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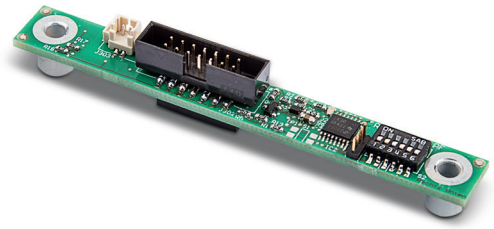
Benutzerhandbuch
User's Manual

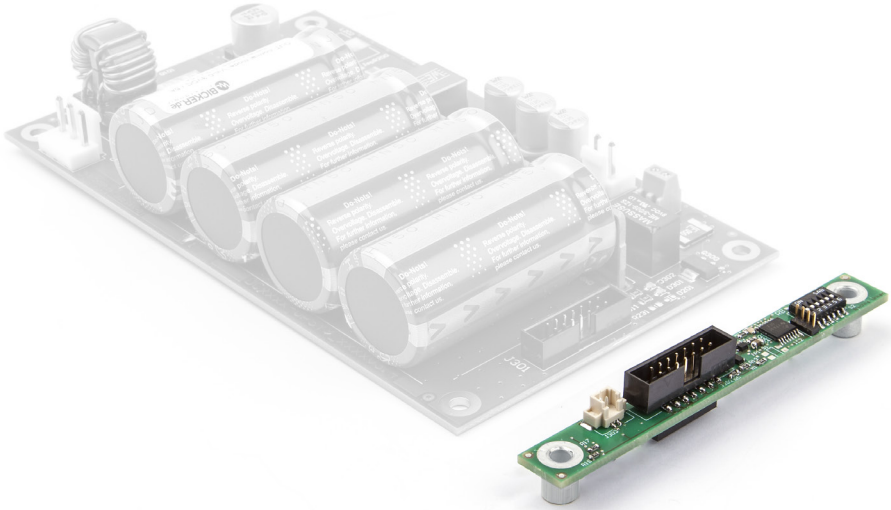
PSZ-1063

µExtension Zusatzmodul für DC2412-UPS(-LD), UPSIC-2403, UPSIC-1205



Deutsch English

Deutsch



PSZ-1063 µExtension Zusatzmodul

für DC2412-UPS(-LD), UPSIC-2403, UPSIC-1205

Herzlichen Glückwunsch zu Ihrem neuen Qualitätsprodukt!

Dieses Handbuch soll den Anwender mit dem Produkt samt dessen Komponenten und Eigenschaften vertraut machen und möglichst vollständig und genau Informationen dazu liefern. Für mögliche vorhandene Fehler kann Bicker Elektronik jedoch keine Haftung übernehmen. Hinweise hierzu, Verbesserungsvorschläge und Kritik werden jederzeit sehr gerne entgegengenommen.

1 Produkt- und Funktionsbeschreibung PSZ-1063

Das µExtension Modul PSZ-1063 ist ein **intelligentes Zusatzmodul,** mit dem die Funktionen der unterbrechungsfreien Stromversorgungen UPSIC-1205, UPSIC-2403 und DC2412-UPS(-LD) um vielfältige Features erweitert werden.

Eine kontinuierliche Betriebsdatenerfassung gestattet **„Data Monitoring"** in Echtzeit. Hierbei werden die Daten über die I^2C-Schnittstelle der UPSIC- und DC2412-UPS-Geräte kontinuierlich erfasst und im µExtension Modul gespeichert. Über die implementierte RS232 Schnittstelle am Modul können die Daten wiederum an den Host weitergereicht werden, was eine einfache Implementierung in das System ermöglicht.

Eine weitere Kernfunktion des Moduls ist das **Reboot-Feature,** das den automatischen Neustart des Systems aktiviert, sobald die Eingangsspannung während des Herunterfahrens oder zu einem späteren Zeitpunkt wiederkehrt. Die Startfunktion des Mainboards kann hier bei anliegender Eingangsspannung ganz einfach über das BIOS aktiviert werden.

Die **Ausgangs- bzw. Versorgungsfreigabe** an das System wird, wenn gewünscht, durch eine Sicherheitsfunktion geregelt, d.h. sie erfolgt erst, wenn die Superkondensatoren 90% Ihrer Kapazität erreicht haben. Ein sicheres Herunterfahren des Systems ist somit immer gewährleistet.

Die USV kann am Host auch ohne Software betrieben werden. Die **Konfiguration** der Zeitwerte ist über den **DIP-Schalter** problemlos einstellbar und das Modul generiert das Auslösesignal zum Herunterfahren des Systems über den Power Button des Mainboards. Die Optionen für **softwaregesteuerte Einstellungen** von Zeiten und zum Herunterfahren über das **UPS Control Center** bleiben natürlich bestehen.

2 Bestimmungsgemäße Verwendung

Vorsicht bei der Handhabung!

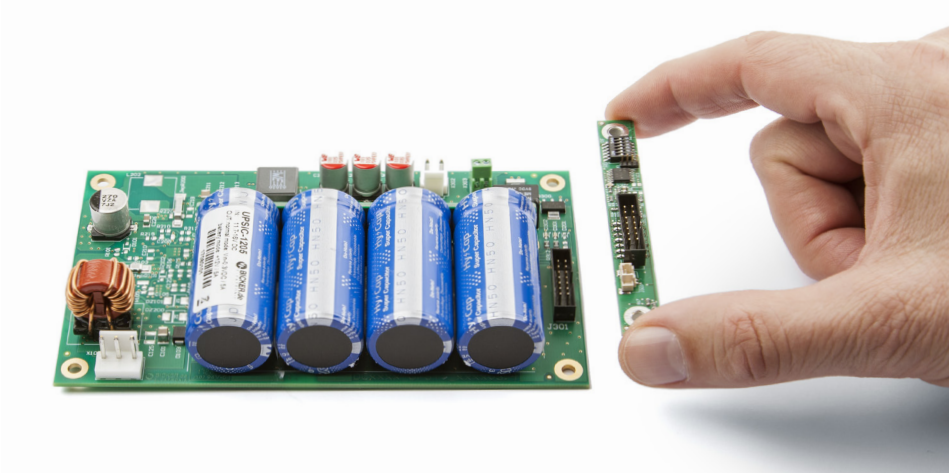
Die Montage des µExtension Moduls auf die jeweils verwendete DC-USV bzw. UPSIC muss zwingend vor der Installation erfolgen.
Auch nach dem Trennen der Versorgung und wenn am Ausgang keine Spannung zu messen ist, werden die DC2412-UPS- und UPSIC-Geräte weiterhin über die Supercaps für bis zu 40 min versorgt. Das Modul und die USV nicht direkt auf eine Metallplatte legen. Kurzschlussgefahr!

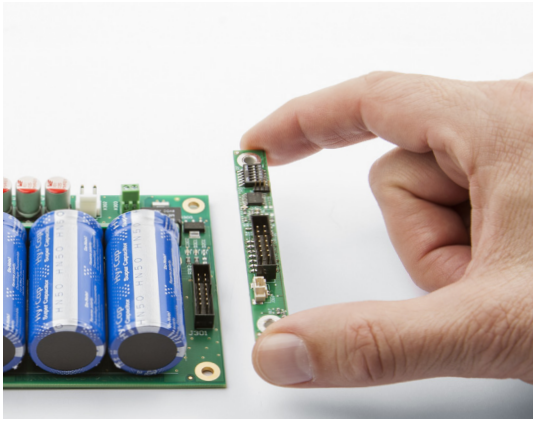
3 Einbau / Montage

Der Einbau darf grundsätzlich nur durch eine Fachkraft erfolgen. Beim Einbau ist darauf zu achten, dass die einschlägigen Normen zur elektrischen Sicherheit beachtet werden. Zudem muss das Endgerät die aktuellen EMV-Normen einhalten. Die Applikation sowie die Platine müssen beim Einbau stromlos sein. Die USV ist ein Einbauteil, welches vorzugsweise in einem Metallgehäuse verwendet werden sollte. Eine freie Luftzirkulation sowie ausreichende Belüftung muss sichergestellt sein.

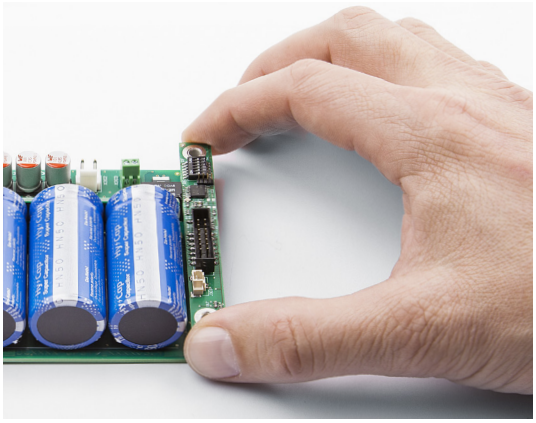
Achtung!

Das Zusatzmodul nur anbringen, wenn das Gerät **nicht** in Betrieb ist. Hierbei **unbedingt** darauf achten, dass die Superkondensatoren entladen sind.

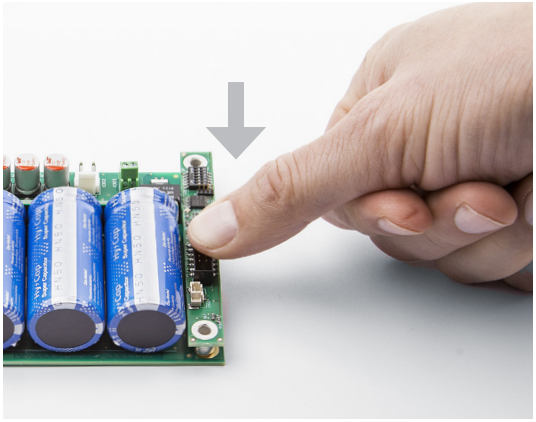




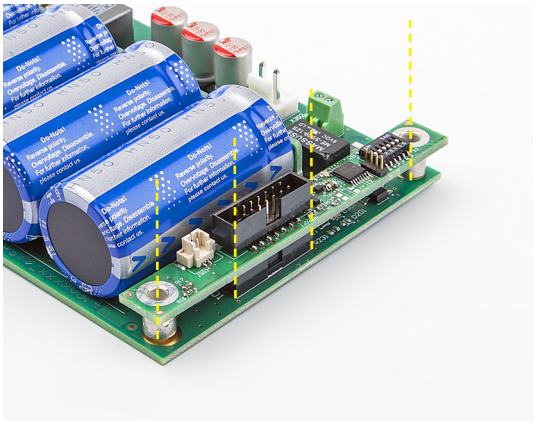
Einbau / Montage
Schritt 01



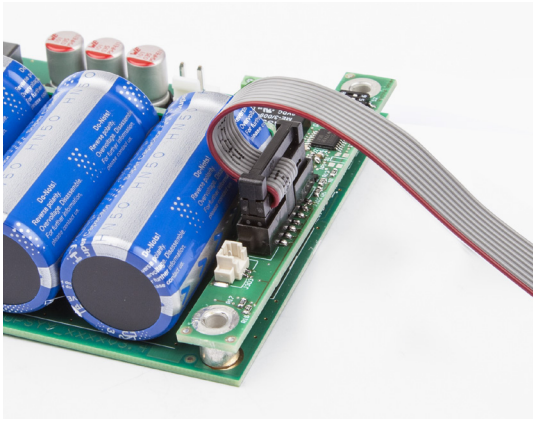
Einbau / Montage
Schritt 02



Einbau / Montage
Schritt 03

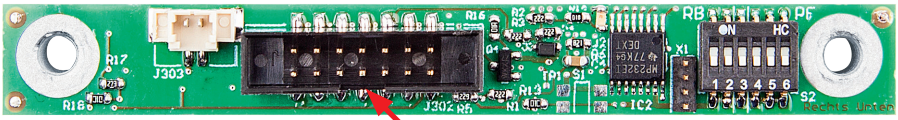


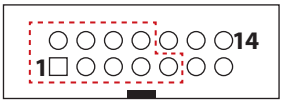
Einbau / Montage
Korrekte Position prüfen!



Einbau / Montage
Optionales Verbindungskabel PSZ-1046 bzw. PSZ-1048

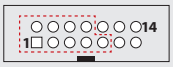
4 Stecker-Pinbelegung J302



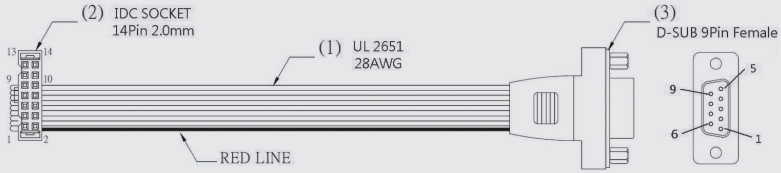


Pinbelegung J302

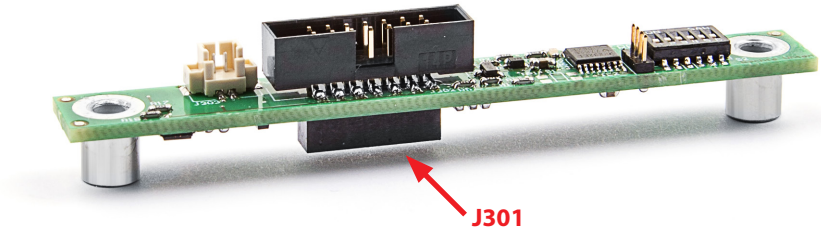
PIN	SIGNAL	DSUB9
01	DCD am PC – Erkennung Kabel angeschlossen	1
02	DSR am PC – Erkennung Caps Ladezustand	6
03	TXD (wird an RXT am PC angeschlossen)	2
04	RTS am PC – Versorgungspannung	7
05	RXD (wird an TXD am PC angeschlossen)	3
06	CTS am PC – Power Fail Erkennung	8
07	Shutdown Signal Erkennung	4
08	N/A	9
09	GND	5
10	SMBAlert	
11	GND	
12	xSDA I^2C	
13	Vout (max. 300mA)	
14	xSCL I^2C	



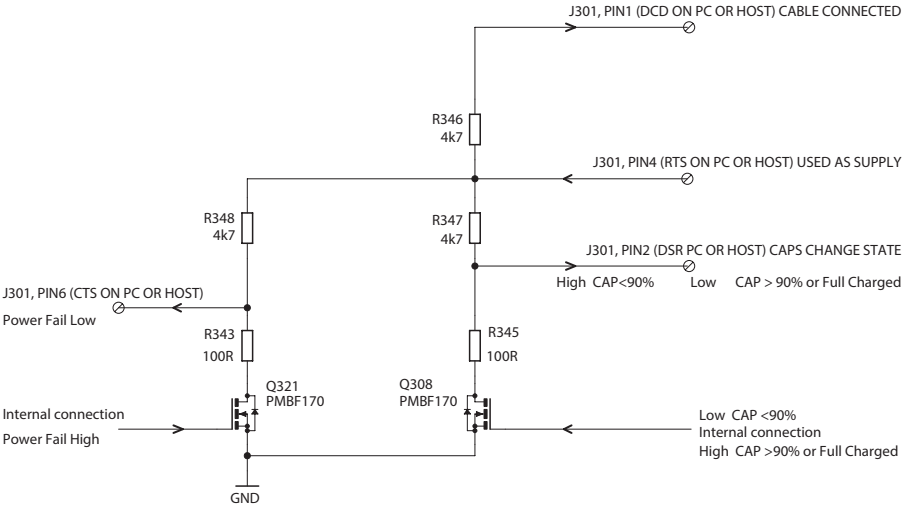
PIN 1 bis 9 (J302) können für RS232 direkt mit 9-poligem D-SUB verbunden werden **(via Interface-Kabel PSZ-1046).**

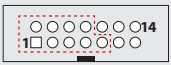


5 Verschaltung der statischen Signale J301
(entspricht J302 auf Rückseite)

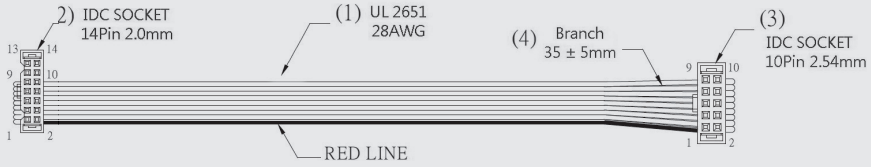


Verschaltung J301

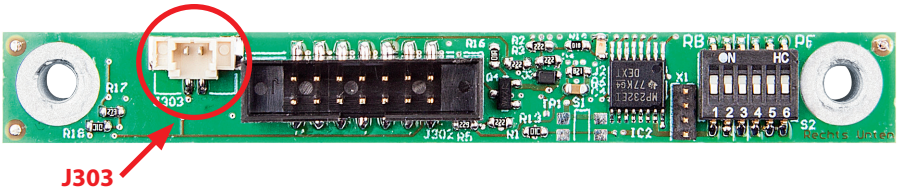




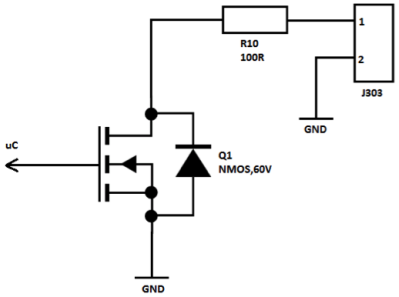
PIN 1 bis 9 (J302) können für RS232 direkt mit dem Mainboard verbunden werden **(via Interface-Kabel PSZ-1048).**



6 Stecker-Pinbelegung und Beschaltung J303



Verschaltung J303

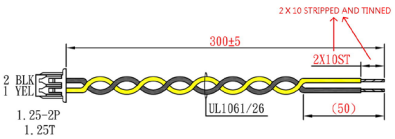


Stecker für zweiadriges Verbindungskabel zu Mainboard

Power Button Press am Mainboard mit…

PSZ-1043 „open end“

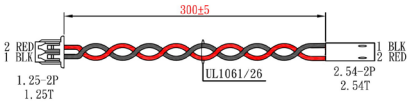
PIN	SIGNAL
Schwarz	GND
Gelb	Open Drain (100Ω)



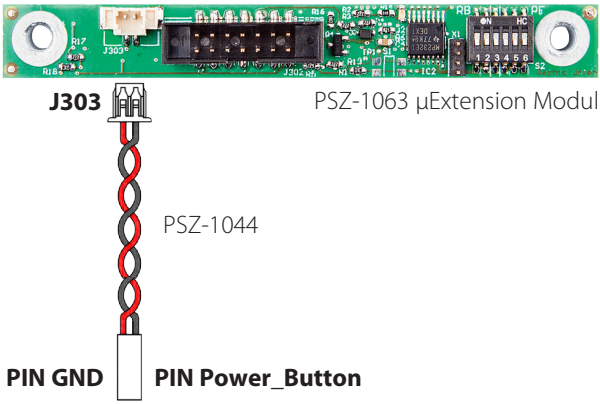
PSZ-1044 2.54 mm Anschluss

PIN	SIGNAL
Rot	GND
Schwarz	Open Drain (100Ω)

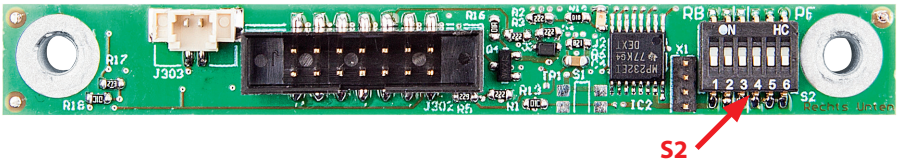
$V_{max} = 40\,V \quad I_{max} = 50\,mA$



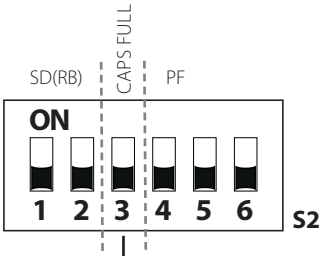
Verkabelungsbeispiel J303 mit PSZ-1044 an Mainboard



7 Einstellungen für DIP-Switch S2



Einstellungen DIP S2



SHUTDOWN-TIMER		
KONTAKT	1	2
Kein Reboot	ON	ON
Reboot nach 10s	ON	OFF
Reboot nach 30s	OFF	ON
Reboot nach 60s	OFF	OFF

POWER FAIL (PF) - TIMER			
4	5	6	KONTAKT
ON	ON	ON	Software
ON	ON	OFF	3s
ON	OFF	ON	8s
ON	OFF	OFF	20s
OFF	ON	ON	40s
OFF	ON	OFF	60s
OFF	OFF	ON	100s
OFF	OFF	OFF	150s

KONTAKT 3

ON Ausgang frei wenn V_{CAP} über 90 %

8 Konfiguration

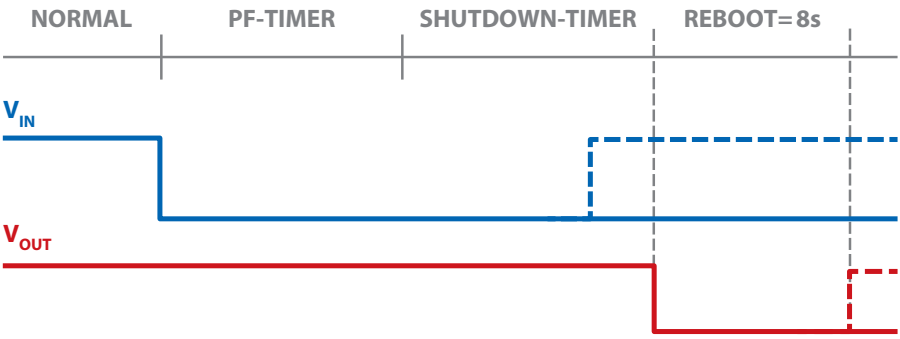
Einstellen der Pufferzeit

Power-Fail (PF)-Timer

Betrifft die Backup-Time. Die Zeit bei einem Stromausfall, nach der ein Shutdown-Signal an den PC oder Host gesendet wird. Wenn innerhalb dieser Zeit die Spannung netzseitig am Eingang wiederkehrt, wird nichts unternommen. Dieser Befehl kann entweder über die Software „UPS Control Center" (RS232-Anbindung via J302 notwendig) oder über den Power Button Press (zweiadriges Kabel via J303) an den PC oder Host weitergeleitet werden.

Shutdown-Timer

Beschreibt die Zeit, die dem System zur Verfügung steht, um geordnet herunterzufahren. Nach Ablauf des PF-Timers wird diese verwendet, um den PC oder Host herunterzufahren. Ist diese Zeit verstrichen, wird der Ausgang für 8s getrennt. Wenn während dieser Zeit die Spannung wiederkehrt, wird der Ausgang trotzdem getrennt, um das System erneut zu starten.



A Einsatz mit Power Button Press

Hier wird das Shutdown-Signal über ein zweiadriges Kabel an den Power Button des Mainboards übertragen (200…500ms, Low - Taster). Die Auswahl am Dip-Schalter für den PF-Timer *(siehe Tabelle PF-Timer)* muss hier **ungleich** „ON,ON,ON" gewählt werden, um diese Funktion zu aktivieren. Eine Vorgehensweise für die Einstellung der Dip-Schalter, um das System für maximale Überbrückungszeit zu konfigurieren, wird in folgenden Schritten beschrieben:

1. Feststellen, wie lang das System bei maximaler Leistungsaufnahme überbrückt werden kann. Wenn die Leistungsaufnahme der Applikation bekannt ist, kann die Überbrückungszeit aus dem DC2412-UPS bzw. UPSIC-Datenblatt ausgelesen werden. Der Wert entspricht t_{BACKUP} in Sekunden.
2. Messen der Zeit, die das System benötigt, um geordnet herunterzufahren. Der Wert entspricht $t_{SHUTDOWN}$ in Sekunden.
3. Stellen des PF-Timers auf den Wert:
   $PF\text{-}Timer_{DIP}$ [s] = (t_{BACKUP} x 0,6*) – $t_{SHUTDOWN}$
   **(Marge für End-Of-Life und Toleranzen aufgrund der Temperatur)*

   Hierbei immer den nächst kleineren Wert am Dip-Schalter wählen.
   Bei einem Stromausfall während des Vin Starts sollte die Bootzeit des Systems ebenfalls beachtet werden.
4. Wählen des Shutdown-Timers so groß wie $t_{SHUTDOWN}$. Hierbei am Dip-Schalter den nächst größeren Wert einstellen, damit das System nicht während des Herunterfahrens unterbrochen wird.

Die oben genannte Prozedur dient nur als Beispiel. Die Einstellungen können frei gewählt werden, um das System nach den eigenen Anforderungen zu optimieren.

Nach Ablauf der Zeit des Shutdown-Timers wird das System für 8s getrennt (Reboot Time). Kehrt innerhalb der Shutdown-Time oder der Reboot-Time die Versorgung wieder zurück, wird das System nach Ablauf der 8s gestartet. *(siehe Diagramm Seite 12)*

Keine Reboot Funktion
Die Einstellung „ON,ON" am Shutdown-Timer bedeutet, dass das System direkt nach Ablauf der PF-Timer Einstellung getrennt wird und ausgeschaltet bleibt.

B Einsatz mit Software „UPS-Control Center“

Der Unterschied zu Methode A (Einsatz mit Power Button Press) liegt darin, dass das Herunterfahren am PC/Host (Shutdown- Befehl) nicht mit dem Power Button des Mainboards (J303) durchgeführt wird, sondern über die Software (Verbindung über PSZ-1046 bzw. PSZ-1048 notwendig).

Um die Funktion „per Software“ korrekt zu konfigurieren ist es notwendig, die eingestellte Zeit im Feld „Shutdown at Power Fail after:“ auch am DIP-Schalter S2 einzustellen. Die Zeit, die dem System zum Herunterfahren zur Verfügung steht, muss weiterhin über den S2 Shutdown-Timer gewählt werden.

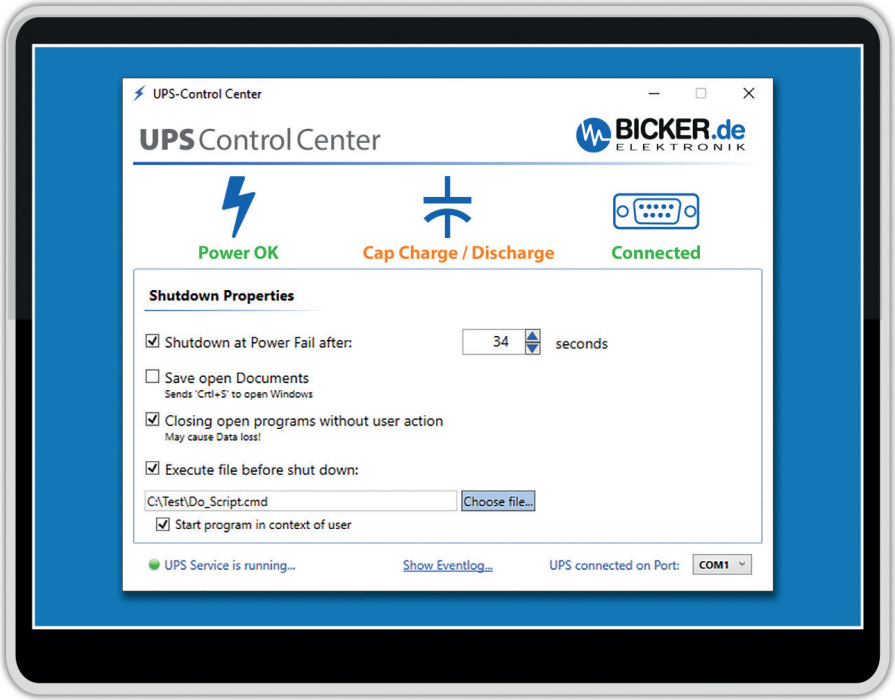
Nach Ablauf der Shutdown-Time wird das System für 8s getrennt (Reboot). Kehrt innerhalb der Shutdown-Time oder der Reboot-Time die Versorgung wieder zurück, wird das System nach Ablauf der 8s gestartet. *(siehe Tabelle Shutdown-Timer)*

C Kapazität über 90 % am PIN 3

Mit dieser Einstellung wird sichergestellt, dass die Versorgung erst an das System weitergegeben wird, wenn die Ladung der Superkondensatoren die 90 % erreicht hat. Dies ist auch nach einem Reboot der Fall und soll sicherstellen, dass die Energie reicht um das System immer sicher herunterzufahren.

9 Software UPS Control Center

Die Software UPS Control Center steht auf unserer Website www.bicker.de direkt beim Produkt zum kostenlosen Download zur Verfügung.



Die Software kann unter folgenden Systemen betrieben werden:
Ab Windows® 7 Home / Professional / Enterprise / Embedded 32bit und 64bit
Ab .Net Framework 4.5
Serial Com-Port

10 Kommunikationsprotokoll RS232

Transfer Packet - Beschreibung

Die Beschreibung des Protokolls bezieht sich auf die serielle Schnittstelle RS232. Das Protokoll gilt zugleich für gesendete und empfangene Daten.

Transfer Packet					
Control Byte	**Data Packet**				**Control Byte**
	Header			**D A T A**	
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 to 254 (can be null)	Last Byte
ASCII 'SOH' (0x01)	**Size of Data Packet** = 'Size of Header' + 'Size of used Data'	Command Index	Command from List	Transfer or Received Data	ASCII 'EOT' (0x04)

Beschreibung

Der Datentransfer beginnt immer mit einem Startzeichen (0x01) und endet mit einem Schlusszeichen (0x04). Nach dem Senden des Startsignals folgt der "Header" mit einer Größe von 3 Byte. Der Header beinhaltet Informationen über die Größe des Datenpakets, den Befehlsindex und die Befehls ID. Nach Übermittlung des Datenpakets wird die Übertragung mit dem Schlusszeichen (0x04) beendet.

Verbindungsdaten RS232

Baudrate	38400
Data length	8-bit
Stop bit	1
Parity	disabled

11 Befehlsliste

Für das µExtension Modul ist der Befehlsindex (Command Index) immer 0x03.

GetInputVoltage() 0x25

This read-word function shows the measured input voltage of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x25	GetInputVoltage()	R	Int16	0	32768	mV

Data packet: 0x01 0x03 0x03 0x25 0x04

GetOutputVoltage() 0x27

This read-word function shows the measured output voltage of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x27	GetOutputVoltage()	R	Int16	0	32768	mV

Data packet: 0x01 0x03 0x03 0x27 0x04

GetInputCurrent() 0x28

This read-word function shows the measured input current of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x28	GetInputCurrent ()	R	Int16	0	32768	mA

Data packet: 0x01 0x03 0x03 0x28 0x04

GetChargeCurrent() 0x29

This read-word-function shows the measured charge current of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x29	GetChargeCurrent ()	R	Int16	-32768	32768	mA

Negative numbers indicate a discharge.
Data packet: 0x01 0x03 0x03 0x29 0x04

GetCapStackVoltage() 0x26

This read-word-function shows the measured voltage at the capacitor stack of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x26	GetCapStackVoltage()	R	Int16	0	32768	mV

Data packet: 0x01 0x03 0x03 0x26 0x04

GetVcap1Voltage() 0x20

This read-word-function shows the measured voltage at capacitor 1.

Cmd	Name	Access	Type	Min.	Max	Unit
0x20	GetVcap1Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x20 0x04

GetVcap2Voltage() 0x21

This read-word-function shows the measured voltage at capacitor 2.

Cmd	Name	Access	Type	Min.	Max	Unit
0x21	GetVcap2Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x21 0x04

GetVcap3Voltage() 0x22

This read-word-function shows the measured voltage at capacitor 3.

Cmd	Name	Access	Type	Min.	Max	Unit
0x22	GetVcap3Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x22 0x04

GetVcap4Voltage() 0x23

This read-word-function shows the measured voltage at capacitor 4.

Cmd	Name	Access	Type	Min.	Max	Unit
0x23	GetVcap4Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x23 0x04

GetCapacity() 0x1E

This read-word-function shows the measured capacity of the capacitor stack.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1E	GetCapacity()	R	Int16	0	1000	F

Data packet: 0x01 0x03 0x03 0x1E 0x04

GetEsr() 0x1F

This read-word-function shows the measured ESR of the capacitor stack.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1F	GetEsr()	R	Int16	0	1000	mΩ

Data packet: 0x01 0x03 0x03 0x1F 0x04

GetChargeStatusRegister() 0x1B

This read-word function returns the status information about the state of the charger system.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1B	GetChargeStatusRegister()	R	Bit Field	-	-	True / False

Data packet: 0x01 0x03 0x03 0x1B 0x04

Bit Field:

SD	SU	CV	UV	CL	CG	CS	CB	CD	CC	RV	PF	RV	RV	RV	RV
LSB															MSB

BIT	Description	
0	SD	Shows that the device is in step-down (charging) mode.
1	SU	Shows that the device is in step-up (backup) mode.
2	CV	Shows that the charger is in constant voltage mode.
3	UV	Shows that the charger is in undervoltage lockout.
4	CL	Shows that the device is in input current limit.
5	CG	Shows that the capacitor voltage is above power good threshold.
6	CS	Shows that the capacitor manager is shunting.
7	CB	Shows that the capacitor manager is balancing.
8	CD	Shows that the charger is temporarily disabled for capacitance measurement.
9	CC	Shows that the charger is in constant current mode.
10	RV	Reserved Bit
11	PF	Shows that the input voltage is below the Power Fail Input (PFI) threshold.
12	RV	Reserved Bit
13	RV	Reserved Bit
14	RV	Reserved Bit
15	RV	Reserved Bit

StartCapEsrMeasurement() 0x31

This read-word function initiates a capacitance and ESR measurement.

Cmd	Name	Access	Type	Min.	Max	Unit
0x31	StartCapEsrMeasurement()	R	Start	-	-	-

Data packet: 0x01 0x03 0x03 0x31 0x04

GetMonitorStatusRegister() 0x1C

This read-word function returns the status information about the state of the monitoring system.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1C	GetMonitorStatusRegister()	R	Bit Field	-	-	True / False

Data packet: 0x01 0x03 0x03 0x1C 0x04

Bit Field:

MA	MS	CP	CM	EM	CF	EF	RV	PF	PR	RV	RV	RV	RV	RV	RV

LSB MSB

BIT	Description	
0	MA	Shows that the capacitance/ESR measurement is in progress.
1	MS	Shows that the system is waiting programmed time to begin C/ESR measurement.
2	CP	Shows that the system is waiting for satisfactory conditions to begin C/ESR measurement.
3	CM	Shows that the capacitance measurement has completed.
4	EM	Shows that the ESR measurement has completed.
5	CF	Shows that the last attempted C measurement was unable to complete
6	EF	Shows that the last attempted ESR measurement was unable to complete
7	RV	Reserved Bit
8	PF	This bit is set when VIN falls below the PFI threshold or the charger is unable to charge. It is cleared only when power returns and the charger is able to charge.
9	PR	This bit is set when the input is above the PFI threshold and the charger is able to charge. It is cleared only when PF (Bit 8) is set.
10	RV	Reserved Bit
11	RV	Reserved Bit
12	RV	Reserved Bit
13	RV	Reserved Bit
14	RV	Reserved Bit
15	RV	Reserved Bit

12 Wartung

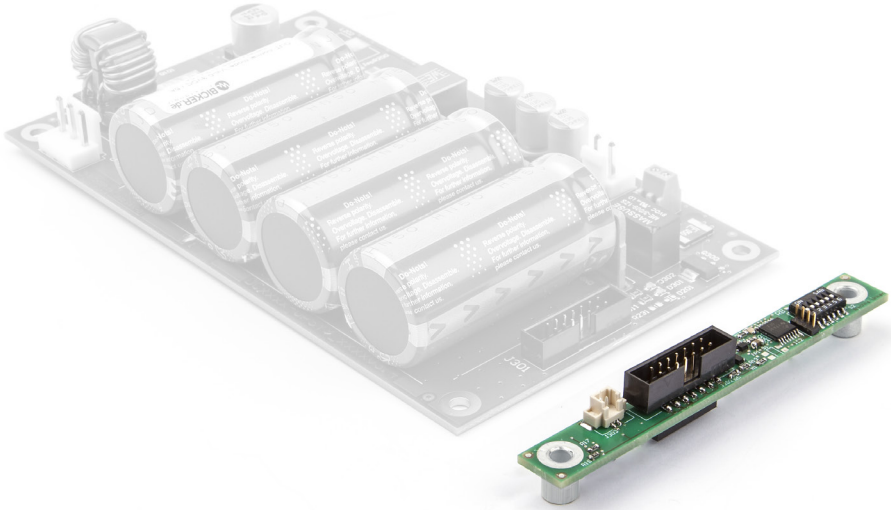
Das Zusatzmodul enthält keine zu wartenden Teile. Im Fehlerfall sind die Stromquelle auszuschalten und die Kabel zu entfernen.

13 Entsorgung

Elektrische und elektronische Geräte dürfen nicht in den Hausmüll! Entsorgen Sie das Produkt am Ende seiner Lebensdauer gemäß den geltenden gesetzlichen Vorschriften.

Notizen

English



PSZ-1063 µExtension Module
for DC2412-UPS(-LD), UPSIC-2403, UPSIC-1205

Congratulations for choosing a quality product!

This manual shall help the user to get familiar with the product and its components and features. It shall provide information as accurately and completely as possible. However, for possible errors no liability can be assumed. Hints to existing mistakes, critics and suggestions for improvement are welcome at any time.

1 Product and function description PSZ-1063

The µExtension Module PSZ-1063 is an **intelligent add-on module** which provides various features which upgrade the functions of the uninterruptible power supplies UPSIC-1205, UPSIC-2403 and DC2412-UPS(LD).

A continuous operating data acquisition allows realtime **data monitoring.** Thereby data are collected via I^2C interface of the UPSIC and DC2412-UPS devices continuously and are recorded in the µExtension Module. Data can be forwarded to the host via implemented RS232 interface at the module what allows a very easy implementation to the system.

A further core feature of the module is the **reboot function** which activates an automatic restart of the system whenever the supply voltage returns during the shut down process or afterwards. The start function of the mainboard can easily be activated via BIOS when input voltage is present.

The **output respectively release of supply** is controlled by a safety function if required. This means the release of supply does not take place until the supercaps have a capacity of minimum 90 %. A safe shut down of the system is guaranteed at any time.

The UPS can be driven without software at the host. The **configuration** of timing values can smoothly be defined with the **DIP switch** and the module generates the start signal for the shut down process via the power button of the mainboard. Of course the options for **software regulated setting** of times and of the shut down procedure via the **UPS Control Center** remain in place.

2 Intended use

Precautions when using the module!

The mounting of the µExtension Module to the used DC-UPS or UPSIC has to be done before installation of the device.

Also after disconnection of the input supply and when no voltage is measurable at the output the DC-2412-UPS / UPSIC devices are still supplied via the supercaps for up to 40 minutes. The module and the UPS must not be placed onto metal surfaces. Danger of short-circuit!

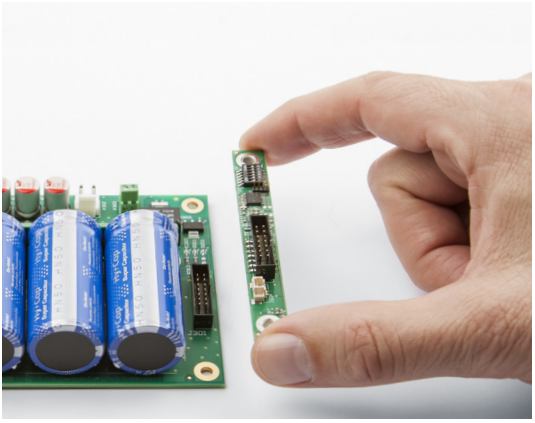
3 Assembly

The assembly of the product has strictly to be done by qualified personnel only. During the mounting process the valid electrical safety standards have to be observed. The end device has to comply with current valid EMC standards. The application as well as the circuit board have to be disconnected from voltage and current during the mounting process. The µExtension module as well as the used DC-UPS or UPSIC are assembly parts which should preferably be built into metal casings. Free air circulation and sufficient air ventilation has to be secured.

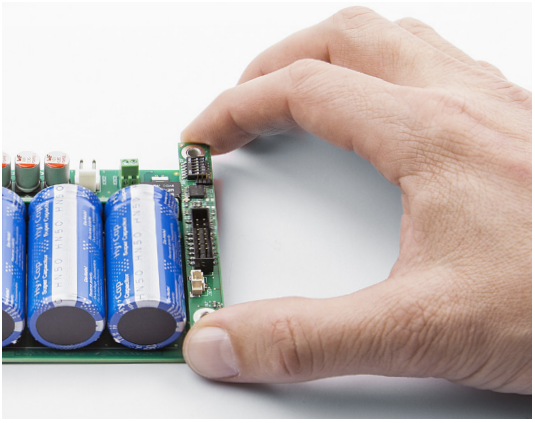
Caution!

Connection or disconnection of the µExtension Module **is only to be done** when the device is not in operating mode. It has **to be assured** the supercaps are free of any load.

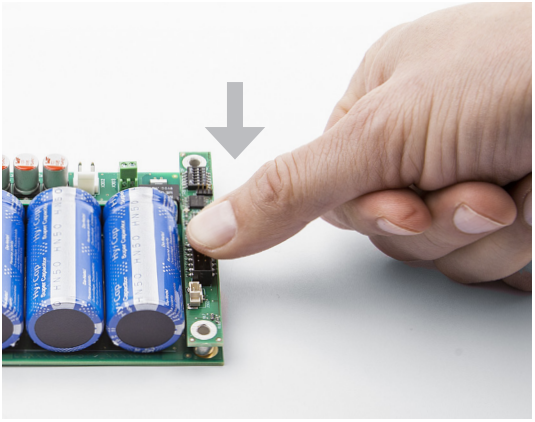
English



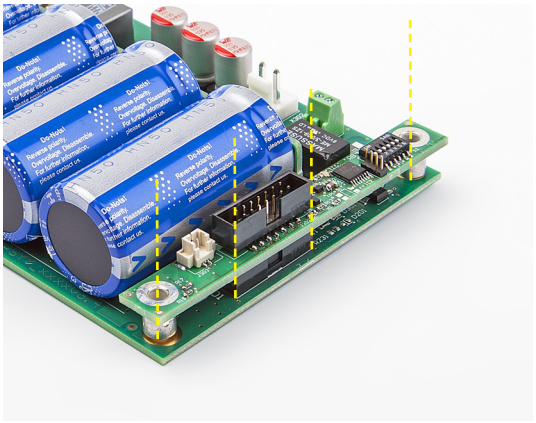
Assembly
Step 01



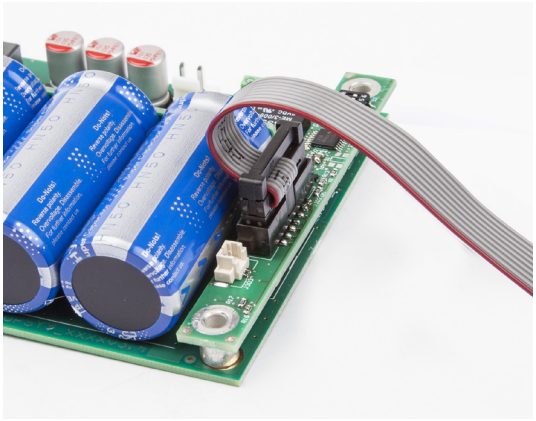
Assembly
Step 02



Assembly
Step 03

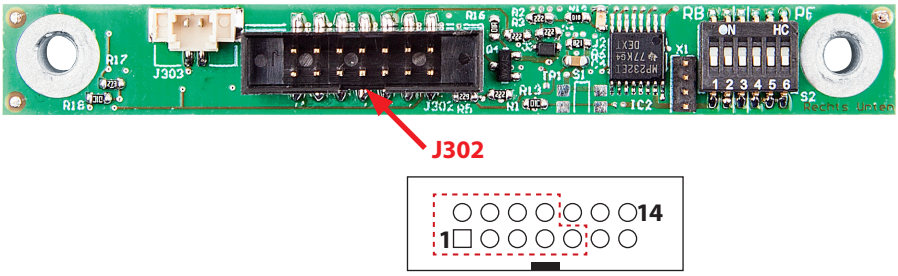


Assembly
Check correct position!



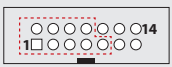
Assembly
Optional
interface cable
PSZ-1046 / PSZ-1048

4 Pin assignment of J302

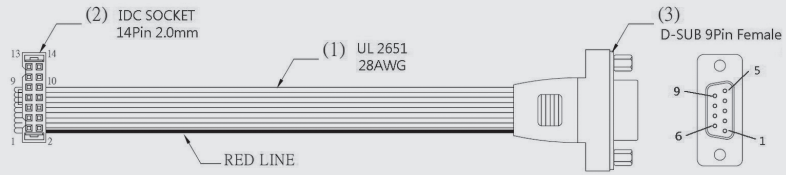


Pin assignment J302

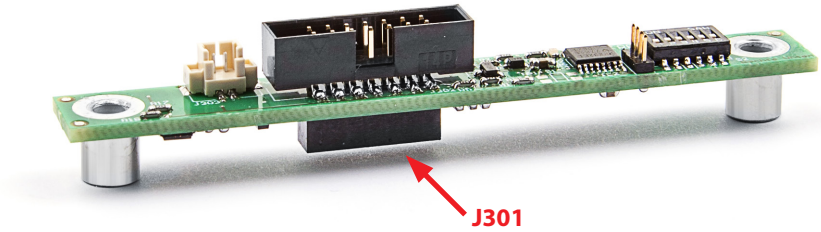
PIN	SIGNAL	DSUB9
01	DCD at PC – Detection cable connected	1
02	DSR at PC – Detection caps loading status	6
03	TXD (is connected to RXT at PC)	2
04	RTS at PC – Supply voltage	7
05	RXD (is connected to TXD at PC)	3
06	CTS at PC – Power Fail detection	8
07	Shutdown signal detection	4
08	N/A	9
09	GND	5
10	SMBAlert	
11	GND	
12	xSDA I^2C	
13	Vout (max. 300mA)	
14	xSCL I^2C	



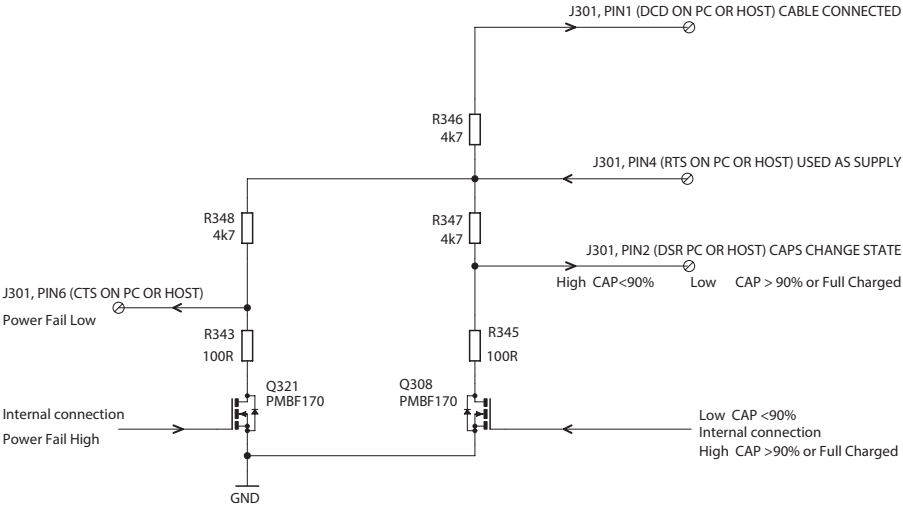
PIN 1 to 9 (J302) can be connected for RS232 directly with 9-pin D-SUB **(via interface cable PSZ-1046).**

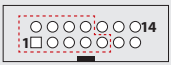


5 Interconnection of static signals J301
(corresponds to J302 on back side)

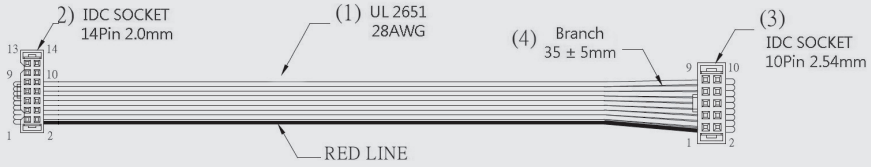


Interconnection J301

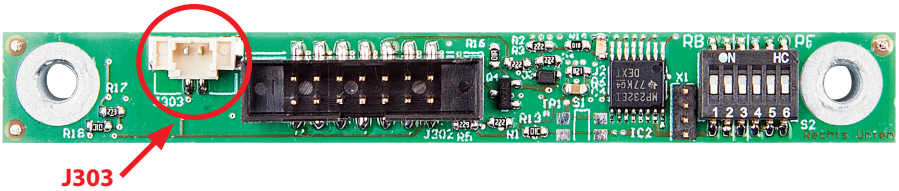




PIN 1 bis 9 (J302) can be connected directly to the mainboard for RS232 **(via interface cable PSZ-1048).**

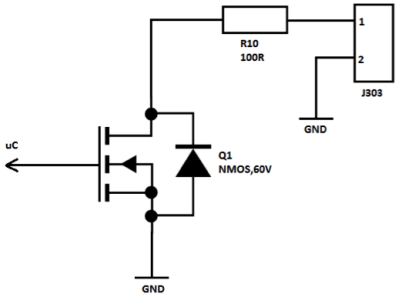


6 Pin assignment and wiring of J303



English

Interconnection J303

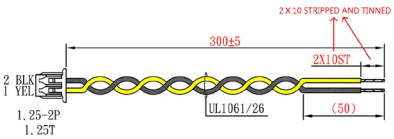


Plug for two-wire connection cable to mainboard

Power Button Press at mainboard with…

PSZ-1043 „open end“

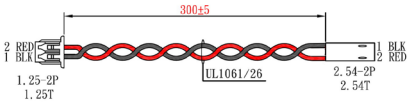
PIN	SIGNAL
Black	GND
Yellow	Open Drain (100Ω)



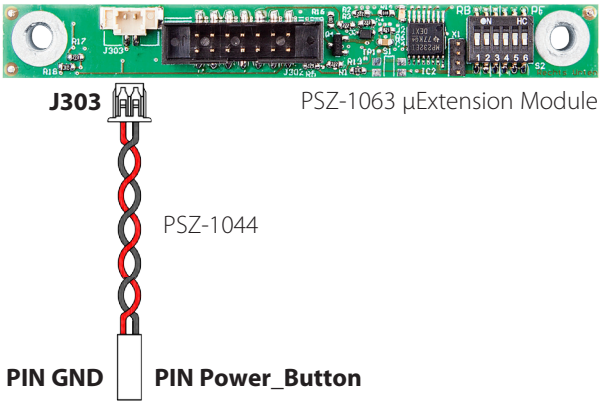
PSZ-1044 2.54 mm connection

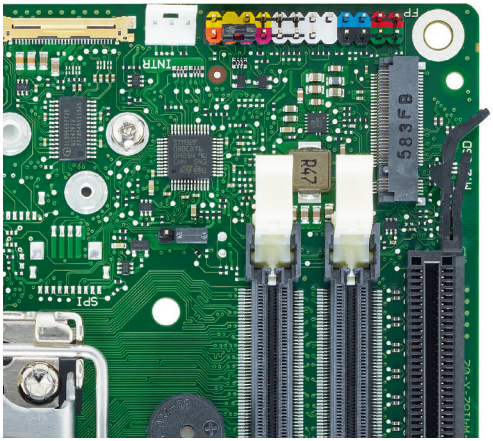
PIN	SIGNAL
Red	GND
Black	Open Drain (100Ω)

$V_{max} = 40\,V$ $I_{max} = 50\,mA$

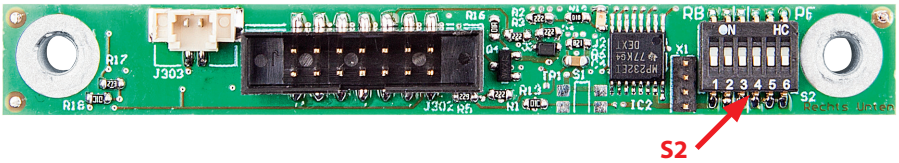


Wiring example J303 with PSZ-1044 on mainboard



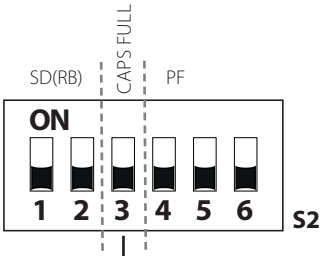


7 Settings for DIP Switch S2



English

Settings DIP S2



SHUTDOWN-TIMER		
PIN	1	2
No Reboot	ON	ON
Reboot after 10s	ON	OFF
Reboot after 30s	OFF	ON
Reboot after 60s	OFF	OFF

POWER FAIL (PF) - TIMER			
4	5	6	PIN
ON	ON	ON	Software
ON	ON	OFF	3s
ON	OFF	ON	8s
ON	OFF	OFF	20s
OFF	ON	ON	40s
OFF	ON	OFF	60s
OFF	OFF	ON	100s
OFF	OFF	OFF	150s

PIN 3

ON Output released when V_{CAP} over 90 %

8 Configuration

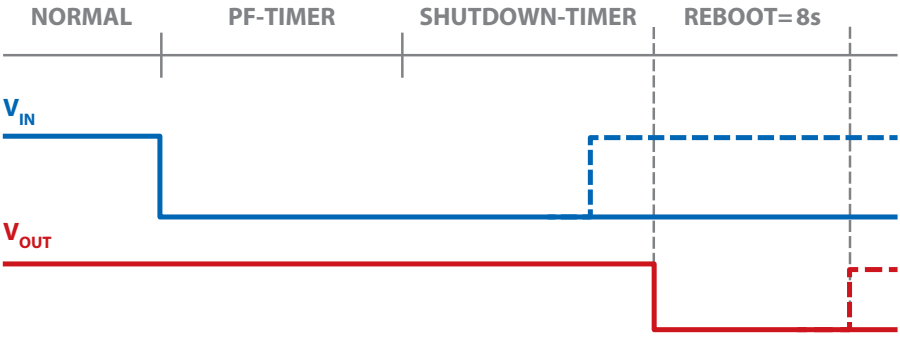
Setting the buffer times:

Power-Fail (PF) Timer

This concerns the backup time. The time at a power fail after which a shutdown signal will be sent to the PC or host. If the supply voltage at the grid side returns within this time no action will be started. This command can be sent to the PC or host via software UPS Control Center (RS232 connection via J302 is mandatory) or via Power Button Press (two-core cable).

Shutdown Timer

Concerns the time which is available for the system to shut down safely. After expiry of the PF-Timer this time is used to shut down the PC or host. When this time has elapsed, the output is cut off for 8s. If the input voltage returns during this time the output still remains cut off to initiate a new restart of the system.



A Use with Power Button Press

The shutdown signal is sent to the power button of the mainboard via a two-core cable (200...500ms low button). The setting at the DIP switch for the PF-timer *(please see table PF-Timer)* has to be **different to** „ON,ON,ON" to activate this function. In the following comes a procedure for the setting of the DIP switch for the configuration of the maximum hold-up time:

1. Identify maximum hold-up time of your system at maximum power consumption. If power consumption of the application is known the hold-up time can be read out of the according datasheets of UPSIC-1205/2403 and DC2412-UPS(LD). The value corresponds to t_{BACKUP} in seconds.
2. Measure the time which is needed by your system to shut down safe. This value corresponds to $t_{SHUTDOWN}$ in seconds.
3. Set the PF-Timer to:
   $PF\text{-}Timer_{DIP}$ [s] = (t_{BACKUP} x 0,6*) – $t_{SHUTDOWN}$
   **(Margin for End-Of-Life and tolerances due to temperature)*
   Always select the next lower value at the dip switch.
   For a power failure during the Vin start the boot time of the system also has to be taken into account.
4. Set the shutdown timer as high as $t_{SHUTDOWN}$. Set value at DIP switch to next higher value to make sure the system will not be interrupted during the shutdown process.

This procedure serves as one example. The settings can be chosen free to optimize the system according to your own requirements.

After the time the shutdown timer has expired the system will be disconnected for eight seconds (reboot time). If the power supply returns within the shutdown time or the reboot time the system will be restarted after the eight seconds *(please see diagram on page 12)*

No reboot function
A configuration of „ON,ON" at the shutdown timer ensures that the system will be cut off and stays off immediately after the PF-Timer setting.

B Use with software „UPS-Control Center“

Different to method A (Use with Power Button Press) the shutdown process at the PC/ host (shutdown command) is not initiated with the power button of the mainboard (J303) but via software (connection via PSZ-1046 orPsz-1048 is mandatory).

For the correct configuration of the function via software it is necessary to set the chosen time in the field „Shutdown at power fail after:“ also at the DIP switch S2. The time available to the system for shutdown must still be selected via S2 Shutdown-Timer.

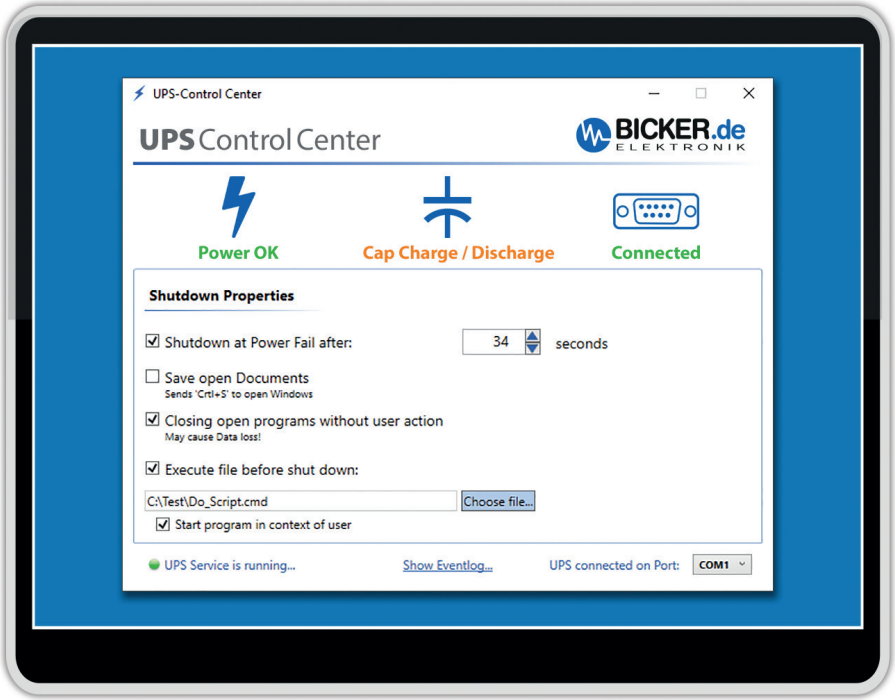
After the shutdown time has expired the system will be disconnected for eight seconds (reboot time). If the power supply returns within the shutdown time or the reboot time the system will be restarted after the eight seconds *(please see table Shutdown-Timer)*.

C Capacity over 90 % at PIN 3

This setting secures the supply will not be released to the system until the supercaps have reached 90 % charge. This is also valid after a reboot situation and shall secure that there is enough energy to shut down the system safe at any time.

9 Software UPS Control Center

The software is available on Bicker website www.bicker.de for free download on the according product sites.



The software runs with following operating systems:
Up from Windows® 7 Home / Professional / Enterprise / Embedded 32bit and 64bit
Up from .Net Framework 4.5
Serial Com-Port

10 Communication protocol RS232

Transfer packet - Description

The description refers to the serial interface RS232. The protocol is valid for sent and received data as well.

Transfer Packet					
Control Byte	**Data Packet**				**Control Byte**
	Header			**D A T A**	
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4 to 254 (can be null)	Last Byte
ASCII 'SOH' (0x01)	**Size of Data Packet** = 'Size of Header' + 'Size of used Data'	Command Index	Command from List	Transfer or Received Data	ASCII 'EOT' (0x04)

Description

The data transfer always begins with a start signal (0x01) and ends with a end signal (0x04). After the start signal was sent the „Header" follows with a size of 3 byte. The Header contains information about the size of the data volume, the command index and the command ID. After transmission of the data packet the transmittance is closed with the end signal (0x04).

Connection data RS232

Baudrate	38400
Data length	8-bit
Stop bit	1
Parity	disabled

English

11 List of commands

The command index of the µExtension Module is always 0x03.

GetInputVoltage() 0x25

This read-word function shows the measured input voltage of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x25	GetInputVoltage()	R	Int16	0	32768	mV

Data packet: 0x01 0x03 0x03 0x25 0x04

GetOutputVoltage() 0x27

This read-word function shows the measured output voltage of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x27	GetOutputVoltage()	R	Int16	0	32768	mV

Data packet: 0x01 0x03 0x03 0x27 0x04

GetInputCurrent() 0x28

This read-word function shows the measured input current of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x28	GetInputCurrent ()	R	Int16	0	32768	mA

Data packet: 0x01 0x03 0x03 0x28 0x04

GetChargeCurrent() 0x29

This read-word-function shows the measured charge current of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x29	GetChargeCurrent ()	R	Int16	-32768	32768	mA

Negative numbers indicate a discharge.
Data packet: 0x01 0x03 0x03 0x29 0x04

GetCapStackVoltage() 0x26

This read-word-function shows the measured voltage at the capacitor stack of the UPS.

Cmd	Name	Access	Type	Min.	Max	Unit
0x26	GetCapStackVoltage()	R	Int16	0	32768	mV

Data packet: 0x01 0x03 0x03 0x26 0x04

GetVcap1Voltage() 0x20

This read-word-function shows the measured voltage at capacitor 1.

Cmd	Name	Access	Type	Min.	Max	Unit
0x20	GetVcap1Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x20 0x04

GetVcap2Voltage() 0x21

This read-word-function shows the measured voltage at capacitor 2.

Cmd	Name	Access	Type	Min.	Max	Unit
0x21	GetVcap2Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x21 0x04

GetVcap3Voltage() 0x22

This read-word-function shows the measured voltage at capacitor 3.

Cmd	Name	Access	Type	Min.	Max	Unit
0x22	GetVcap3Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x22 0x04

GetVcap4Voltage() 0x23

This read-word-function shows the measured voltage at capacitor 4.

Cmd	Name	Access	Type	Min.	Max	Unit
0x23	GetVcap4Voltage()	R	Int16	0	5000	mV

Data packet: 0x01 0x03 0x03 0x23 0x04

GetCapacity() 0x1E

This read-word-function shows the measured capacity of the capacitor stack.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1E	GetCapacity()	R	Int16	0	1000	F

Data packet: 0x01 0x03 0x03 0x1E 0x04

GetEsr() 0x1F

This read-word-function shows the measured ESR of the capacitor stack.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1F	GetEsr()	R	Int16	0	1000	mΩ

Data packet: 0x01 0x03 0x03 0x1F 0x04

GetChargeStatusRegister() 0x1B

This read-word function returns the status information about the state of the charger system.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1B	GetChargeStatusRegister()	R	Bit Field	-	-	True / False

Data packet: 0x01 0x03 0x03 0x1B 0x04

Bit Field:

SD	SU	CV	UV	CL	CG	CS	CB	CD	CC	RV	PF	RV	RV	RV	RV
LSB															MSB

BIT	Description	
0	SD	Shows that the device is in step-down (charging) mode.
1	SU	Shows that the device is in step-up (backup) mode.
2	CV	Shows that the charger is in constant voltage mode.
3	UV	Shows that the charger is in undervoltage lockout.
4	CL	Shows that the device is in input current limit.
5	CG	Shows that the capacitor voltage is above power good threshold.
6	CS	Shows that the capacitor manager is shunting.
7	CB	Shows that the capacitor manager is balancing.
8	CD	Shows that the charger is temporarily disabled for capacitance measurement.
9	CC	Shows that the charger is in constant current mode.
10	RV	Reserved Bit
11	PF	Shows that the input voltage is below the Power Fail Input (PFI) threshold.
12	RV	Reserved Bit
13	RV	Reserved Bit
14	RV	Reserved Bit
15	RV	Reserved Bit

StartCapEsrMeasurement() 0x31

This read-word function initiates a capacitance and ESR measurement.

Cmd	Name	Access	Type	Min.	Max	Unit
0x31	StartCapEsrMeasurement()	R	Start	-	-	-

Data packet: 0x01 0x03 0x03 0x31 0x04

GetMonitorStatusRegister() 0x1C

This read-word function returns the status information about the state of the monitoring system.

Cmd	Name	Access	Type	Min.	Max	Unit
0x1C	GetMonitorStatusRegister()	R	Bit Field	-	-	True / False

Data packet: 0x01 0x03 0x03 0x1C 0x04

Bit Field:

MA	MS	CP	CM	EM	CF	EF	RV	PF	PR	RV	RV	RV	RV	RV	RV

LSB MSB

BIT	Description	
0	MA	Shows that the capacitance/ESR measurement is in progress.
1	MS	Shows that the system is waiting programmed time to begin C/ESR measurement.
2	CP	Shows that the system is waiting for satisfactory conditions to begin C/ESR measurement.
3	CM	Shows that the capacitance measurement has completed.
4	EM	Shows that the ESR measurement has completed.
5	CF	Shows that the last attempted C measurement was unable to complete
6	EF	Shows that the last attempted ESR measurement was unable to complete
7	RV	Reserved Bit
8	PF	This bit is set when VIN falls below the PFI threshold or the charger is unable to charge. It is cleared only when power returns and the charger is able to charge.
9	PR	This bit is set when the input is above the PFI threshold and the charger is able to charge. It is cleared only when PF (Bit 8) is set.
10	RV	Reserved Bit
11	RV	Reserved Bit
12	RV	Reserved Bit
13	RV	Reserved Bit
14	RV	Reserved Bit
15	RV	Reserved Bit

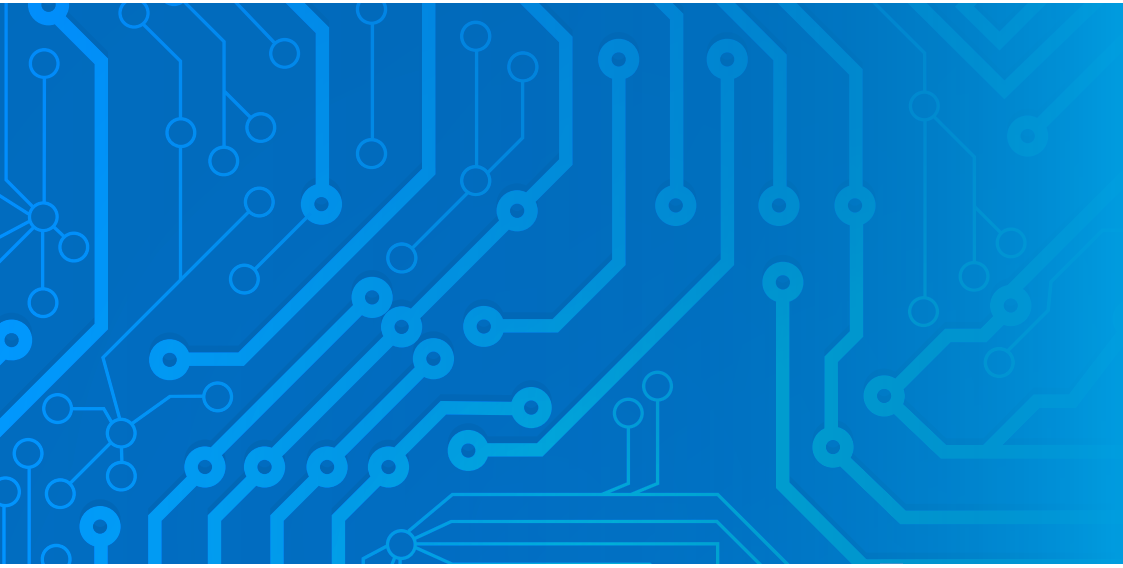
12 Maintenance

This extension module contains no serviceable parts. In case of a malfunction the power source has to be disconnected and cables have to be removed.

13 Disposal

Electric and electronic devices must not be disposed with domestic waste!
Dispose the product according legal regulations at the end of the life time. 

Notes



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