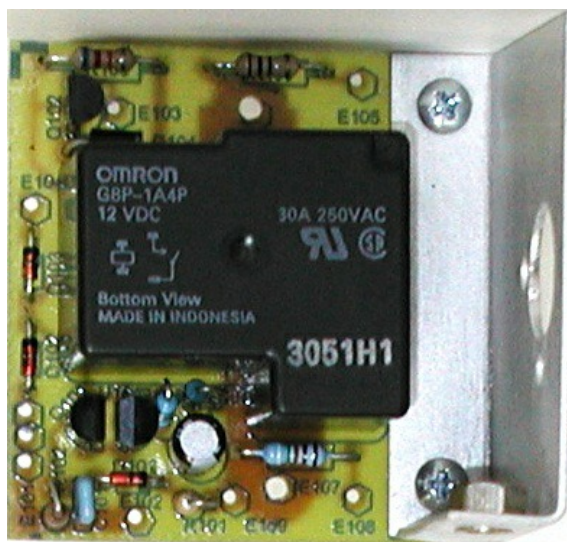


# MC-15A-1 Battery Disconnect



## MC-15A-1 Battery Disconnect Assembly

Monitor and Control assembly protects a battery from over discharge, protects the DC BUSS output from over voltage, allows low current switch control of DC BUSS ON-OFF and accepts remote shut-down control.

30 Amp power relay allows the MC-15A-1 to be mounted close to the high current wiring with low current control from a remote located switch.

### Disclaimer:

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# MC-15A-1 Battery Disconnect

## Applications:

- Battery disconnect providing protection from over-discharge
- Under and Over Voltage protection (disconnects on fault, does NOT crowbar)
- Relay switches up to 30 ADC using low current switch contacts
- Provisions for remote shut down control

## Physical Characteristics:

<b>Size</b>	1.800" x 1.800" x 0.900"
<b>Material</b>	FR-4 through hole printed wiring board
<b>Mounting</b>	Two 4-40 screw holes spaced 1.430"

## Electrical Characteristics:

Parameter	Conditions	Value	Notes
Input Voltage	Pick Up 11.00 VDC (nominal)	10.80 to 11.25 VDC	
	Drop Out 10.50 VDC (nominal)	10.25 to 10.75 VDC	
Over Voltage	Disconnect	< 17.0 VDC	
	Re-connect	> 15.0 VDC	
Input Current	No load at 12.70 VDC	< 95 mADC	
	Maximum switching current	30 ADC	
DC BUSS ON-OFF	Switch contacts in series with Q102 and relay (switch compliance)	ON	< 1 VDC, 95 mA
		OFF	15 VDC, < 1 mA
Remote Shut-down	Switch contacts pull down Q102 bias (switch compliance)	Enable	5 VDC, < 10 $\mu$ ADC
		Shut-down	< 0.5 VDC, 250 $\mu$ ADC
AUX BATT OUT	100 $\Omega$ isolated battery output	$I_o$ for < 1 VDC drop	10 mADC
Batt Volt Meas	Isolated battery for voltage measurement		$R_s = 9.53K, 1\%$
Temperature	Free air flow		0 to +45 °C

# MC-15A-1 Battery Disconnect

## Theory of Operation.

The Battery Disconnect Assembly, MC-15A-1, monitors the battery voltage via a S-80845 voltage monitor, U101. This fixed voltage comparator turns Q102 off when the battery voltage drops to approximately 10.5 VDC. No option is provided for over-riding this function. Discharging the battery beyond this point will provide little usable energy and can damage the battery permanently.

A remote located, low current, switch connected to E103 provides manual DC BUSS ON-OFF control. The switch so connected must switch 90 mA at up to 15 VDC.

A remote shut-down input at E104 over-rides all other functions to disconnect the battery. This input is designed

to disconnect the load from the battery while the battery is equalized.

A simple zener diode and transistor switch provides over voltage protection which also can over ride all other functions to disconnect the load from the battery.

The assembly is less than 2" by 2" and has mounting holes for two 4-40 screws. The BATTERY INPUT and DC BUSS OUTPUT connections, E107 and E106, are solder connections accepting up to #12 AWG stranded wire.

## MC-15A-1 List of Material

Qty	Designator	Value/Type	Description	Part Number	Supplier <sup>(1)</sup>
1	C101	0.1 µF, 50V	MLC ceramic	581-SR205E104MAR	
1	C102	47 µF, 16V	Al Radial	647-UVR1C470MDD1TD	
1	D101	1N5245B, 15V	0.5 W, Zener	512-1N5245B	
1	D102	1N5232B, 5.6V	0.5 W, Zener	512-1N5232B	
1	D103	1N4454	Si switching diode	512-1N4454	
1	D104	1N4007	Si, 1 Amp rectifier	512-1N4007	
1	K101	30 A, SPST Power Relay	12 V, 90 mA Coil	653-G8P-1A4P-DC12	
1	Q101	2N4401	NPN switching	512-2N4401TA	
1	Q102	2N7000	N-Ch MOSFET	512-2N7000	
1	R101	20K, 5%, ¼ W	Carbon film	291-20K-RC	
1	R102	6.2K, 5%, ¼ W	Carbon film	291-6.2K-RC	
1	R103	62K, 5%, ¼ W	Carbon film	291-62K-RC	
1	R104	75K, 1%, ¼ W	Metal film	271-75K-RC	
1	R105	56.2K, 1%, ¼ W	Metal film	271-56.2K-RC	
1	R106	100, 5%, ¼ W	Carbon film	291-100-RC	
1	R107	9.53K, 1%, ¼ W	Metal film	271-9.53K-RC	
1	U101	S-80845	4.5 V Voltage Detector	628-80845CNY-G	
1		PWB	FR-4 Through Hole	MC15A121	2
1		Mounting Bracket	0.040" Al	MC15A140	
1		6-32 Swaged Standoff	0.25" Hex	534-1620-2	
2		0.25" 4-40 Screw	Pan Head	67413641	3
2		4-40 Flat Washer		67491001	
2		4-40 LK Washer		87920708	
2		4-40 0.25" Nut		31F2106	4

### Notes:

1. Supplier is Mouser Electronics (<http://www.mouser.com>) unless otherwise specified.
2. BWC items shop built - details available at <http://www.bwcelectronics.com>
3. MSC Industrial Supply Co. (<http://www.msdirect.com>)
4. Newark (<http://www.newarkinc.com>)

# MC-15A-1 Battery Disconnect

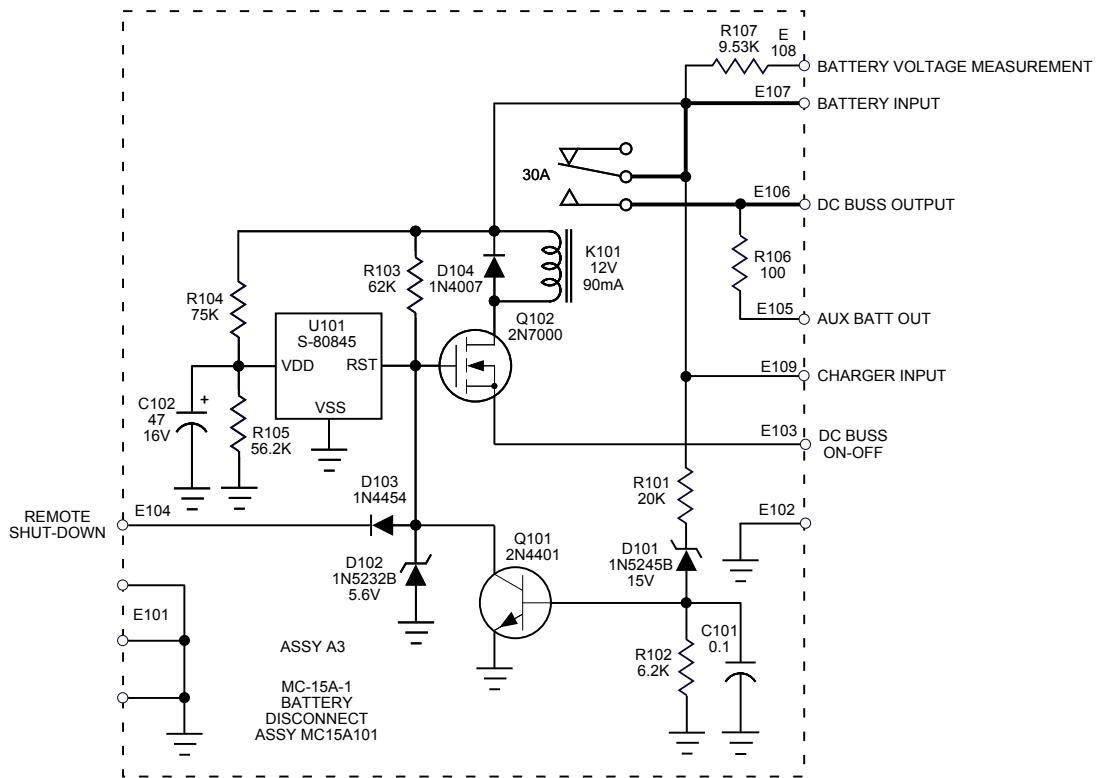


Figure 1. MC-15A-1 Schematic.

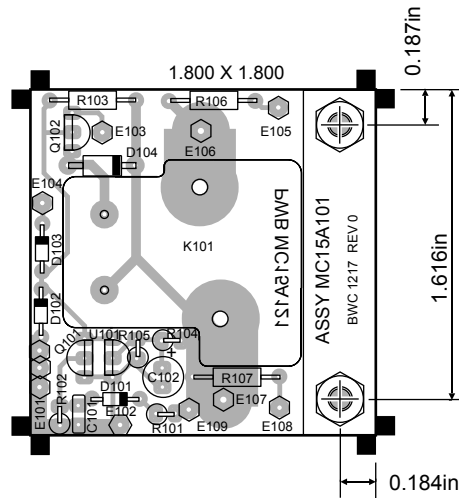


Figure 2. MC-15A-1 Component Locator.