SmartMeter™ System

Itron CENTRON® GPRS SmartMeter User Guide

SMR45-4601A

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Document Revisions

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The information in this guide should not be considered as all-inclusive or covering all cases for events that may occur. If further information is required, consult your technical support representative.

See the License Agreement contained in the product for complete license information.

Contact your technical support representative for more information on any of our products.

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1 Introduction

1.1 About This Guide

This document is a manual designed to help guide you through the testing, installation and activation of your Itron CENTRON® SmartMeter. This manual provides general instructions on the support of your SmartMeter and references to supporting manufacturer documentation for detailed guidelines and instructions on features and operating characteristics of the SmartMeter for installation, programming, communication, and troubleshooting.

1.2 Reference Materials

The following reference software and documentation are pertinent to the successful installation and use of the CENTRON SmartMeter.

Itron/Schlumberger
- CENTRON Device Manual
- PC-PRO+Advanced Software
- PC-PRO+Advanced Installation Guide
- PC-PRO+Advanced User Guide

SmartSynch
For more information on the CENTRON SmartMeter, see the product brochure and spec sheet, available online at http://smartsynch.com/support/documents/CENTRON_SmartMeter_e.pdf.

1.3 Contacting SmartSynch

1.3.1 Technical Support

SmartSynch's technical support staff is ready to answer your technical questions. Your technical support representative can provide information about the latest SmartSynch products, upgrade options, and more. Contact your technical support representative directly, through the Online Customer Support Center at http://smartsynch.com/support/login.html, or by email at cs@smartsynch.com.

Note: You must be a registered user to access SmartSynch's online support services.

Help us help you

When contacting technical support please provide the following information for the fastest possible service:
- Your name, company name, and contact number
- SmartMeter make and model (meter manufacturer, SSI version number)
- Complete description of the issue, including the steps to reproduce it
- Wording of any message(s) displayed when the issue was encountered
- Action taken to resolve the problem

1.3.2 Documentation Feedback

SmartSynch, Inc. strives to produce quality documentation for our products and welcomes your feedback. If you have comments or recommendations about our online help or printed guides, you can email us. Please send email messages to cs@smartsynch.com. This email address is only for documentation feedback. If you have a technical question, please contact your technical support representative.

1.3.3 SmartSynch Headquarters

SmartSynch, an energy technology company based in Jackson, Mississippi, is the leading provider of advanced metering solutions to the energy and utility industry. Its core product, the SmartMeter System, enables energy and utility companies to communicate with commercial and industrial electricity meters using wireless communications and the Internet. The SmartMeter System manages the delivery of critical information to any application system, workstation, computer, or browser-enabled personal communication device.

Mailing Address:	SmartSynch, Inc. P.O. Box 12250 Jackson, MS 39236-2250	Telephone: Fax:	601-362-1780 601-362-1787
Street Address:	4400 Old Canton Road Suite 300 Jackson, MS 39211	World Wide Web: Office Hours:	www.smartsynch.com 8:00 a.m. to 5:00 p.m. Central Time

2 Getting Started

Please review the reference documentation before you begin the installation and use of the supporting software.

2.1 Operations

The CENTRON SmartMeter is an Itron CENTRON electronic single-phase electricity meter integrated with a SmartSynch Interface (SSI) Module, which fully supports ANSI standards for electricity metering and is intended for use by commercial and industrial utility customers.

The CENTRON SmartMeter offers you secure over-the-air transfer of data between the SmartMeter and the TMS (Transaction Management System).

2.2 Safety Precautions

The CENTRON SmartMeter contains a Siemens MC56 GPRS Cellular Engine for wireless communication purposes. The following safety precautions pertain to the hazards related to this device's radio frequency (RF) functionality and must be observed during all phases of installation, operation, service, and repair. Failure to comply with these precautions violates safety standards of design, manufacture, and intended use of the product.

> **WARNING!**
> **Use authorized utility procedures for installing, maintaining, and removing a SmartMeter. Equipment damage, personal injury, or death can result if devices are not properly installed and operated.**

2.2.1 Interference with Medical Equipment

Before installing the CENTRON SmartMeter on the premises of a hospital or other health care facility, observe the restrictions on the use of mobile communication devices in sensitive areas. Some medical equipment may be sensitive to radio frequency (RF) energy, possibly requiring the meter to be properly shielded or placed in an alternate location.

The operation of cardiac pacemakers, hearing aids, and other implanted medical equipment can be affected by interference from cellular devices placed too closely. Pacemaker patients are advised to observe the same precautions recommended for handheld mobile phones while installing or operating the CENTRON SmartMeter.

2.2.2 Fire or Explosion Hazards

Do not install or operate the CENTRON SmartMeter in the presence of flammable gases or fumes. This includes gasoline stations, fuel depots, chemical plants, or sites where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard.

2.2.3 Interference with Other Devices

The communication module embedded in the CENTRON SmartMeter receives and transmits radio frequency (RF) energy while in operation. Interference can occur if it is placed too close to televisions, radios, computers, or inadequately sheltered equipment. Follow any applicable regulations if you suspect that this device may cause interference or danger.

2.3 Prerequisites

To perform the installation of your SmartMeter, you must have access to the following supporting software and should have reviewed relevant documentation:

Itron/Schlumberger (Meter Configuration and Analysis Tool) software, for programming the CENTRON meter. PC-PRO+98 is a Microsoft Windows-based tool that communicates with the CENTRON meter for program development, meter programming, meter reading, meter testing, and report generation. PC-PRO+ system requirements and installation instructions may be obtained in the:

- **PC-PRO+Advanced Installation Guide**
- **PC-PRO+Advanced User Guide**

3 Installing the CENTRON SmartMeter

3.1 Preliminary Inspections

The CENTRON SmartMeter is calibrated and tested at the factory and is ready for installation. Before installing and applying power to the SmartMeter, a quick inspection of the SmartMeter is recommended to ensure there is no damage to the SmartMeter, which could possibly occur during shipping. Physical damage to the SmartMeter indicates potential damage to the inside of the SmartMeter. Do not connect power to a SmartMeter that is suspected of having internal damage. Contact your SmartSynch technical support representative if you suspect your SmartMeter is damaged.

3.2 Installation Process

The customer will receive meters in a "Preconfigured" state. This means that meters have been integrated with an SSI SmartMeter Module loaded with the SSI embedded software, an **inactive (unless shipped active per customer request)** cellular network Subscriber Identity Module (SIM) card, and has passed several quality control stages. In addition, a *Ship* file containing device specific information has been generated by SmartSynch for the customer. This file is imported into a configuration server by SSI personnel and a copy is provided to the customer. Upon SIM card activation, upon shipment, or later upon customer request, an *Activation* file containing cellular network-specific information is generated. This file is also imported into the configuration server and a copy is provided to the customer.

Typically, a customer can deploy the meter using one of two methods, depending on business needs:

3.2.1 Option 1: Direct Field Installation

This option is used when the customer prefers immediate deployment of the meters "from the box to the base." This option is desirable in a deployment situation where a large number of meters need to be deployed in a relatively short period of time. The customer-specific information is automatically Over-the-Air downloaded to the SSI module upon energizing the meter and no addition action is needed on-site. Follow the meter installation instructions in Section 3.2.3.

3.2.2 Option 2: Meter Shop Test and Field Installation

There is no need for the Meter Shop to reprogram and test the SmartMeter when it arrives. Upon shipment, the meter will have undergone significant functional and RF testing at the factory. Internal quality control checks will ensure the SSI module is able to communicate with the meter successfully as well as communicate with all other internal components before it is shipped. The device will also arrive in a generic "Preconfigured" state with no customer-specific data stored in internal memory. There is no need for the Meter Shop to perform any programming steps on the meter.

3.2.3 Meter Installation

1. The installer verifies network coverage with a SmartSynch Coverage Validation Unit (CVU).
2. The meter is placed in the socket and energized. The meter is now in the Pre-Configured state.
3. Once in the Pre-Configured state, the SSI embedded software transmits an Auto-Configuration message to the configuration server.
4. Upon receiving the meter's Auto-Configuration message, the configuration server will set all of the customer specific parameters into the SSI module's non-volatile memory.

5. When the SSI module inside the meter is fully configured with the customer specific information it will immediately send an Auto-Registration message to the customer's TMS server.
6. If the meter successfully communicates with TMS the Registration message is processed and the meter sends a confirmation message back to the configuration server.
7. The meter is added/updated in the "Registration Group" under the Master List in TMS.
8. The meter is now in the "Placed" state.
9. The meter is ready to receive the Provisioning commands from TMS.
10. Once the meter is provisioned, meter data can be collected from the meter.

3.3 Provisioning the SmartMeter

The provisioning process must be completed to ensure the resulting transaction communication between the TMS and the device is correctly interpreted. If the provisioning process does not run to completion within 30 minutes, the TMS Operator should confirm that coverage validation procedures were properly followed and then review the PIN settings in the Device properties setup.

Next, the operator should check the events in Monitoring Home>Event Search that have occurred within the time following the provision request.

There should be a response within a short time period from the specified device showing the version of the SSI Module, since the **Get Version** transaction is the initial start of the provisioning process. Once the Get Version response is returned to the TMS for the TMS to determine certain attributes of the Device, the TMS sends a number of other transactions to the device to complete the provisioning process.

If the **Get Version** does not complete successfully, check your Device PIN configuration.

If there is no response of the initial provisioning transaction, follow the troubleshooting processes outlined in Section 4. If unsuccessful, check the status of your local Internet connection, and then contact SmartSynch Customer Support for assistance.

4 Troubleshooting

4.1 Troubleshooting Process Flow

The troubleshooting support directives may involve a number of participants to resolve the issue, depending on the type of issue involved. Resolution may include TMS Administrators, TMS Operators, Field Meter Support personnel, or any user who may be required to support the TMS, its clients, or related data.

Section 4.2 describes the required corrective action that corresponds with each step in the flowcharts. The first chart describes the process for Onsite (Field) troubleshooting, and the next describes the process from the TMS Operator's perspective

Onsite Troubleshooting Flowchart
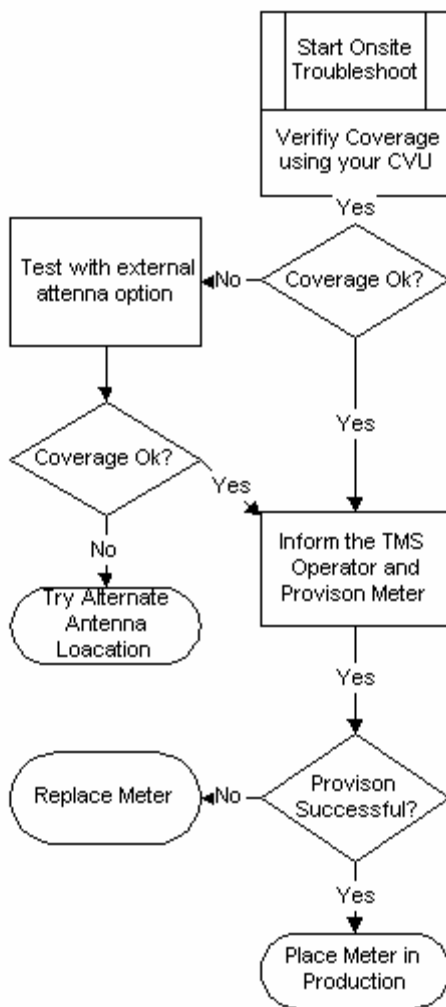
With either process, be sure to perform these initial steps:
1. Confirm that the meter is actually installed in the field.
2. Verify that the PIN for that meter is correct.
3. Verify that the site exceeds the acceptable minimums using the Coverage Validation Unit.

TMS Troubleshooting Flowchart (for meters that have been previously provisioned successfully)
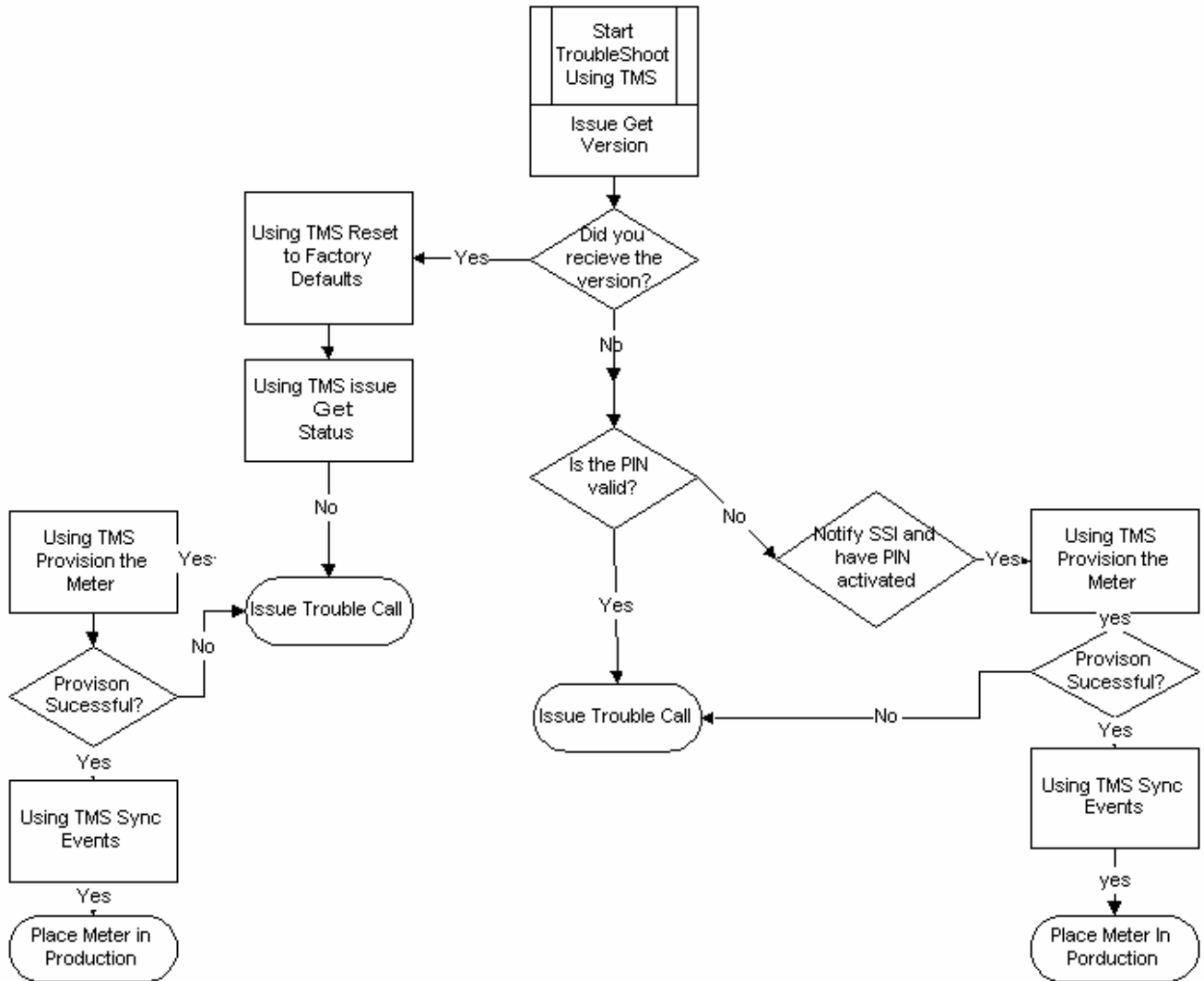
4.2 Troubleshooting Process Description

Process Steps	Description	Action
1	Is Meter Installed in field?	Check work orders, inventory management, or verify with Field Personnel that meter is installed and energized at a valid Customer location.
2	Install Meter	Refer to the Installation section of this document

Process Steps	Description	Action
3	Is Pin # Correct?	Validate that the pin number in the TMS system is indeed the pin number that is matched with the correct meter. Checking the manufacturer's spreadsheet sent with the meters and/or visually inspecting the label on the meter can accomplish this task.
4	Did site pass CVU tests?	Check Meter Test Person's site validation notes and verify that test were properly run and meet the minimum requirements.
5	Get Version?	Perform Get Version ANSI action on device. (See TMS User Guide)
6	Restore Meter to Factory Defaults?	Perform Restore Meter to Factory Defaults ANSI (see TMS User Guide)
7	Get Status?	Perform Get Status ANSI action on device. (See TMS User Guide)
8	Get Status Successful?	Check the results of the Get Status ANSI using Event Search and View Details. (See TMS User Guide)
9	Execute the following Task: Provision	Execute Provision on the meter. (See TMS User Guide)
10	Did the meter provision?	Check the results of the Provision ANSI using Event Search and View Details. (See TMS User Guide)
11	Sync System to Device	If meter is already in a Functional Group, user will need to execute task Sync System to device. (See TMS User Guide)
12	Put meter into production system	Do the necessary paperwork to put meter on production system and notify appropriate stakeholders.
13	Ping the Pager Using the Internet/Web Browser	Go to the Network web page. Send a message tab. Enter in the pin number of the device and a miscellaneous message in the message field. Click Send. (See Section 4.2.1)
14	Is Pin Active?	After using the internet/web browser, does the screen say message submitted (yes) or invalid pin (no)? (See Section 4.2.1)
15	Activate Pin Through SmartSynch	Log on to the OCS and create a new case for the invalid pin. SmartSynch Personnel will take care of the issue and notify the user when the PIN is active.
16	Field Site Visit - Call into TMS Operator	Dispatch a meter tech to perform the Onsite troubleshooting procedure and have them call into the TMS operator at the time of completion.
17	Bring Meter in for evaluation	Replace meter with another SmartMeter and bring into Meter Shop for further evaluation.

5 CENTRON Display Feature
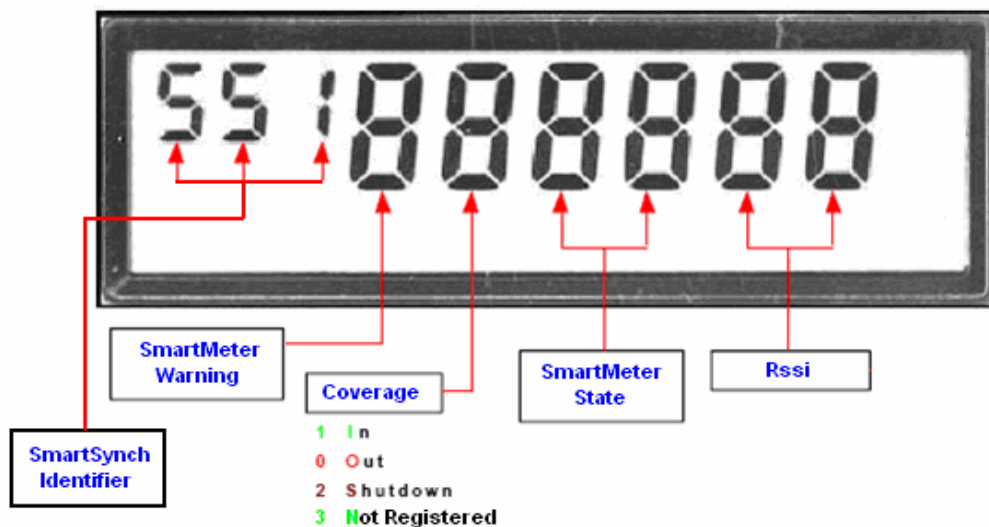
1. **SmartSynch Identifier**: In general, the meter program controls the number of displays, associated fields, and display time. This 3-letter field identifies SmartSynch display among available displays.

Values	Description
SSI	SmartSynch, Inc.

2. **SmartMeter Warning**: displays error codes generated by SmartSynch embedded software.

–	●	Normal operations – no errors
1	●	SmartMeter module's NVRAM error
2	●	Read/write failure in the Common Configuration area - NVRAM
3	●	Read/write failure in the App. Specific Configuration area - NVRAM
4	●	Actual firmware binary image is corrupted
5	●	Firmware image decompression error
6	●	Meter clock deviation is greater than the maximum correction limit
7	●	Software watchdog triggered – processor is reset

● Good.   ● Warning.   ● Error

3. **Wireless Coverage Status**: coverage status detected by the GPRS modem.

Values	Description
1	In coverage: modem can hear the network
0	Out of coverage: modem can't hear the network
2	Shut-down: modem power is off when temperature is outside [-20C, +70C] range
3	Not Registered: modem is **not** currently registered to any networks, but **is** trying to manually register on its own

4. **SmartMeter State**: provides a high-level state of SmartSynch firmware.

00	●	Initial state – SmartMeter not Quality Controlled yet
01	●	SmartMeter passed the Meter Integrator QC
02	●	SmartMeter passed Utility QC & is ready for deployment
03	●	SmartMeter is attempting to auto-configure with configuration server
04	●	SmartMeter is configured & is attempting to register with TMS
30	●	SmartMeter failed to automatically download configuration
05	●	SmartMeter has automatically registered with TMS
31	●	SmartMeter failed to automatically register with TMS
06	●	TMS has successfully provisioned the SmartMeter
80	●	SmartMeter failed to transmit messages in up to 24 hours
81	●	SmartMeter failed to transmit in at least 24 hours (# messages < 10)
82	●	SmartMeter failed to transmit in at least 24 hours (# messages >= 10)

● Not ready.   ● Good.   ● Warning.   ● Error

States: 00 – 29; Errors: 30 – 59; Warnings: 80-99

5. **Received Signal Strength Indicator (RSSI)**: signal strength as reported by the modem

Displayed RSSI Value	**Equivalent Power Value (dBm)**
0	-113 or less
1	-111
2	-109
3	-107
5	-103
7	-99
9	-95
11	-91
13	-87
15	-83
17	-79
19	-75
21	-71
23	-67
25	-63
27	-59
29	-55
31	-51
99	not known or not detectable

6   Requirements and Compliance

The CENTRON GPRS SmartMeter is compliant with all applicable Federal Communications Commission (FCC) and Industry Canada (IC) requirements. The FCC and IC identification numbers for the CENTRON GPRS SmartMeter are listed as follows:

> **FCC identifier: QHC-CENGPRS1**
> **IC identifier: 4393B-CENGPRS1**

This certification is granted to SmartSynch Inc.

The reference application registered under the above identifier is certified to be in accordance with the following Rules and Regulations of the Federal Communications Commission (FCC):

> "This device contains GSM 1800MHz function that is not operational in U.S. Territories. This device is to be used only for mobile and fixed applications. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance. Antennas used for this OEM module must not exceed 7dBi gain (GSM 1900) and 1.4dBi (GSM 850) for mobile and fixed operating configurations. This device is approved as a module to be installed in other devices. Each OEM must obtain their own Certification for each device containing this module."

In addition, the CENTRON GPRS SmartMeter fully complies with the TS 51.010 tests as adopted by the PTCRB and defined in the NAPRD section 11.