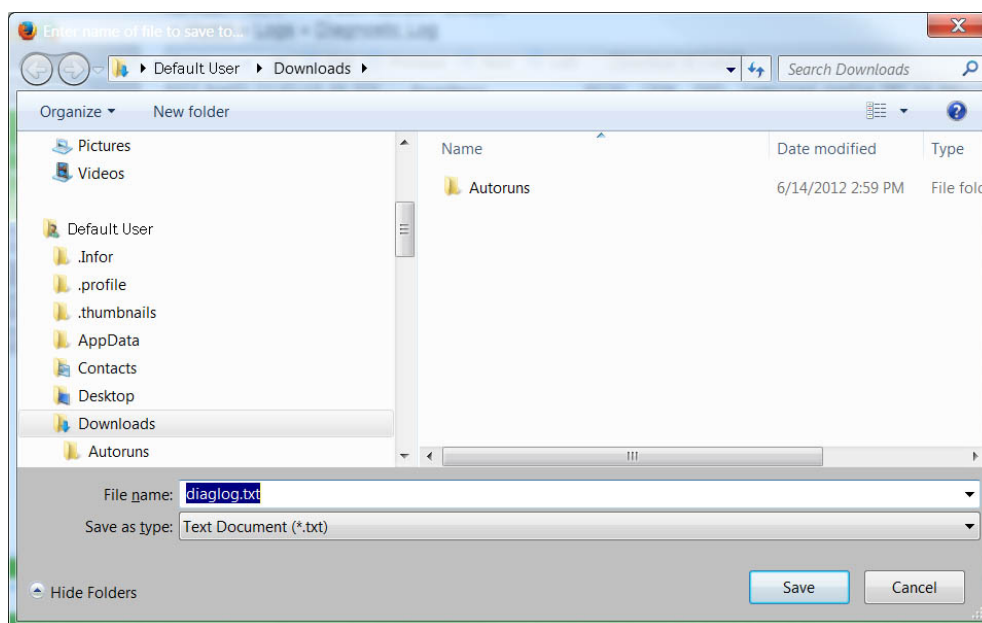


Figure 7-38 File Download Prompt

If **Save** is selected, the user is prompted for a location and file name for the saved file.

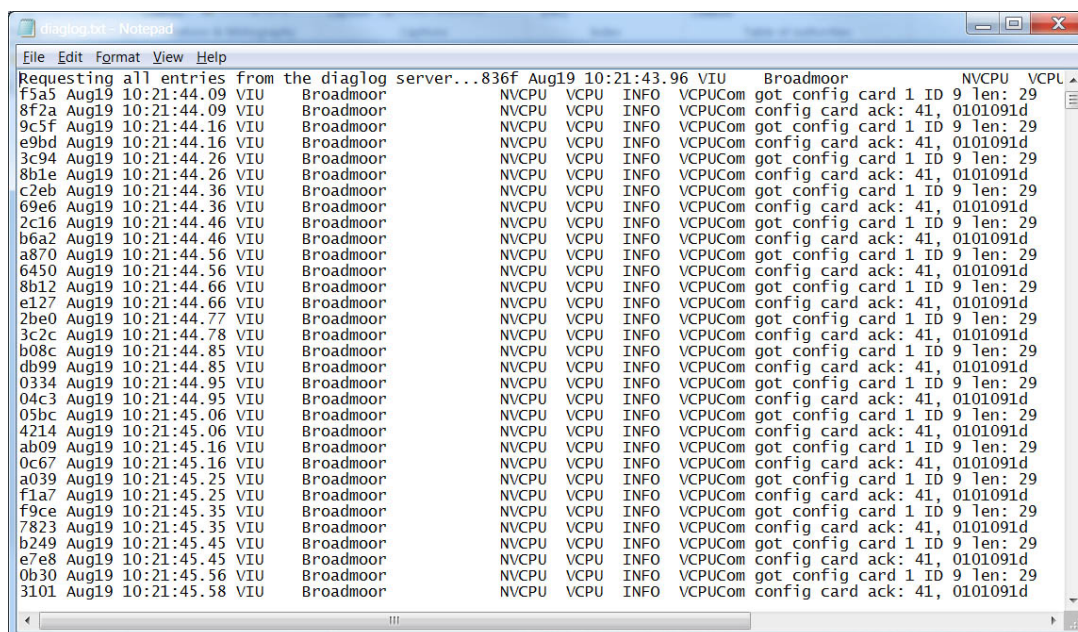
**NOTE****NOTE**

Some browsers save files to the user's Download folder by default. The browser properties or options settings can be changed so that the browser will ask the user where the files are to be saved as in Figure 7-39.



**Figure 7-39 File Save Screen**

If **Open** is selected, the file contents are displayed in a text editor such as Microsoft® Notepad.



**Figure 7-40 File Opened In Notepad**



To view the Diagnostic Log in the Advanced view, select **Advanced** from the drop down menu to the left of the **First** button (Figure 7-41).

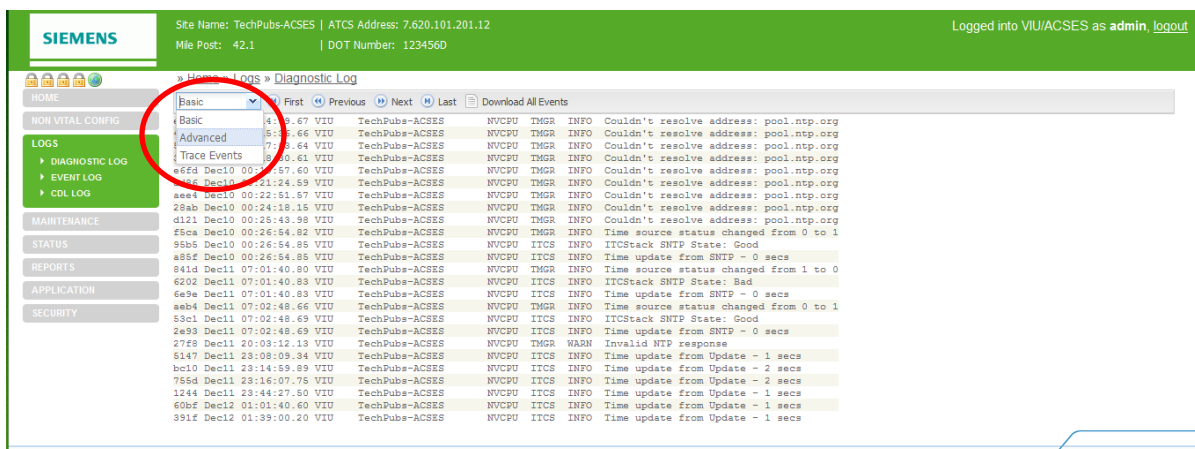


Figure 7-41 Log View Drop-Down Menu

The Advanced view (Figure 7-42) provides the same navigation buttons as the Basic view. However, below the buttons are several data entry fields that allow the log to be searched within date and time parameters.

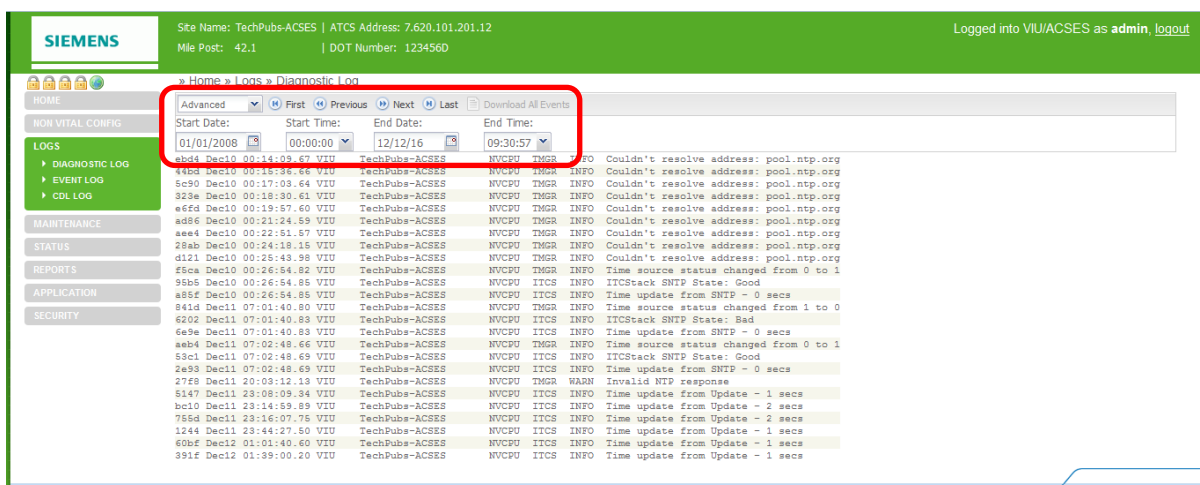


Figure 7-42 Diagnostic Log – Advanced View

Dates can be entered directly in the date fields or the calendar icon at the right end of the date field or can be selected to display a calendar. The time fields are similar except that a drop down list provides a list of times or the time can be entered directly in the field.

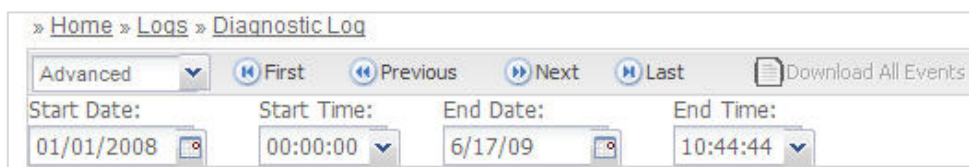


Figure 7-43 Calendar Display

The final selection from the view drop down list is **Trace Events** Figure 7-44). Select this view to see events as they are logged into the Diagnostic Log. This screen refreshes every 5 seconds so there is a short delay between the time the event occurs and it is displayed.

Site Name: TechPubs-ACSES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 123456D  
Logged into VIU/ACSES as admin, [logout](#)

» Home » Logs » Diagnostic Log

Trace Events ▼ First Previous Next Last Download All Events

Basic	06.62	VIU	Venu-ACSES2	NVCPU	CPGM	BASIC	Configuration settings committed	
Advanced	06.86	VIU	Venu-ACSES2	NVCPU	VCPU	INFO	VCPUCOM config card ack: 9, 00000	
Trace Events	07.37	VIU	Venu-ACSES2	NVCPU	GACS	INFO	Ethernet ACSES 200/11 is running	
	09.19	VIU	Venu-ACSES2	NVCPU	VCPU	INFO	VCPUCOM config card ack: 9, 00676	
	09.25	VIU	Venu-ACSES2	VIU-1	EVT	INFO	VNV Session:End Init State	
	463f	Sep11 06:23:09.25	VIU	Venu-ACSES2	VIU-1	PRGM	INFO	VPI Debounce Timer Changed to 20
	0079	Sep11 06:23:09.48	VIU	Venu-ACSES2	NVCPU	VCPU	INFO	VCPUCOM got config card 1 ID 24 1
	cf84	Sep11 06:23:09.48	VIU	Venu-ACSES2	NVCPU	VCPU	INFO	ACSES CI 2 adopted
	0f44	Sep11 06:23:09.48	VIU	Venu-ACSES2	NVCPU	VCPU	INFO	VCPUCOM got config card 2 ID 25 1
	5d3c	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	PRGM	INFO	VPI Debounce Timer Changed to 20
	923d	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	PRGM	BASIC	UCN Calculated over: MCF, SIN & S
	3111	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	EVT	INFO	PTC UCN : 292E7059
	328e	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	EVT	INFO	VNV Session:Invalid Maint Rx
	475d	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	EVT	INFO	VNV Session:Init Rx
	ebac	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	EVT	INFO	VNV Session:Maint Rx
	370c	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	EVT	INFO	Cfg Rcvd: MCF CRC: 4E87C208 SIN:
	56ad	Sep11 06:23:09.53	VIU	Venu-ACSES2	VIU-1	EVT	INFO	Cfg Rcvd: VIU Address: B1 6B 56 0

Figure 7-44 Diagnostic Log – Trace Events View

## 7.4.2 Events Log

The Events Log screen provides structure, options and features similar to those described in paragraph 7.4.1 for the Diagnostic Log.

## 7.4.3 CDL Log

The **Refresh** function updates the CDL log display to show current CDL status events.

The Download function is identical to that of the Diagnostic and Event Logs described above.

Site Name: TechPubs-ACSES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 123456D

» Home » Logs » CDL Log

Refresh Download

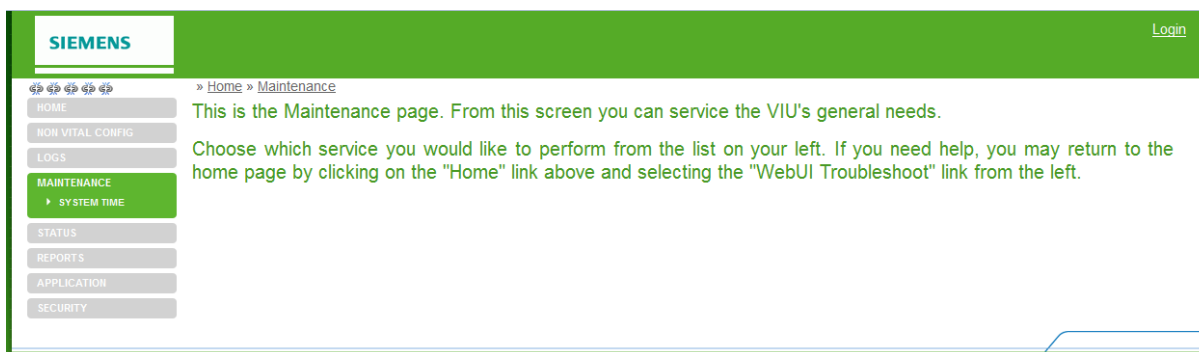
Nov-28 16:56:12	DEBUG	CDL_OPERATION	1
Nov-28 16:56:12	DEBUG	CDL_OPERATION	6
Nov-28 16:56:12	DEBUG	CDL_INST_IF	19
Nov-28 16:56:12	DEBUG	CDL_LogTraverse( 315, snmp )	
Nov-28 16:56:12	DEBUG	CDL_CONSTANT	50
Nov-28 16:56:12	DEBUG	CDL_CONSTANT	53
Nov-28 16:56:12	DEBUG	CDL_CONSTANT	9
Nov-28 16:56:12	DEBUG	CDL_CONSTANT	0
Nov-28 16:56:12	DEBUG	CDL_SNMP_MSG	21
Nov-28 16:56:12	DEBUG	CDL_LogTraverse( 312, record )	
Nov-28 16:56:12	DEBUG	CDL_MSG_RECORD	21
Nov-28 16:56:12	DEBUG	CDL_LogTraverse( 416, = )	
Nov-28 16:56:12	DEBUG	CDL_LogTraverse( 422, 0 )	
Nov-28 16:56:12	DEBUG	CDL_CONSTANT	0
Nov-28 16:56:12	DEBUG	CDL_LogTraverse( 424, flag_time_src_valid )	
Nov-28 16:56:12	DEBUG	CDL_VAR_WRITE	12
Nov-28 16:56:12	DEBUG	CDL_INST_ENDIF	19
Nov-28 16:56:12	DEBUG	CDL_END	0
Nov-28 16:56:12	Phase Three (logic) compile successful.		
Nov-28 16:56:12	INFO	Closed String binary file.	
Nov-28 16:56:12	INFO	Closed instructions file.	
Nov-28 16:56:12	INFO	Closed question file!	
Nov-28 16:56:12	INFO	Closed oper param menu question file	
Nov-28 16:56:12	INFO	Closed oper param menu answer file	
Nov-28 16:56:12	INFO	Closing CDL log file!	

Figure 7-45 CDL Log Screen



## 7.5 MAINTENANCE

The Web browser user interface provides access to the maintenance functions that allows the VIU-20e to test handling of Class D messages and to change the date and time to be set if a GPS receiver is not present (Figure 7-46). To access the date/time set function, select Maintenance from the main menu to display the Maintenance screen.

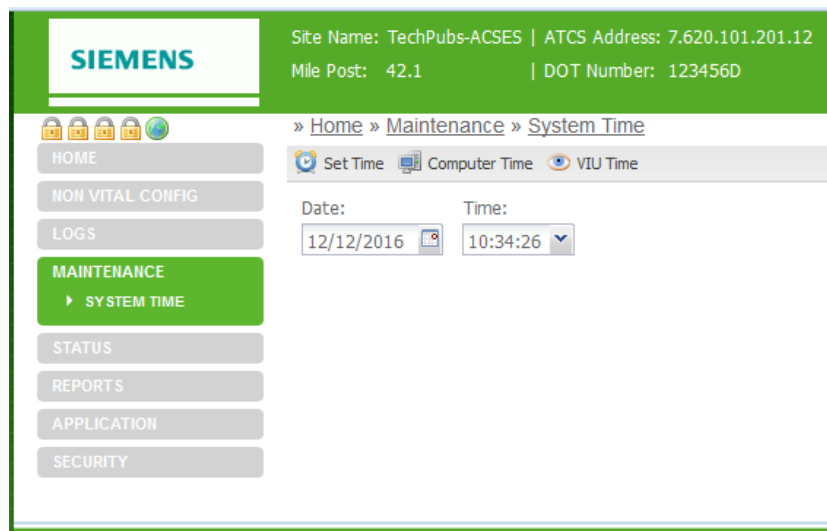


**Figure 7-46 Maintenance Screen**

### 7.5.1 System Time

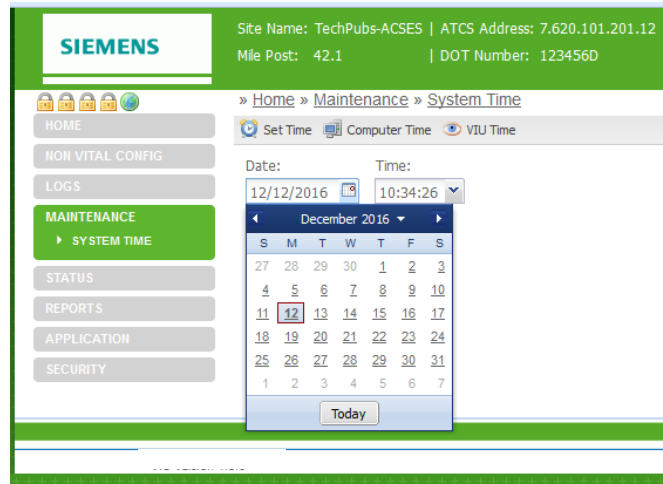
On the Maintenance screen, select System Time from the Maintenance submenu at the left side of the screen.

The System Time screen provides two data fields and three time set buttons (Figure 7-47). These are described in the following paragraphs.



**Figure 7-47 System Time Screen**

The first data field is for the date. The date can be typed directly in the field or a calendar can be displayed by selecting the small calendar icon to the right of the data field (Figure 7-48).



**Figure 7-48 Date Field with Calendar Displayed**

In a similar manner, the system time can be typed directly in the time data field or the drop down list containing set times can be displayed (Figure 7-49). If a set time is selected from the list, it can be adjusted by typing over the portion of the time display to be changed.

### 1. Set Time Button

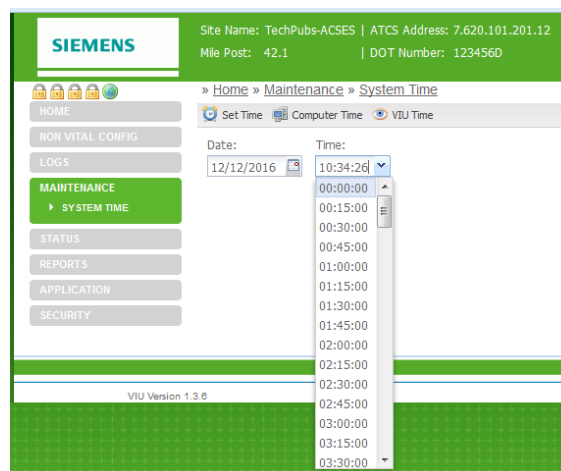
Once the date and time are entered in the data fields, select the **Set Time** button to update the VIU-20e to the displayed time.

### 2. Computer Time

If the VIU-20e is to be set to the date and time on the connected PC, select the **Computer Time** button.

### 3. VIU Time

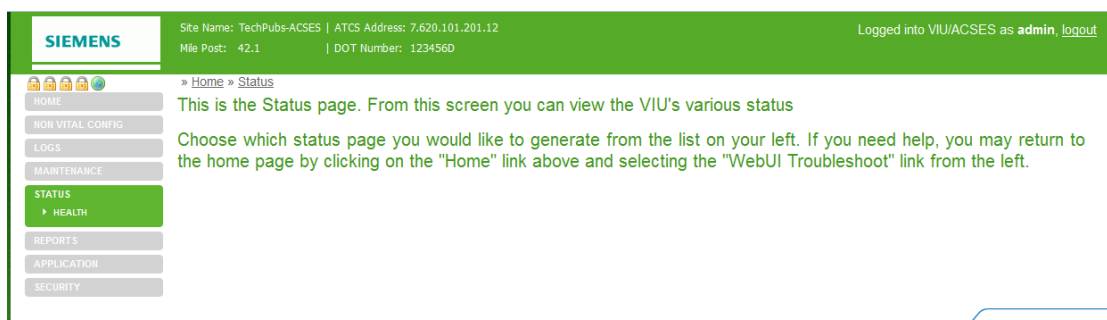
To display the date and time currently set on the VIU-20e, select the VIU Time button.



**Figure 7-49 Time Field with Drop Down List of Times**

## 7.6 STATUS

The Web browser user interface provides access to a status function that allows the status of the GPS receiver to be checked as well as the overall health of the system vital and non-vital functions. To access the status function, select **Status** from the main menu on the left side of the screen to display the Status screen (Figure 7-50).



**Figure 7-50 Status Screen**

On the Status screen, select **Health** from the Status menu at the left side of the screen to view the Health status category.

### 7.6.1 Health

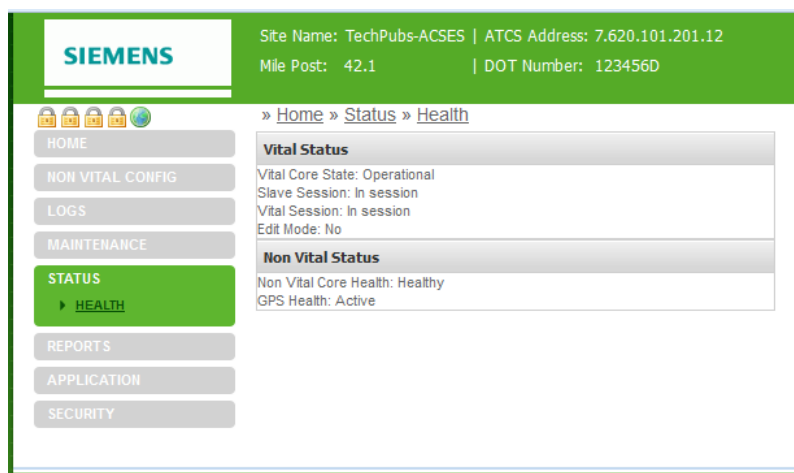
The Health screen shows the current health status for the main vital and non-vital functions (Figure 7-51).

On the vital side are the following:

- Vital Core State
- Slave Session
- Vital Session
- Edit Mode

On the non-vital processor are the following:

- Non Vital Core Health
- GPS Health



**Figure 7-51 Health Status Screen**

## 7.7 REPORTS

The Web browser user interface provides access to two reports generated by the VIU-20e: the Configuration Report and the Version Report. To access these reports, select **Reports** from the main menu on the left side of the screen to display the Reports screen (Figure 7-52).



**Figure 7-52 Reports Screen**

On the Reports screen, select the desired report from the Reports menu.

### 7.7.1 Config Report

The Configuration Report lists all of the parameters sent from the Web browser user interface including the Site ATCS Address and MCF CRC (Figure 7-53). These parameters are listed in the following order:

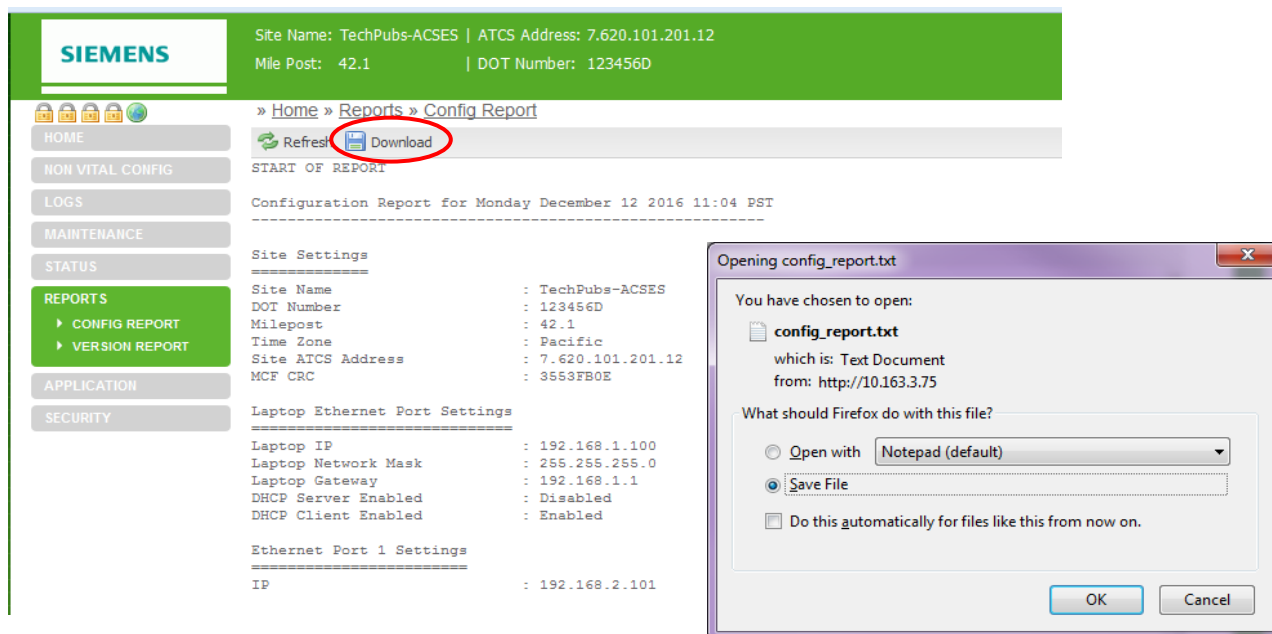
- Site Settings
- Laptop Ethernet Port Settings
- Ethernet Port 1 Settings
- Ethernet Port 2 Settings
- Comms Laptop Port Settings
- Comms Serial Port Settings
- GPS and Time Settings
- SNTP Client Settings
- Diagnostic Log Settings
- Event log Settings
- ITC Port Settings
- ATCS Router Settings
- ACSES II Network Settings
- SNMP Settings
- CDL Compiler Settings
- Application Menu Answers
- ID Question
- Operational Parameters
- ID Operational Parameter
- UCN and PTC UCN Parameters

Use the scroll bars at the bottom and right edges of the screen to view the entire report.



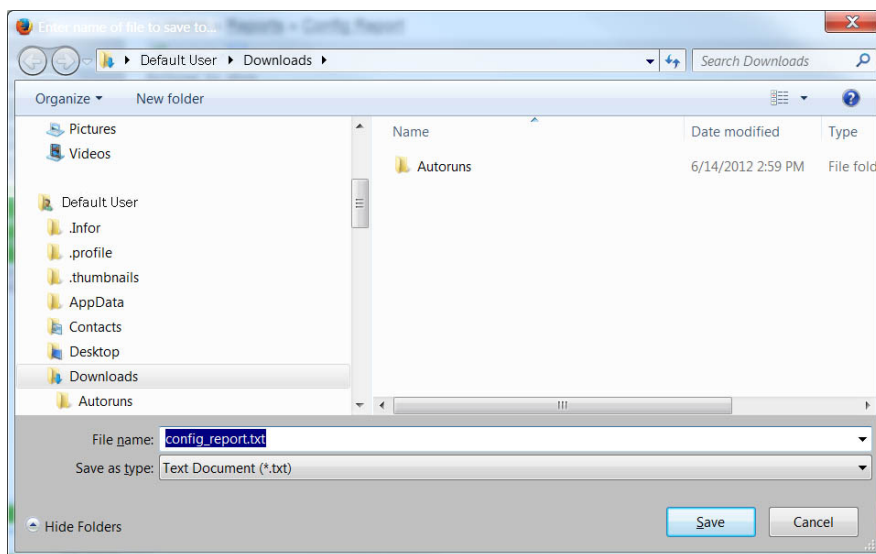
**Figure 7-53 Typical Configuration Report Screen**

The Download button at the top of the Reports screen allows the user to save the report to a PC. When the Download button is selected, the user has the option to open or save the log file.



**Figure 7-54 Report Download Prompt**

If **Save** is selected the user is prompted for a location and file name for the saved report.

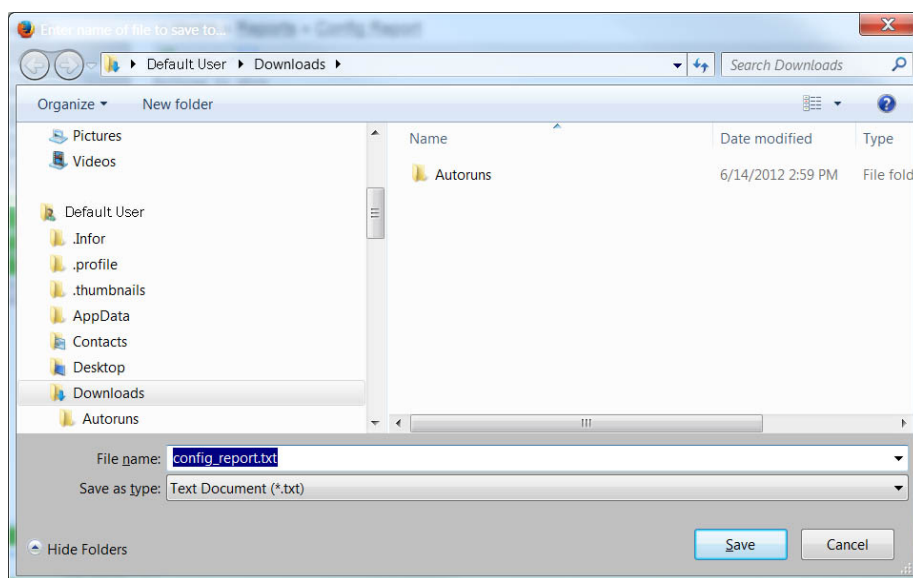


**Figure 7-55 Report Save Screen**

**NOTE**

**NOTE**

Some browsers save files to the user's Download folder by default. The browser properties or options settings can be changed so that the browser will ask the user where the files are to be saved as in Figure 7-56.



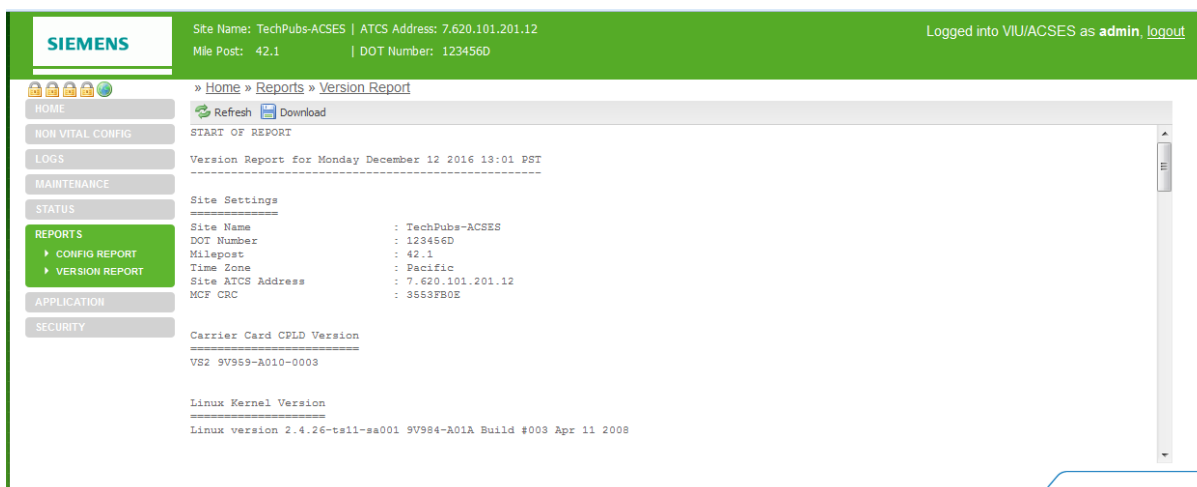
**Figure 7-56 File Save Screen for Configuration Report**

If **Open** is selected, the report contents are displayed in a text editor such as Microsoft ® Notepad.

The **Refresh** button on the report display updates the display when pressed.

## 7.7.2 Version Report

The Version Report identifies the VIU-20e site and then lists the current versions of the VIU-20e firmware, software, and hardware (Figure 7-57). This version information can be valuable when troubleshooting system problems. Use the scroll bar at the right edge of the screen to view the entire report.

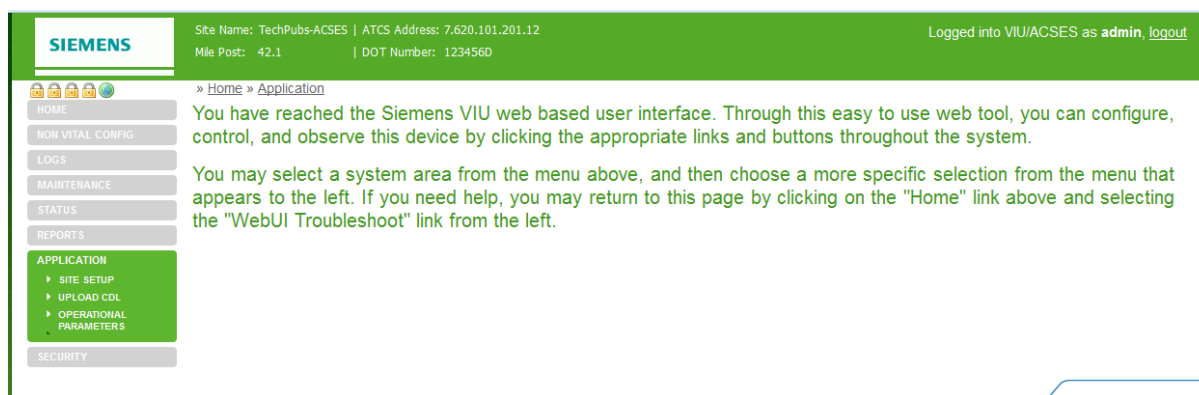


**Figure 7-57 Typical Version Report Screen**

All other functions associated with the Version Reports screen are identical to those described above for the Configuration Reports screen.

## 7.8 APPLICATIONS

The Application submenu contains options for Site Setup, Uploading a CDL, and setting the VIU-20e Operational Parameters. The initial Applications screen is shown in Figure 7-58.

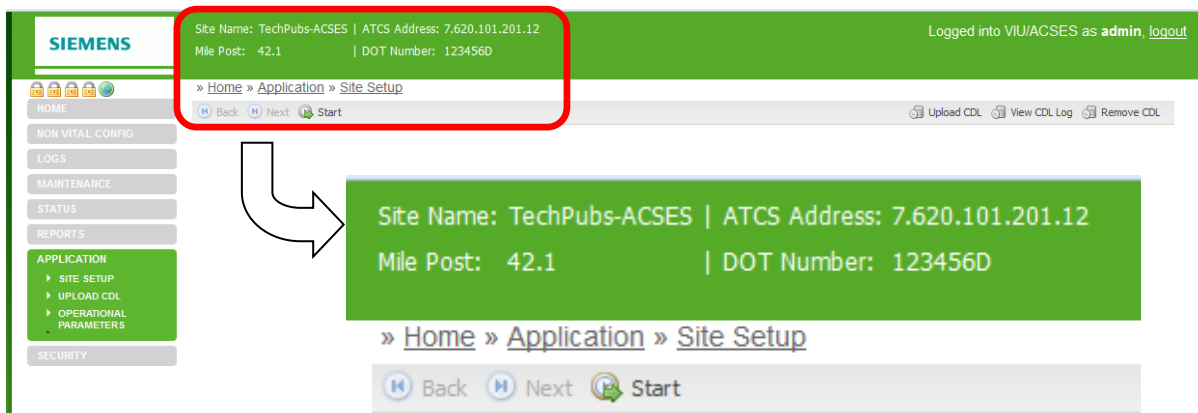


**Figure 7-58 Applications**

### 7.8.1 Site Setup

Selecting **Site Setup** from the Application submenu displays the initial Site Setup screen (Figure 7-59). Information appearing at the top of the screen identifies the Site Name, site ATCS Address, Mile Post number for the location and the DOT Number.

Immediately below this information and the screen path is a button bar. The functions of these buttons are described below.



**Figure 7-59 Initial Site Setup Screen**

### 7.8.1.1 Button Functions

The three buttons (**Back**, **Next**, **Start**) on the button bar enable viewing and selection of various user-definable parameters and alarm options for the VIU-20e location. When Site Setup is first selected the **Start** button is the only one enabled. Click the **Start** button to display the first parameter for the identified location (parameters will vary depending on the CDL installed). After the first parameter is displayed the **Next** button is enabled on the button bar (Figure 7-60) and the **Start** button changes to **Restart**.

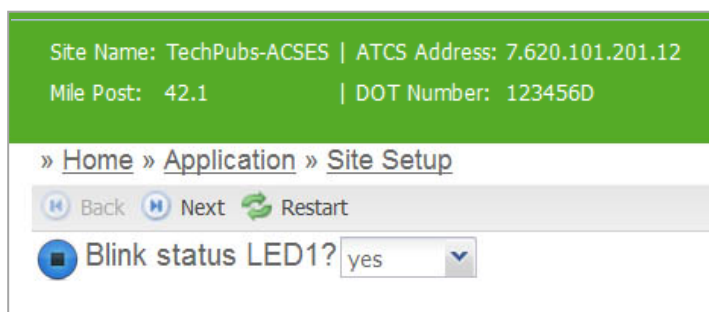
#### **NOTE**

#### **NOTE**

If no CDL file is loaded, a prompt appears in the lower right corner of the screen when the **Start** button is pressed prompting the user to upload a CDL file. The **Upload CDL** button is displayed at the right end of the button bar.



With each click of the **Next** button a new parameter is displayed in the list (Figure 7-60). A green check mark appears to the left of each parameter as it is accepted (**Next** button clicked). With two or more parameters displayed, the **Back** button is also enabled. With each click of the **Back** button, the last parameter displayed is unchecked to allow that parameter to be changed. Clicking the **Restart** button at any time removes all of the parameters from the list and leaves only the first parameter displayed unchecked.



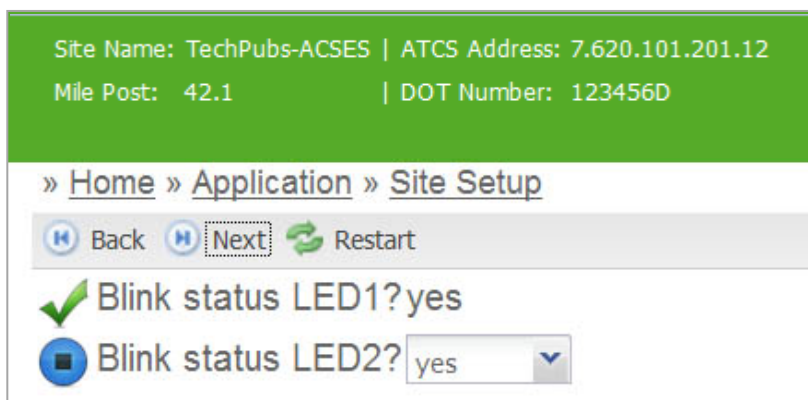
Site Name: TechPubs-ACSES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 123456D

» [Home](#) » [Application](#) » [Site Setup](#)

[Back](#) [Next](#) [Restart](#)

☒ Blink status LED1? yes

**Figure 7-60 First Site Parameter Displayed**



Site Name: TechPubs-ACSES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 123456D

» [Home](#) » [Application](#) » [Site Setup](#)

[Back](#) [Next](#) [Restart](#)

☒ Blink status LED1? yes

☒ Blink status LED2? yes

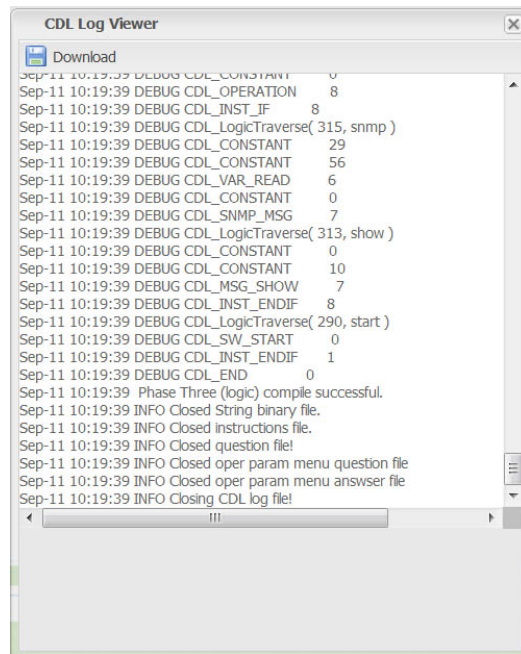
**Figure 7-61 Second Site Parameter Displayed**

After the last parameter in the CDL is displayed and accepted, the **Next** button changes to **Finish**. Click the **Finish** button to compile the CDL. A message will appear in the lower right corner of the screen indicating that the CDL was compiled successfully.



**Site Setup**  
CDL compiled successfully

Click the **View CDL Log** button at the right end of the button bar to view the CDL compilation results in the CDL log (see sample below). If the compilation fails, the errors will be identified in the log. Click the **Remove CDL** button to delete the CDL.



## 7.8.2 Upload CDL



**WARNING**

### WARNING

**BEFORE PROCEEDING SITE EQUIPMENT MUST BE PLACED IN THE MAINTENANCE MODE AND APPLICABLE SAFETY PRECAUTIONS IN PLACE TO PROTECT VEHICLES, PEDESTRIANS, AND RAILWAY TRAFFIC. EDITING VITAL PARAMETERS WILL CAUSE THE SITE EQUIPMENT TO ENTER A RESTRICTIVE/SAFE STATE. IT IS THE RESPONSIBILITY OF THE RAILROAD OR AGENCY TO ENSURE QUALIFIED PERSONNEL PERFORM ANY CHANGES AND PERFORM ADEQUATE TESTING PRIOR TO PLACING EQUIPMENT BACK INTO SERVICE.**

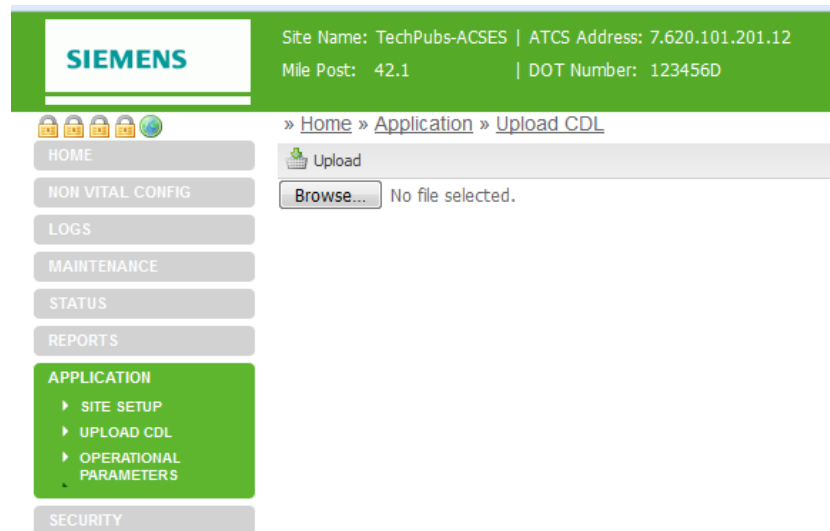


**WARNING**

### WARNING

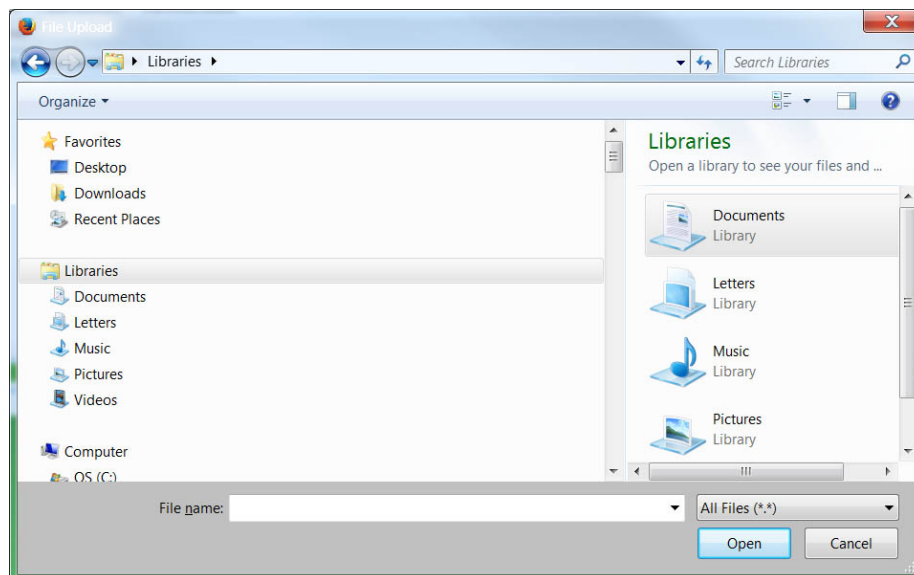
**WHEN EDITING A VITAL APPLICATION REMOTELY, AN AUTHORIZED TECHNICIAN MUST BE PRESENT AT THE SITE BEFORE PROCEEDING. PARAMETERS CHANGED BY THE REMOTE USER WILL REQUIRE THE SYSTEM TO BE REBOOTED. A QUALIFIED TECHNICIAN WILL BE REQUIRED AT THE SITE TO VERIFY ALL EQUIPMENT HAS RECOVERED FROM THE RESTRICTIVE STATE.**

Select **Upload CDL** from the Application submenu to display the Upload CDL screen.



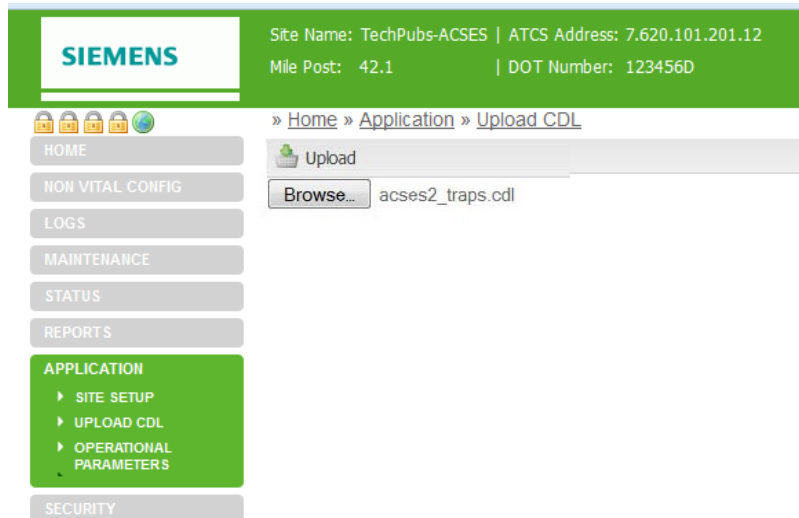
**Figure 7-62 Upload CDL Initial Screen**

Select the **Browse** button to display the File Upload screen (Figure 7-63). Navigate to the desired CDL file, select the file and click on the **Open** button at the bottom of the screen.



**Figure 7-63 File Upload Screen**

The selected CDL file name will appear in the text box to the right of the **Upload** button on the Upload CDL screen. Click on the **Upload** button to upload the file.



**Figure 7-64 Selected CDL File Name Displayed on CDL Upload Screen**

#### NOTE

#### NOTE

A CDL file can also be uploaded from the Application/Site Setup and Application/Operational Parameters screens. The **Upload CDL** button as well as buttons for **View CDL Log** and **Remove CDL** are also provided at the right end of the button bar on these screens.

Following successful CDL upload, a prompt appears to run site setup (Figure 7-69). Click on the prompt to start site setup. The display switches to the Site Setup screen.



**Figure 7-65 CDL File Uploaded Successfully, Ready for Site Setup**

### 7.8.2.1 Compile CDL

Refer to paragraph 7.8.1 for information on how to compile the CDL from the Site Setup screen.

### 7.8.2.2 View or Download CDL Log

After the CDL is successfully compiled, the CDL Log can be viewed or downloaded to a PC. Refer to Table 7-2 for locations to view or download the CDL Log.

**Table 7-2 View or Download CDL Log**

<b>CDL Log Action</b>	<b>Submenu</b>	<b>Menu Item</b>	<b>Comment</b>
View CDL Log	<b>LOGS</b>	<b>CDL LOG</b>	Log displayed automatically if CDL has been uploaded and compiled.
View CDL Log	<b>APPLICATION</b>	<b>SITE SETUP or OPERATIONAL PARAMETERS</b>	Select <b>View CDL Log</b> on button bar
Download CDL Log	<b>LOGS</b>	<b>CDL LOG</b>	Select the <b>Download</b> button on the button bar

**NOTE****NOTE**

The CDL Log can be opened in Windows® WordPad and printed from that application. WordPad retains the column format as viewed on the screen.

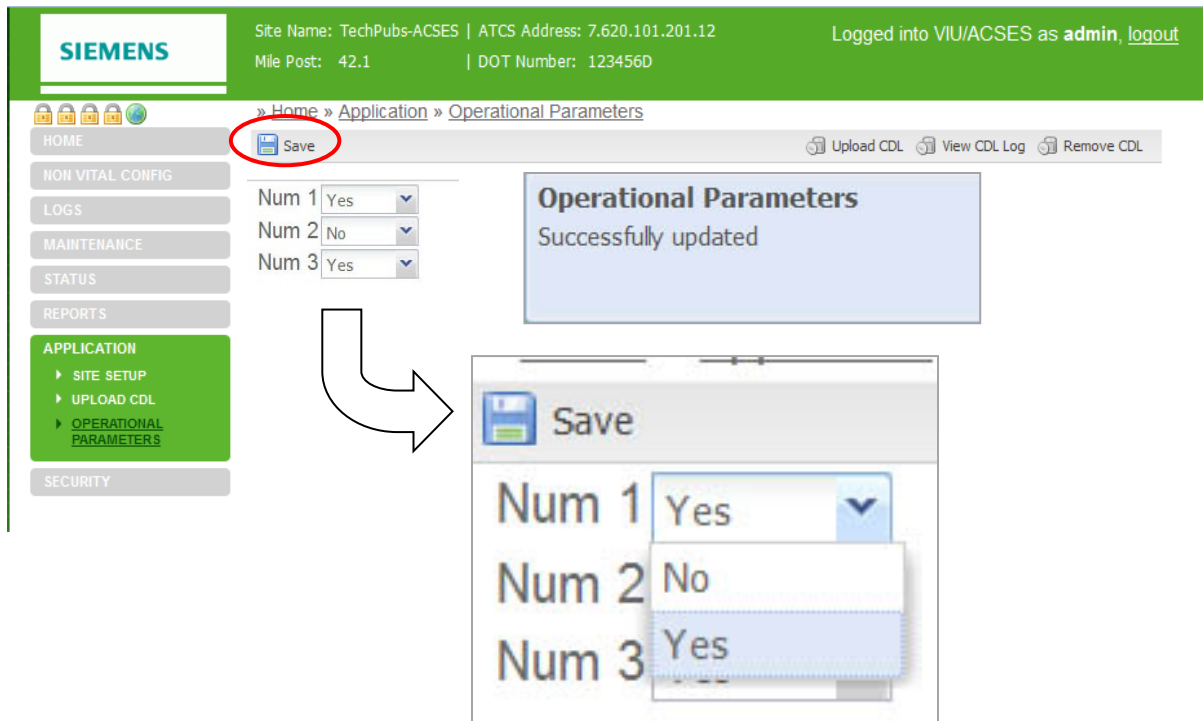
### 7.8.3 Operational Parameters

The Operational Parameters function allows the user to view and modify the operational parameters contained in the CDL logic.

**NOTE****NOTE**

The CDL must be uploaded and compiled before the operational parameters will be displayed.

Each parameter is displayed with a drop-down menu that contains the options available for that parameter (Figure 7-66). Select an option for each parameter from its drop down menu. Once all changes have been selected, click the **Save** button on the button bar to save the changes. A message box will appear in the lower right corner of the display indicating that the parameters have been updated successfully.



**Figure 7-66 Typical Operational Parameter Display**

## 7.9 SECURITY

The Security menu has two sub-menus for enabling and setting the Local UI password and setting the Web UI password.

### 7.9.1 Local UI Password Enabling and Setting

When the local UI password is selected when the local UI is used, before any operation can be performed that would result in taking an operational box out of service (i.e. preventing it responding to ACSES encoder request messages) the user must enter the local UI password. Such operations include: going into edit mode to change vital configuration parameters, loading a new MCF or MEF.

When the Local UI password is enabled the user can set the password. The format of the password is a 4 character hexadecimal value: range 000 to FFFF. Note lower cased character will be converted to upper case after the value has been saved as shown in Figure 7-67.

SIEMENS

Site Name: TechPubs-ACSES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 123456D

» Home » Security » Local UI Password

Save Discard Refresh Default

☒ Local UI Password

Local UI Password:

5678

SECURITY

- ▶ LOCAL UI PASSWORD
- ▶ WEBUI PASSWORD

**Figure 7-67 Enable and Setting Local UI Password**

## 7.9.2 Web UI Password

The default Web UI password is “admin”.

The user can change the Web UI password on this screen. Enter the new password (up to 20 characters which are case sensitive) and retype it to confirm the password, then select the change password button.



### CAUTION

IF THE USER FORGETS THE WEB UI PASSWORD ACCESS TO THE WEB UI WILL BE PROHIBITED. THE DEFAULT PASSWORD CAN BE RESTORED VIA LINUX. CONTACT SIEMENS CUSTOMER SERVICE FOR DETAILS.

SIEMENS

Site Name: TechPubs-ACSES | ATCS Address: 7.620.101.201.12  
Mile Post: 42.1 | DOT Number: 123456D

» Home » Security » WebUI Password

Change Password

Enter new password

Confirm password

SECURITY

- ▶ LOCAL UI PASSWORD
- ▶ WEBUI PASSWORD

**Figure 7-68 Setting Web UI Password**

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## SECTION 8

### MAINTENANCE AND TROUBLESHOOTING

#### 8.0 MAINTENANCE AND TROUBLESHOOTING



**WARNING**

#### WARNING

THE USER MUST PROVIDE TIMELY MAINTENANCE UPON FAILURE OF THE VIU-20E UNIT. FAILURE TO PROVIDE TIMELY MAINTENANCE MAY POTENTIALLY LEAD TO UNSAFE FUNCTIONING OF THE UNIT.

THE USER MUST ENSURE THAT THE VIU-20E SYSTEM APPLICATION LOGIC IS NOT TAMPERED WITH OR APPLIED INCORRECTLY. ANY UNAUTHORIZED ACTIVITY PERFORMED TO CHANGE THE APPLICATION LOGIC CAN LEAD TO UNSAFE FUNCTIONING OF THE UNIT.

#### 8.1 MAINTENANCE

##### 8.1.1 Battery Maintenance

The VIU-20e has no internal backup battery; therefore, no regular backup battery maintenance or replacement is required.

##### 8.1.2 Uploading Software to the VIU-20e from a USB Drive

Occasionally, it may be necessary to load software changes/patches to the VIU-20e. This process is accomplished using the USB port on the VIU-20e front panel.

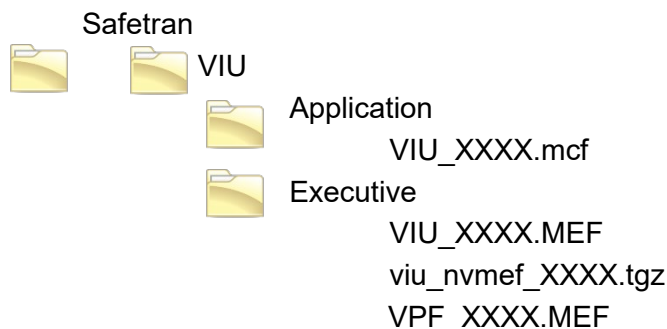
The file structure on the USB drive must have the following format. The VIU-20e will look in specific folders for each file type. Folder names and relationships are exact, file names (those listed within the parenthesis with e.g.,) are for example only.



**WARNING**

#### WARNING

THE USER MUST VERIFY THAT THE CORRECT VERSION OF SOFTWARE IS LOADED DURING INSTALLATION TESTING. THE USE OF AN INCORRECT VERSION OF SOFTWARE MAY POTENTIALLY LEAD TO UNSAFE FUNCTIONING THE UNIT.



**Figure 8-1 Example USB Drive File Structure**

To upload software from the USB drive:

1. Insert a USB drive containing the new software in the USB port.
2. The VIU will initiate the USB interface function and display the first entry in the USB menu.
3. Use up (▲) and down (▼) arrow keys to scroll to the desired software upload function.
4. Use left (◀) or right (▶) arrow key to display **YES**.
5. Press **Enter**.

**NOTE****NOTE**

If the local UI password is enabled, the user will have to enter the password before loading any files that will cause the VIU to stop performing its normal operation.

### 8.1.3 Downloading Event and Diagnostic Logs from the VIU-20e to a USB Drive

As a part of routine maintenance or to aid in diagnostics of system problems, all or part of the VIU-20e Event Log, Diagnostic Log, Configuration and Version reports can be downloaded to the USB drive for easier viewing on a PC.

To download reports to the USB drive:

1. Insert a USB drive in the USB port.
2. The VIU-20e will initiate the USB interface function and display the first entry in the USB menu.
3. Use up (▲) and down (▼) arrow keys to scroll to the desired report download function.
4. Use left (◀) or right (▶) arrow key to display **YES**.
5. Press **Enter**.

## 8.2 TROUBLESHOOTING

### 8.2.1 Status LEDs

**Table 8-1 VIU-20e Status LED Indications**

LED NOMENCLATURE	FUNCTION
Power	Green LED lights when power is applied to the VIU-20e.
Health	Yellow LED indicates VIU-20e health as follows: Slow flash (0.5Hz) = VIU-20e is healthy and communicating with internal CPU. Fast flash (2Hz) = VIU-20e is unhealthy.
GPS	Yellow and green LEDs are associated with GPS connector on top of unit. LEDs indicate the following: Green on steady = looking for GPS satellite Green flashing = found satellite and generating timing pulse Green off = GPS failure or not used Yellow on steady = GPS health OK Yellow off = GPS health problem
ECD	Show TX (green) & RX (red) activity between ECD located on the power connector and the internal CPU.
ETHERNET Port 1 Port 2	Yellow and green LEDs are associated with Ethernet ports 1 and 2 on top of unit. LEDs indicate the following: Yellow not lit = 10 Mbps link rate Yellow lit = 100 Mbps link rate Green flashing = message activity.  NOTE: Port 2 indicators apply to either Ethernet Port 2 or ESSR only (Port 2), depending on which is in use. Both cannot be used simultaneously.
SERIAL TX RX	Show TX (green) & RX (red) activity on serial connector located on top of VIU-20e.
INPUT STATUS	20 red LEDs. Indicate status of monitored vital inputs as determined by software.
USB	USB 2.0 interface activity indicators: Green on steady = USB drive is inserted and it is safe to remove the USB drive. Yellow flashing = file transfer in progress, do not remove USB drive. Red flashing = USB drive read or write error detected.

Several status LEDs are provided on the VIU-20e. These LEDs can provide initial indication of system health and potential problems. Refer to Table 8-1 for indications provided by these LEDs.

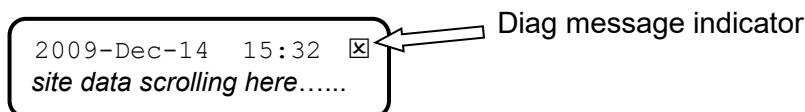
## 8.2.2 LED Activity at Power-Up

LED activity at power-up is as follows:

- First minute following power-up, the display reads VIU-20e SYSTEM BOOTING PLEASE WAIT and only the power LED is lit.
- At approximately 1 minute, 30 seconds from power-up, all front panel LEDs light to test for bad LEDs.
- At approximately 2 minutes from power-up, the VIU-20e settles into normal operation, the input status LEDs show current input status and the health LED flashes at 0.5 Hz.

## 8.2.3 Front Panel Diag Messages

The VIU-20e front panel display can show messages (Diag messages) and codes for several common system problems. If at least one Diag message is present, an asterisk (\*) will be displayed in the upper right corner of the display, as shown:



If there is at least one Diag message present, then every few seconds the display will switch to show the number of messages with a prompt to press the Diag button, then revert back to the normal display. This alternating display will continue every few seconds until the problem(s) is/are resolved. To view the Diag messages, press the Diag key on the front panel keypad at any time.



After pressing the Diag key, the front panel display will show the message count (message# of total messages), the error code, and the text message, as shown in the example below. To scroll through the Diag messages, use the up and down or left and right arrow keys. To return to the normal display press the Exit key.



A list of common Diag messages is shown in Table 8-2.

**Table 8-2 VIU-20e Front Panel Diag Messages**

Error Code	Message	Reason
101	MCF CRC Err	The MCF CRC is not valid. Check that the correct MCF and MCF CRC are loaded.
107	UCN Err	The UCN is incorrect.
109	Vital Unconfig	The Vital Core is unconfigured.
110	In Edit Mode	The Vital Core is in Edit mode.
151	No Slv Comms	There is no communication to the slave card.
<b><i>The following Diag messages are less likely to be seen, but are valid.</i></b>		
100	MCF Chk Err	MCF is corrupt – reload the MCF.
102	MCF Chk Err	The MCF is invalid – load a valid MCF.
103	Mod Type Err	The MEF is not valid for the hardware – load the correct MEF.
104	HW CI Err	The MEF is not valid for this hardware version of the card.
105	MCF CI Err	The MCF is not supported by the MEF.
106	SIN Err	The ATCS Site ID (SIN) is invalid.
108	MCF Cfg Err	The MCF is not supported by the MEF.

## 8.2.4 Possible System Problems

Table 8-3 lists some possible VIU-20e system problem conditions with causes and remedies.

**Table 8-3 Possible VIU-20e System Problems**

Problem	Cause	Remedy
Power LED does not light, VIU-20e does not power up	Poor power cable connection	<ol style="list-style-type: none"> <li>1. Check for correct power to B and N terminals on power connector.</li> <li>2. Check for poor wire connections at power connector and battery.</li> <li>3. Ensure power connector is firmly seated in the connector on the top of the VIU-20e.</li> </ol>
	Insufficient power	Verify that voltage level at B & N terminals of power connector > 8.5 volts.
	Incorrect battery polarity	Reverse B & N connections at power connector.
Health LED flashing at 2 Hz rate.	VIU-20e unconfigured, internal communication failure, VIU-20e unhealthy.	<ol style="list-style-type: none"> <li>1. View status message on display (indicates if VIU-20e is unconfigured, out of session, and health of master &amp; slave vital I/O circuits).</li> <li>2. Verify that MCF CRC, UCN and SIN are correct.</li> <li>3. Download and review Diagnostic Log for problem indications.</li> <li>4. Try a reboot of the VIU-20e. If none of the above fixes the problem, replace The VIU-20e.</li> <li>5. In systems with multiple VIU-20es, perform checks as above plus:</li> <li>6. Verify connections between main and auxiliary VIU-20es.</li> <li>7. Verify that IP addresses and configuration in general are correct.</li> </ol>
No Ethernet communications, Ethernet status LEDs not lit.	Bad Ethernet cable	Replace cable
	Bad Ethernet port	Try another port or replace VIU-20e
	Bad LAN connections	Check all LAN connections
No serial port communications, Serial status LEDs not lit.	Bad serial cable	Replace cable
	Serial port not configured properly on connected device	Configure device properly
	Bad connections	Check all serial cable connections
VIU-20e prompts user to insert USB drive when executive starts.	Failed or corrupted factory test results	Return VIU-20e to factory
USB drive not recognized.	Unsupported device	Use appropriate USB device

### 8.2.5 Using DT Diagnostic Tools

Connect a PC containing the Diagnostic Terminal software to the VIU-20e as described in Section 7. Launch the DT program.



**Figure 8-2 Diag Button Menu**

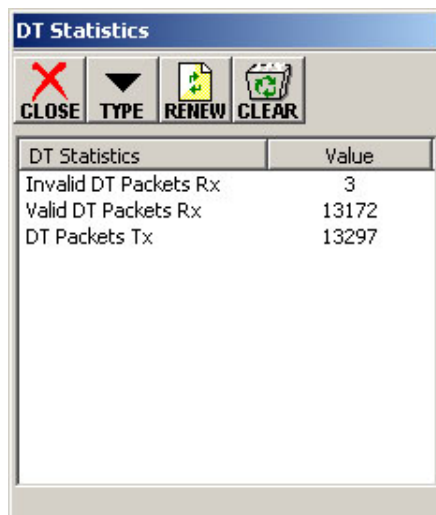
Click the **DIAG** button at the top of the DT Input Status Screen to display the diagnostic drop-down menu. This menu contains links to diagnostic tools (Statistics, Sniffer) that may be helpful in isolating communications problems internal to the VIU-20e or between the VIU-20e and a connected PC running the DT utility program.

#### 8.2.5.1 Statistics

Select **Statistics** from the diagnostic drop down menu to display the DT Statistics screen (Figure 8-3). This screen provides a snapshot of communications statistics pertaining to the Laptop Serial port on the VIU-20e. These statistics indicate the number of valid / invalid Diagnostic Terminal data packets transmitted and received via this port.

Click the **RENEW** button to update the current DT Statistics display.

Click the **CLEAR** button to delete the current statistics record and return all values to zero.



**Figure 8-3 DT Statistics Screen**

The **TYPE** button displays a drop-down menu of statistic types that can be viewed (Figure 8-4). However, only the **DT Statistics** option is valid. All other selections will return a 'No data found' message.

Click the **CLOSE** button to return to the Input Status Screen.

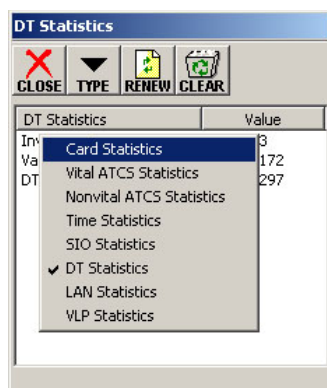


Figure 8-4 Statistics Type Drop-Down Menu

### 8.2.5.2 Sniffer

Select **Sniffer** from the diagnostic drop down menu to display the Sniffer screen (Figure 8-5).

The Sniffer is provided as a diagnostic tool primarily for use by Siemens Engineering personnel.

The Sniffer monitors ATCS message activity between the VIU-20e and the DT utility program and displays the message bytes for evaluation.

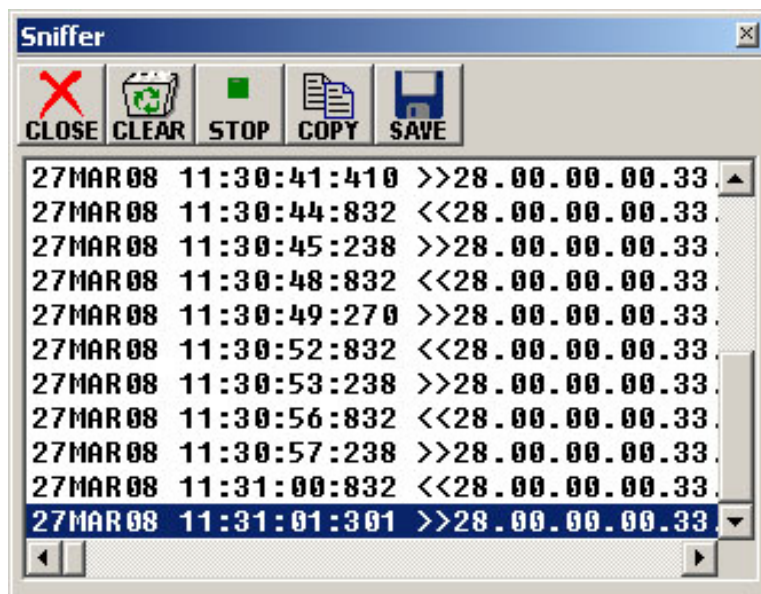


Figure 8-5 Sniffer Screen

This is a dynamic display. As new message traffic occurs, it is added to the bottom of the display and the message list scrolls up screen.

Click the **STOP** button to freeze the display so that currently displayed messages can be examined. The button label changes to **START**. Click the button again to continue monitoring messages as they occur.



Use the scroll bar at the bottom of the screen to view the full length of the messages.

Click the **CLEAR** button to remove all currently displayed messages from the screen. New messages will appear on the screen as they are sent or received.

Click the **SAVE** button to save a snapshot of the record to a file or to create a real time recording of the messages to a file.

Click the **CLOSE** button to return to the Input Status Screen.

### **8.2.6 Other Useful Information**

The DT Status Log and Summary Log may be useful in identifying problems with the VIU-20e system. Please refer to Section 7 for details on accessing these logs.

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## APPENDIX A

### MINIMUM GUIDELINES FOR TESTING A VIU-20e

#### A.0 DEFINING VIU-20e CONFIGURATION PARAMETERS

The following procedure provides minimum guidelines for testing a VIU-20e (ACSES) unit upon new installation, modification, disarrangement of wiring to the unit, or any change requiring a new, or modified MCF. This procedure outlines the minimum testing that must be done to verify the VIU-20e system hardware and software is functioning as intended. The railroad and/or authority may require additional testing to be performed in support of changing a unit or modifying a configuration file.

#### A.1 SCOPE

- Location Circuit Plans. These plans should contain the input assignments and program configuration information for the VIU-20e location.
- VIU-20e (ACSES) Configuration Sheets furnished by the Signal Design Group.
- Railroad/User Maintenance and Testing Regulations and Instructions. (All applicable test procedures, standards, and operating instructions.)
- Railroad/User Software Configuration Guidelines, where applicable.
- Railroad software configuration information.

**Table A-1 VIU-20e Basic Verification Test Steps**

STEP	ACTION
1	Cross-check the Location Circuit Plan to the Configuration Sheets provided by the Signal Design Group to verify all programmed data matches.
2	Enter Site Setup by pressing MENU / ENTER / and answering YES to enter Vital Edit Mode.
3	Press RIGHT ARROW button two times until UCN is displayed.
4	Press ENTER to display the UCN value of the VIU-20e.
5	Verify UCN value of the VIU-20e matches the UCN shown on the Location Circuit Plans.
6	Referencing the Location Circuit Plans, confirm that all Inputs are wired and functioning properly. Input statuses can be seen on the front panel. (Red = Energized, Dark = Deenergized)
7	Use a Wayside/Carborne Simulator connected to validate all messages associated with each interlocking signal when it is displaying a <u>Permissive</u> Aspect. Repeat for every programmed route.
8	Use a Wayside/Carborne Simulator connected to validate all messages associated with each interlocking signal when it is displaying a <u>Stop</u> Aspect. Repeat for every programmed route.

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## APPENDIX B

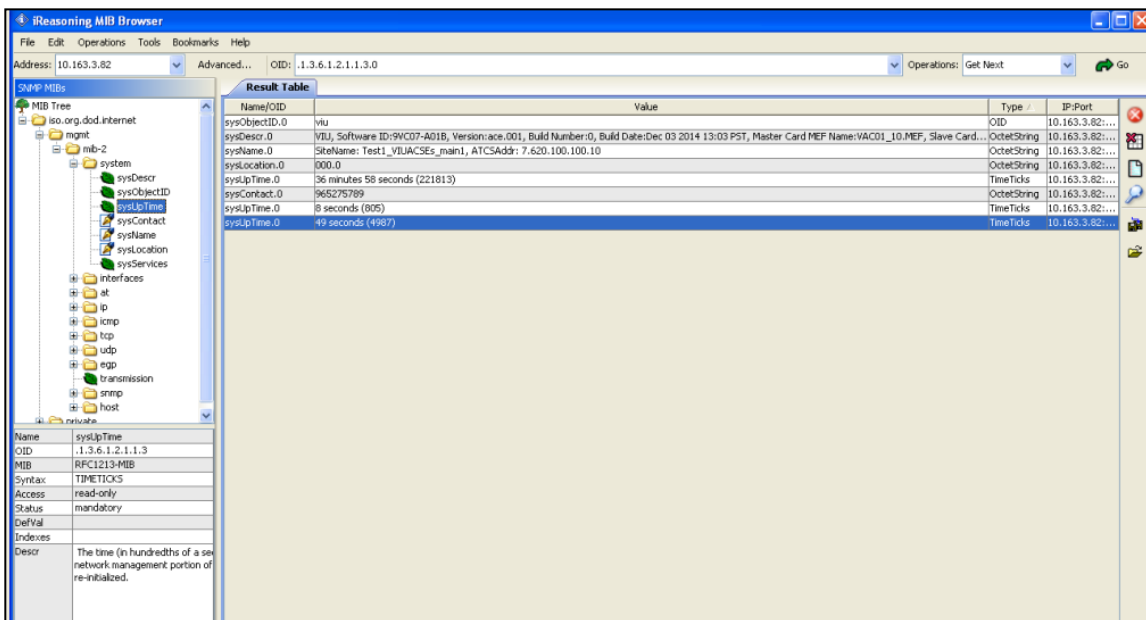
### SNMP TRAPS

#### B.0 SNMP GETS

SNMP Get functions are available in ACSES to obtain the following information in the MIB tree:

**Table B-1 SNMP GET Functions**

FUNCTION	DESCRIPTION
sysDescr	System Description which includes software versions, software IDs, build dates for NVCore MEF, Vital Master MEF and Slave MEF
sysName	Includes Site name and ATCS Address
sysLocation	Includes mile post
sysUpTime	Time since Vital MEF last rebooted
sysContact	Contact phone number entered on SNMP Configuration Web UI page



**Figure B-1. Sample SNMP MIB**

## B.1 SNMP TRAPS

The VIU-20e supports the following SNMP Traps. Exactly how these are used depends on the CDL program (see CDL documentation for CDL syntax). The Clear column indicates (Yes or No) if the VIU-20e will generate a separate trap when the condition clears.

**Table B-2 SNMP Traps**

NAME	DESCRIPTION	OPERATIONAL IMPACT	NOTES	CLEAR?
VIU Health	Alert sent indicating the overall health of the system. The alert is sent when health changes from good to bad and the clear is sent when health changes from bad to good.	If the alert occurred, one of the other alerts in the list should have occurred.		Y
System in edit mode	A user has placed the system in edit mode to modify vital parameters. The alarm will be cleared when system reboots and comes up fully operational.	In edit mode the system will not generate ACSES messages and all I/O is set to the most restrictive state.	Expecting that configuration change trap will be the trigger for us to discover any meaningful changes.	Y
Configuration Changed	Sent If either the vital or non-vital configuration data changed (due to user change or other remote command).	None. Informational.		N
Invalid address received	The Network should be configured not to deliver ATCS messages to the wrong VIU-20e.		The time period for reporting this is configurable in the CDL	N
Invalid Encoder Number	The encoder number in the data doesn't match the ATCS addresses.			N
Invalid Signal Number	OBC requested signal that is not configured in VIU-20e.			N
Message number error	Out of sequence message received from OBC			N
Message Version number error.	VIU-20e checks that VIU-20e version is set to 1.			N

NAME	DESCRIPTION	OPERATIONAL IMPACT	NOTES	CLEAR?
Loss of time source	The VIU-20e has not been receiving time updates for a programmable period. Clears when time updates resume for a programmable period.		Duration thresholds are configurable by user.	Y

For each trap the following Object Identifiers (OID) are available:

**Table B-3 SNMP Object Identifiers**

SNMP OID	VALUE	DESCRIPTION
deviceType.0	VIU	Defines the type of equipment that sent the SNMP trap. For the VIU-20e, this field will always contain "VIU"
dateTime.0	03-May-2012 18:56:13	Date and Time the system created the alert
siteName.0	VIU-20e location	This field contains the Site Name, as set in the VIU-20e configuration settings.
milePost.0	35.2	This field contains the Milepost Number, as set in the VIU-20e configuration settings
spareText2.0	Not used	Reserved for future use.
spareText1.0	2950240fd20218	Not used. Reserved for future use.
alarmPriority.0	4	The priority of the alarm as set by the VIU-20e's CDL logic. This value is specific to each alert (see the manual for the specific CDL program).
alarmClearFlag.0	0	Indicates whether this is the alarm or the corresponding clear for the alarm.
alarmText.0	Alarm Enabled Message	The Alarm text as programmed into CDL logic. This value is specific to each alert (see the manual for the specific CDL program).
alarmID.0	2	The Alarm ID number as programmed in the CDL logic. This value is specific to each alert (see the manual for the specific CDL program).
trapNum.0	3	The Trap Number as programmed in the CDL logic. This value is specific to each alert (see the manual for the specific CDL program).
snmpTrapOID.0	1.3.6.1.4.1.3064.3.20.2.2	The ID of the trap in the unit's MIB. This value is specific to each alert (see the manual for the specific CDL program).

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## **APPENDIX C**

### **EXTERNAL HAZARDS**

#### **C.0 EXTERNAL HAZARDS**

The Onboard ACSES Computer needs to protect against the following hazards:

1. Accepts corrupt ACSES messages as being valid,
2. Accepts stale ACSES messages as being valid,
3. Sets a state that's less restrictive than the data contained in a valid ACSES response message,
4. Maintains a non-restrictive state when no valid ACSES response message is received from the VIU-20e after an application specific timeout

The project designer must ensure that each VIU-20e has a unique ATCS address.

The application engineer writing the application program (MCF) needs to ensure that the MCF contains the correct restrictive states when ATCS communications between modules is lost. That the correct states are attained when ATCS communications between VIU-20e is lost should be rack tested along with the application logic.

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