

	Doc or ECO #:	ECO-70683-002	Date:	05/07/19	Author:	SCL
	Rev. #:	A				
Engineering Change Order (ECO)	Engineering Approval:	Aeg	Date:	5/07/19	Quality Approval	DO

P/N #:	70683	Effective Date:	May 9, 2019
Title:	Ruggedized MSS Power Supply Capacitor Reverse Modification		

1.0 Purpose / Summary

To improve communication performance on MSS systems on long tethers we will replace AC coupling caps on the power supply modules, essentially undoing ECO-70683-001

Additionally, Arrow will no longer be shipping the Distribution PCB (71357) due to damage in shipping we will install that as part of the ICB assembly.

2.0 Parts Affected

Part Number	Notes	Removed	Added	Modified	REV
70683	MSS Power chassis and modules from Arrow	☐	☐	☒	A
52347	IP65 PRO4 power supply from arrow	☐	☐	☒	A
71357	Power distribution PCB moved from power supply to panel assembly BOM	☐	☐	☒	A
71095	MSS Panel	☐	☐	☒	E
72006	Cap used for in house stock rework Not added to BOM	☐	☒	☐	A

3.0 Detail

MSS power supplies previously had an ac coupling capacitor removed to reduce leakage that was causing GFCI's to trip (ECO-70683-001)

The removal of this capacitor had the side effect of degrading the the connection quality on our m100 communications modem. Replacing this capacitor allows the m100 to function correctly and at full performance. In a previous ECO GFCI's were replaced with ELCI's, which will prevent the circuit tripping from returning.

The symptoms primarily manifest as degraded command and control. Systems showed unstable auto depth. The ROV would quickly ascend 1-3 feet, then descend trying to correct its positioning. The effect is noticeable on long tethers (400m). Shorter tethers function adequately.

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The degraded communication results in a higher occurrence of packet loss and noticeably and increase in thruster comms TX_DT, which averaged 60ms's on new panels. Indicator lights on the M100 also showed degraded link quality.

Systems with older generation power supply chassis averaged 25ms and did not indicate degraded link performance, and the issue was isolated to the power chassis. The suspicion is that increased EMI adversely effects the M100.

Arrow/Excelsys provided the specifications of the AC coupling capacitor.

(72006 - CAP CER 0.1UF 500V X7R 1210 - Digikey - 399-6478-1-ND)

Engineering replaced the removed capacitor and retested the system. All communication issues were resolved, signal strength was strong (determined by the green status LED on the m100 modem signifying 80+mb/s, and the TX_DT was averaging 26ms.

It was determined that the capacitor will be replaced moving forward.

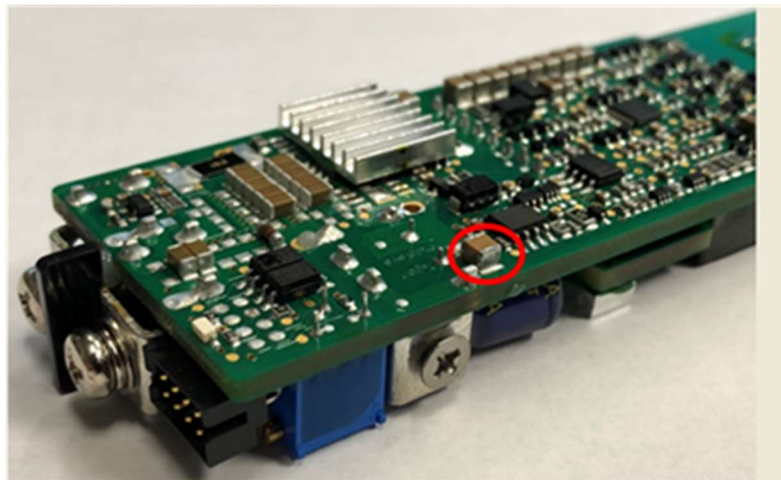


Figure 1 Power module with Capacitor highlighted.

Due to bending and breaking of the Distribution PCB, Arrow will no longer be including them on MSS power supply assemblies. Instead, VideoRay will be sourcing and installing the boards in house during the ICB assembly process.

The IP65 power supply chassis (52347) will also come with the AC coupling caps installed.

TX-DT will also be monitored in Final QC moving forward, and has been added to the MSS Final QC Form.

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4.0 Disposition of Material

- All current MSS stock will be reworked in house
- Arrow will no longer remove the capacitor during assembly
- Currently upgrades are being handled on a case by case basis

5.0 Action Items

Action	Department	Acknowledgement Initials
Rework all current inventory of the MSS & IP65 Power Supply	Production	KK
Update BOM's	Engineering	SCL & JV
Update Epicor	Engineering	RN
Customer support will formalize upgrade plan	Support	TG

6.0 Modified / Referenced Documents:

Document	Current Revision
ECO-70683-001	A
WI-70218 - MSS ICB Assembly Instructions	B
BOM-71095	N/A
BOM-70683	N/A
MSS Final QC form (Defender, PRO5)	G,D

7.0 Revision History

Date Revised (mm-dd-yyyy)	Location of Change (section, paragraph no., step no., etc.)	Description of Change Made	Name of Person making the Change