

SCTE[®] | STANDARDS

Network Operations Subcommittee

SCTE STANDARD

SCTE 205 2022

**Outside Plant Power Recommended Preventive
Maintenance Operational Practice**

NOTICE

The Society of Cable Telecommunications Engineers (SCTE) Standards and Operational Practices (hereafter called “documents”) are intended to serve the public interest by providing specifications, test methods and procedures that promote uniformity of product, interoperability, interchangeability, best practices, and the long term reliability of broadband communications facilities. These documents shall not in any way preclude any member or non-member of SCTE from manufacturing or selling products not conforming to such documents, nor shall the existence of such standards preclude their voluntary use by those other than SCTE members.

SCTE assumes no obligations or liability whatsoever to any party who may adopt the documents. Such adopting party assumes all risks associated with adoption of these documents and accepts full responsibility for any damage and/or claims arising from the adoption of such documents.

NOTE: The user’s attention is called to the possibility that compliance with this document may require the use of an invention covered by patent rights. By publication of this document, no position is taken with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from the standards developer. SCTE shall not be responsible for identifying patents for which a license may be required or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

Patent holders who believe that they hold patents which are essential to the implementation of this document have been requested to provide information about those patents and any related licensing terms and conditions. Any such declarations made before or after publication of this document are available on the SCTE web site at <https://scte.org>.

All Rights Reserved
©2022 Society of Cable Telecommunications Engineers, Inc.
140 Philips Road
Exton, PA 19341

Document Types and Tags

Document Type: Operational Practice

Document Tags:

- | | | |
|--|------------------------------------|--|
| ☐ Test or Measurement | ☐ Checklist | ☐ Facility |
| ☐ Architecture or Framework | ☐ Metric | ☒ Access Network |
| ☒ Procedure, Process or Method | ☐ Cloud | ☐ Customer Premises |

Document Release History

Release	Date
SCTE 205 2014	08/11/2014
SCTE 205 2022	12/19/2022

Note: Standards that are released multiple times in the same year use: a, b, c, etc. to indicate normative balloted updates and/or r1, r2, r3, etc. to indicate editorial changes to a released document after the year.

Table of Contents

Title	Page Number
NOTICE	2
Document Types and Tags	3
Document Release History	3
Table of Contents	4
1. Introduction	6
1.1. Executive Summary	6
1.2. Scope	6
1.3. Benefits	6
1.4. Intended Audience	6
1.5. Areas for Further Investigation or to be Added in Future Versions	6
2. Normative References	6
2.1. SCTE References	7
2.2. Standards from Other Organizations	7
2.3. Published Materials	7
3. Informative References	7
3.1. SCTE References	7
3.2. Standards from Other Organizations	7
3.3. Published Materials	7
4. Compliance Notation	7
5. Abbreviations and Definitions	8
5.1. Abbreviations	8
5.2. Definitions	8
6. Safety Equipment	10
7. Recommended Tools and Equipment	11
8. Frequency of performing HFC OSP Power Supply Maintenance.	11
9. Procedure – Physical Inspection of the System	11
9.1. Inspection of the cabinet	11
9.2. Pad Undermining	12
9.3. Inspection of indicator lamps	12
9.4. Ground Integrity	12
9.5. Surge Suppression/SPI Alt Box	12
9.6. Inspect all Wiring and Power Supply	12
9.7. Remove all Dirt, Dust and Debris from the Cabinet	13
10. Battery Maintenance Procedure	13
10.1. Battery Visual Inspection	13
10.2. Power Supply Charger Evaluation	14
10.3. Battery Test Evaluation Using Float Voltage	14
10.4. Battery Test Evaluation Using Conductance Reading	15
10.5. Battery Test Evaluation using Power Supply Self-Test	15
10.6. Battery Redeployment Procedure using 24-hour Open Circuit Voltage Test (performed in the warehouse on batteries removed from the field but under consideration for redeployment)	16
11. Power Supply Standby	16
11.1. Checking the Inverter Module	16
11.2. Replacing Inverter Module Procedures	17
12. Communications/Transponder Evaluation	18

13. Alarms _____	18
14. Documentation _____	21
15. Appearance And Completion _____	22
15.1. Dress the Wires – All wires should be routed in an orderly manner. _____	22
15.2. Tie-wrap all wires neatly. _____	22
15.3. Ensure equipment is secure and cabinet is locked before departing. _____	22
APPENDIX A: Sample Preventive Maintenance Certification Report _____	23

List of Figures

Title	Page Number
Figure 1 - Depending on the power supply make/model, some inverter modules may be tethered to the power supply with a ribbon cable that must be disconnected when removing the inverter module	17

List of Tables

Title	Page Number
Table 1 – Battery Evaluation Criteria	15
Table 2 – Example Alarms and Corrective Actions	19

1. Introduction

1.1. Executive Summary

This document is intended to deliver the information needed for a cable operator to properly maintain outside plant powering systems including the power supply, batteries, cable assemblies, and management and monitoring devices, while also providing a template to deliver comprehensive maintenance information back to management. With new cable network architectures such as distributed access architectures (DAA), outside plant powering becomes even more critical, because the slightest power interruption can cause an extended customer affecting outage.

1.2. Scope

The intent of this document is to serve as a reference for cable technical personnel on how to do a proper preventive maintenance visit on outside plant cable power systems. As reliability expectations increase, the powering sub-systems of today's cable networks must be depended on for near-perfect operation. The procedures in this document will help guide the reader through proper maintenance guidelines for power systems, including power supplies, batteries, transponders and enclosures, resulting in optimal system performance and reducing outages and unnecessary truck rolls.

1.3. Benefits

The procedures in this document will help to ensure that personnel performing outside plant power supply and powering maintenance correctly perform the task and record relevant information to help management in future power decisions. With new HFC architectures like DAA affected by the slightest powering issue, these routine tests become all the more critical, and must be performed correctly to ensure that maintenance does not create any powering impacts. The operator should see improved performance of their network powering system as well as complete documentation to better assess future decisions.

1.4. Intended Audience

The intended audience for this document includes cable system managers, supervisors, power supply maintenance departments, those in charge of recording and records, service technicians, and others who might be interested in proper maintenance of outside plant powering.

1.5. Areas for Further Investigation or to be Added in Future Versions

DAA powering architecture and centralized powering considerations could be investigated further in a future revision.

2. Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this document. The editions indicated were valid at the time of subcommittee approval. All documents are subject to revision and, while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1. SCTE References

No normative references are applicable

2.2. Standards from Other Organizations

No normative references are applicable.

2.3. Published Materials

No normative references are applicable.

3. Informative References

3.1. SCTE References

No informative references are applicable.

3.2. Standards from Other Organizations

[OSHA 29 CFR 1926.441] Safety and Health Regulations for Construction; Batteries and battery charging.

3.3. Published Materials

Manufacturer-specific battery, power supply, cabinet and transponder manuals

4. Compliance Notation

<i>shall</i>	This word or the adjective “ required ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
<i>forbidden</i>	This word means the value specified shall never be used.
<i>should</i>	This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
<i>should not</i>	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
<i>may</i>	This word or the adjective “ <i>optional</i> ” means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.
<i>deprecated</i>	Use is permissible for legacy purposes only. Deprecated features may be removed from future versions of this document. Implementations should avoid use of deprecated features.

5. Abbreviations and Definitions

5.1. Abbreviations

AC	alternating current
ATS	automatic transfer switch
AWG	American Wire Gauge
°C	degree Celsius
DAA	distributed access architecture
°F	degree Fahrenheit
GPS	Global Positioning System
i.e.	id est (that is)
IM	inverter module
IP	Internet Protocol
LAP	lightning arrestor protector
LED	light emitting diode
MAC	media access control
MSO	multiple system operator
mV	millivolt
NEC	National Electrical Code
NESC	National Electrical Safety Code
OSP	outside plant
PIM	protective interface module
PM	preventive maintenance
PS	power supply
PTS	precision temperature sensor
RF	radio frequency
RMS	root mean square
RTS	remote temperature sensor
RX	1) receive; 2) receiver
SCTE	Society of Cable Telecommunications Engineers
SPI	service power inserter or interface
TMPR	tamper
TX	1) transmit; 2) transmitter
UPS	uninterruptible power supply
V	volt (or volts)
VAC	voltage (or volts) alternating current
VDC	voltage (or volts) direct current
XPDR	transponder

5.2. Definitions

alternating current (AC)	An electric current that periodically reverses direction and whose instantaneous magnitude varies continuously over time. Examples include extremely low frequency AC from a household electrical outlet (50 Hz or 60 Hz), as well as RF signals. See also <i>current</i> .
capacitor	An electronic component that exhibits capacitance, that is, the ability to store electrical energy in an electrostatic field. In cable TV standby