

CCC Desk Instruction	Power Systems Map Board Maintenance And Updates			Number: CCC-I-0014	
Complex Control Center	Approved by: SIC	Initial Issue Date: 06/12/12	Page: 1 of 11	Revision: 3 Eff Date: 01/17/24	

PURPOSE:

This desk instruction is provided to define the responsibilities and expectations of console operations personnel in the Complex Control Center (CCC) at Kennedy Space Center (KSC). This desk instruction is to be used exclusively by console operations personnel in the Complex Control Center as a reference guide to work requirements that are identified in MSO-P-0004, "Complex Control Center Operations".

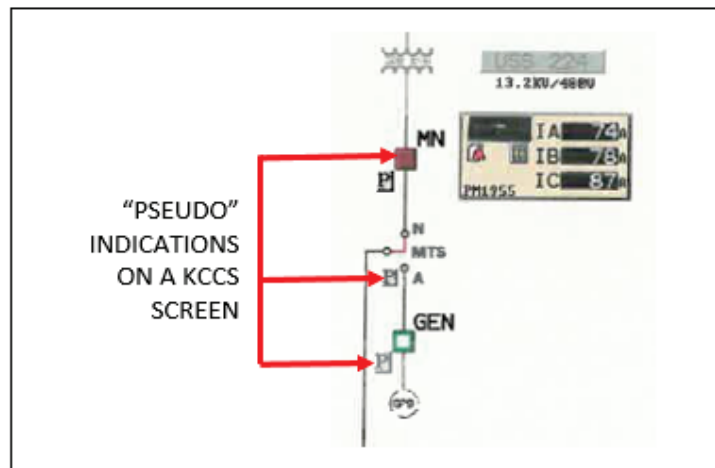
INSTRUCTIONS:

The following instructions shall be adhered to by all console operations personnel when working with the electronic Power Systems Map Board in the Complex Control Center.

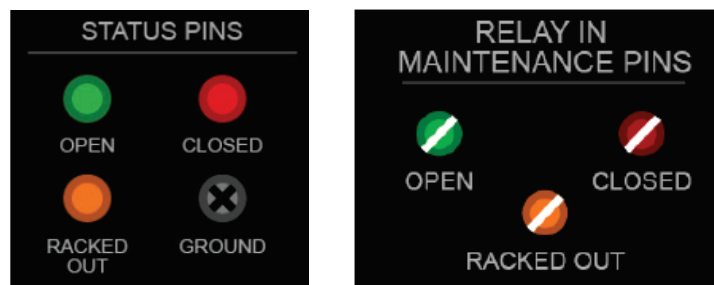
I. Temporary Electronic Power Systems Map Board Changes

Note: Temporary changes do not involve permanent Adobe Illustrator drawing updates or Citect software linking changes being made to the electronic Power Systems Map Board.

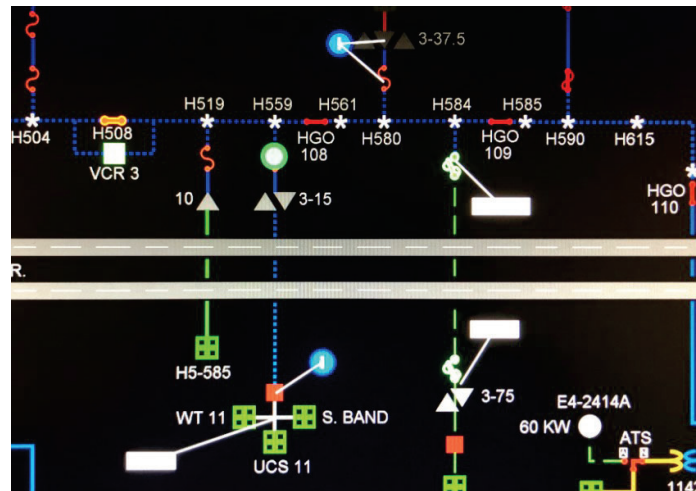
- a. Power console operators shall generate a Switching Order, in adherence with CCC-I-0012, CCC Switching Order and Work Permit Process, Using KSC Form 26-67, to support planned Electrical shop work. See Attachment A for an illustration of the Switching Order Form.
- b. Prior to any switching operations, electrical shop personnel shall come to the Complex Control Center, review the switching order and review the configuration of the electronic Power Systems Map Board. Electrical shop personnel shall then initial switching order Step 1 to verify they have reviewed the Map Board before going into the field to perform the work.
- c. Electrical shop personnel shall then go to the field, verify existing configuration, and then contact the power console and request permission to perform the work outlined on the switching order.
- d. When the steps on the Switching Order are complete and changes to the configuration of field electrical equipment has occurred, then the power console operators shall change the electronic Map Board to match the field configuration changes. This is to be done by changing "pseudo" indications on the KCCS screen or by adding electronic "pins" and "notes" to the electronic Map Board. All actions taken are to be recorded in the Systems Electronic Tie-In (SETI) log and reflected on the KCCS power console screens as well. (i.e. – Disable Alarms, Set Outages On The Screen, Add "i" notes, etc.)

SAMPLES OF "PSEUDO" INDICATIONS ON KCCS SCREENS

- e. Power console operators shall use color-coded electronic "pins" to reflect temporary electrical configuration changes on the electronic Power Systems Map Board as follows:
- Green – Used indicate equipment is in the "open" configuration
 - Red – Used to indicate equipment is in the "closed" configuration
 - Orange – Used to indicate equipment is "open/racked out"
 - Gray & Black – Used to indicate equipment is "grounded"
 - Red With A White Stripe – Used to indicate a relay is "set to maintenance"

SAMPLES OF ELECTRONIC "PINS"

- f. Power console operators shall use electronic "I-Notes" or "Sticky Notes", placed on the electronic Power Systems Map Board, to add pertinent information for electrical equipment affected by the temporary configuration change. (i.e. – "1050 A/B Outage Until 1/2019", Outage Number XXXX, Work Permit Number, etc.)

SAMPLES OF ELECTRONIC "NOTES"

- g. On the Switching Order, KSC Form 26-67, the Power console operators shall divide section 24 into thirds by drawing lines as shown in the sample below. To the left of the line in section 24 on the Switching Order, the Power console operators shall initial and enter the date for when the temporary configuration of the electronic Power Systems Map Board, matching the changes made in the field per that Switching Order, were completed.

24. Status Board Corrected		SSOE-OUT
OUT	IN	Date
Date	Date	Initials
25. Date & Time		SSOE - IN
Time	Time	Date
Initials	Initials	Initials

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- h. When the Electrical shop personnel complete their work in the field, as defined by the Switching Order, and return the system to normal configuration, they shall report to power console that they are complete and that the electrical system has been returned to normal configuration. At this time, the Power console operators shall remove all electronic "pins" and "notes" from the electronic Power Systems Map Board that were used to reflect any temporary configuration changes, and shall also return any "pseudo" indications on KCCS screens to their normal position thus returning the electronic Power Systems Map Board to normal configuration. These actions shall be recorded in the SETI log and reflected on the affected KCCS power console screens as well. (i.e. – Re-enabling of Alarms, Removing Outages On Screen, Removing "i" notes, etc.)

- i. The Power console operators shall, using the right of the line in section 24 on the Switching Order, shall initial and enter the date for when the electronic Power Systems Map Board configuration was returned to normal configuration. See sample below. The completed Switching Orders shall be filed in the Switching Order/Work Permit log book on the power console.

	24. Status Board Corrected	SSOE-OUT	
	OUT Date	IN Date	Date Initials
	25. Date & Time	SSOE - IN	
	Time Initials	Time Initials	Date Initials

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- j. For any Switching Orders not complete at the end of the shift they were started, they shall be filed in the desktop filing system on the power console.
- k. All power console operators shall review any changes made to the electronic Power Systems Map Board during their shift with the next power console operator coming on station during the shift tie-in briefing. All power console operators coming on station are to review their console screen "i" notes and SETI log entries from the past few shifts to ensure they are aware of any systems or components that are out of normal configuration.
- l. All Power console operators shall ensure that up-to-date status of system configuration and Switching Order step completion is communicated to the next Power console operator working the power console at shift change. All Power console operators shall ensure adequate time between shift changes to ensure there is time to conduct a proper shift-tie in between shift personnel.

II. Permanent Electronic Power Systems Map Board Changes

Note: Permanent changes do involve Adobe Illustrator drawing updates and permanent Citect software linking being incorporated onto the electronic Power Systems Map Board.

- a. Two types of system or equipment modifications can result in a requirement to make a permanent change to the electronic Power Systems Map Board: (1) In-House modifications requiring permanent electronic Power Systems Map Board changes; and (2) Fixed Price Contractor modifications requiring permanent electronic Power Systems Map Board changes.
- b. Power console operators shall be made aware of permanent electrical system/equipment changes through official communication with BOSS Engineering, BOSS Construction Management (Fixed Price Contractor Work) or BOSS Construction Services (NASA Fixed Price Contractor Work).

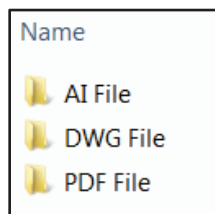
- c. Power console operators shall also be made aware of permanent electrical system/equipment changes through reviewing all electrical outage requests and by attending the weekly electrical outage meeting.
- d. The Power console operators shall generate a Switching Order, Using KSC Form 26-67, to support any planned electrical system work. The affected electrical system shall then be de-energized to support the planned modification work.
- e. If electrical system modification work is being done by any BOSS Fixed Price Contractor, BOSS Construction Management shall immediately notify the Power console operators of any field changes made on any C of F project that affects the configuration of any part of Kennedy Space Center electrical distribution system. If electrical system modification work is being done by a NASA Fixed Price Contractor, BOSS Construction Services shall immediately notify the Power console operators of any field changes made on any C of F project that affects the configuration of any part of Kennedy Space Center electrical distribution system.
- f. When Electrical Shop personnel or the Construction Monitor for either the BOSS or NASA Fixed Price Contractor is ready for the electrical system to be re-energized, they shall contact the Power console operators to inform them that the work is complete and the system is ready to be re-energized.
- g. The Power console operators, prior to closing the outage and re-energizing the electrical system, shall then walk down the job site that was modified to ensure they are aware of all system/equipment changes that have been made. The Power console operators shall also verify all field equipment has been labeled properly during this walk down.
- h. The Power console operators shall then initiate a new CCC-F-00014, KSC electronic Power Systems Map Board Change Order Form, and shall make the permanent changes to the latest version of the Adobe Illustrator (AI) file for the electronic Power Systems Map Board to reflect the permanent changes made to the electrical system configuration. Refer to Attachment B for an illustration of form CCC-F-00014.

(NOTE - The Adobe Illustrator drawing is not the official released Power Distribution System Configuration Drawing. It is an electronic back-up of the electronic Power Systems Map Board reflecting real-time configuration of the electrical distribution system. The electronic Power Systems Map Board and the AI drawing are tools to be used by the Power console operators, Power Systems Technicians and Power Systems engineers to reflect real-time configuration for day to day work on the electrical distribution system. The official Power Distribution System Configuration Drawing is 79K17429 and it is maintained and updated by BOSS Design Engineering. The most current released copy is maintained in the KSC Engineering Documentation System).

- i. The Power console operators shall use form CCC-F-00014 to document the electronic Power Systems Map Board configuration changes and the Adobe Illustrator drawing changes that were made to reflect the permanent changes made to the electrical distribution system.

- j. The CCC Manager shall update the Master list of Video Wall modifications and changes located at: [\\bossfile\ccc\\$\shared\Video Wall\Mods & Changes\Video Mods Chgs Master List.xlsx](#) to include all changes made in the latest version of the Adobe Illustrator drawing.
- k. The CCC Manager shall distribute the list of modifications and changes made in the latest revision of the Adobe Illustrator drawing, to all power console operators, power system engineers, and power shop management.
- l. The CCC Manager shall also create a .PDF file and a .DWG file from the latest updated Adobe Illustrator file and send the .DWG file and list of modifications and changes made in the latest revision of the Adobe Illustrator drawing to BOSS Design Engineering. BOSS Design Engineering will then produce a PDF copy for the BOSS Power Systems Engineers and BOSS Electrical shop personnel as well as incorporate the changes into the official Power Distribution System Configuration Drawing (79K17429).
- m. The CCC Manager shall provide the latest version of the Adobe Illustrator drawing file to the BOSS KCCS SCADA Administrator so a .SVG file can be prepared and Citect software linking to the electrical distribution system drawing can be incorporated. The CCC Manager will also submit a Maximo Outage request to take down the KCCS power network and the electronic Power Systems Map Board so that the KCCS SCADA Administrator can install the updated software for the electronic Power Systems Map Board.
- n. The CCC Manager shall maintain all versions of the original and backed-up copies of the Adobe Illustrator (.AI), .PDF, and .DWG electrical distribution system drawing files. The CCC Manager shall also periodically plot a hard copy of the latest version of the Adobe Illustrator electrical distribution system drawing file to provide a back-up in the event of an anomaly with the electronic Power Systems Map Board.

BACK-UP FILE STORAGE ON SECURED SHARED DRIVE



- o. The Power console operators shall file form CCC-F-00014 (and attached before and after package of illustrations), along with the updated list of modifications and changes, in the electronic Power Systems Map Board Change Order book at the power console.
- p. The Power console operators shall then update any and all affected electrical impact documents associated with the permanent changes that are made to the electrical distribution system.

- q. The Power console operators shall also print out any affected KCCS screens, redline them, and submit them to the CCC Manager to have the affected screens updated and modified to reflect the permanent electrical configuration changes in a future KCCS power systems software load.
- r. The Power console operators shall also authorize and support the Electrical Shop personnel in re-energizing the affected electrical system when all work in the field, that incorporated the configuration changes, is complete and they shall then close the electrical outage.

ATTACHMENT A

Switching Order							
1. Ordno S/S	2. C-5/C-5A S/S	3. Switch Order No.	4. Date of Outage	5. Time of Outage	Page 1 of 1		
6. Operation to be Performed							
7. Justification							
8. Requested By							
9. Prepared By							
10. Date & Time							
11. Authorized By							
12. Date & Time							
13. Operation Performed By							
14. Completed, Date & Time							
15. Work Permit No.		16. Issued To / Received By		17. Company			
				18. Date & Time			
STEP 1 All parties involved in this Switch Order have reviewed switchboard and concur with Switch Order. Electrical system power switching procedure will be adhered to with no unapproved deviation.							
19. C/R / ION		20. TIME		21. OPER. INITIAL	22. P.C.G. INITIAL		
23. Remarks:							
						24. Status Board Corrected	
						25. Date & Time	

KSC FORM 26-67 NS 03/16 (1.4) PREVIOUS EDITIONS ARE OBSOLETE. Validate prior to use.

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RECORDS

The following records are retained by the organizations listed below:

Record	Responsible Organization
Adobe Illustrator File (NASA_SA-Version_VXX)	Complex Control Center
CCC-F-0014, KSC Map Board Change Order Form	Complex Control Center
KSC Form 26-67, Switching Order	Complex Control Center

ROLES AND RESPONSIBILITIES

Department Manager: Ensures compliance within the Department to the requirements stated in this procedure.

Spaceport Integration Center Manager: Ensures compliance at the Spaceport Integration Center level to the requirements stated in this procedure.

Complex Control Center Staff: Ensures performance of console operations duties in accordance with this desk instruction.

REFERENCE DOCUMENTS

The following documents are referenced in this procedure:

Document Number	Title
79K17429	Power Distribution System Configuration Drawing
Adobe Illustrator File (NASA_SA-Version_VXX)	KSC Master Single line Power Systems Distribution Drawing
CCC-F-0014	KSC Map Board Change Order Form
KSC Form 26-67	Switching Order
MSO-P-0004	Complex Control Center Operations

ACRONYMS

AI – Adobe Illustrator
BOSS – Base Operations & Spaceport Services Contract
CCC – Complex Control Center
KCCS – Kennedy Complex Control Set
KSC – Kennedy Space Center
NASA – National Aeronautics and Space Administration
SETI – Systems Electronic Tie-In Log
SCADA – Supervisory Control and Data Acquisition
SIC – Spaceport Integration Center

DEFINITIONS

N/A

REVISION RECORD

The following revisions have been applied to this document:

Revision Number	Change Description	Date
0	Initial Release	06/12/12
1	Added new section II.k. for power console operators to notify Design Engineering when a change has been made to the CCC AutoCAD reference drawing.	05/26/15
2	Converted Desk Instruction from ISC to BOSS document and updated for use of new electronic Power Systems Map Board	08/14/19
3	Updated new BOSS logo. Updated Section II CCC Manager update distribution requirements. Updated signatures.	01/17/24

DOCUMENT APPROVALS

Manager, Complex Control Center
Signed by: cards