

# 1. TN-045. OnBoard Scripting

Revision History:

Rev A 10/21/11 R. Hochman

Overview:

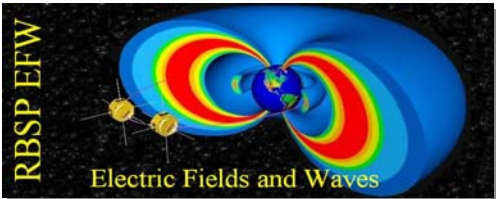
This note describes how to turn a series of up to 16 scripts into one script that you can use to load the (up to) 16 scripts into the SRAM at certain designated locations. Attached in the appendix are the reference documents for script identities and script collections.

Here is a sample script I wrote. It basically has space for 16 different scripts, I assigned 8 of them for BEB tables. I followed an example script made by PRH. Any line that starts with a semicolon is a comment. This script lists the script addresses (0x21, 0x22, 0x23... and says which beb tables goes in each spot, and below lists each paragraph and 'includes' the BEB table by name (eg BEB\_T01.A). I named it SCR\_0003 for script collection 3 (as you can see in the collections appendix) and assigned each table to meory locations 0x21 through 0x28 (as you can see in the ident appendix).

```

=====
; RBSP EFW FLIGHT PROGRAM
; FILE : SCR_0003.A
; AUTHOR: Rachel Hochman
; REV : 9/13/2011
;
; THIS DEFINES THE SCRIPT CONFIGURATION #0003 - List of BEB Tables
=====
      INCLUDE ICMD5.A      ;COMMAND MNEMONICS
      INCLUDE MEMMAP.A     ;MEMORY LOCATION
      INCLUDE ENAMAP.A     ;ENABLES
      INCLUDE ACTMAP.A     ;ACTUATORS
;
EOL EQU 0 ;END OF LIST
=====
; BINARY FILE HEADER FOR B2C TO USE
=====
      ORG   SCRIPTS-3      ;
      DB    'M'            ;MAIN MEMORY DATA LOAD
      DW    SCRIPTS        ;
;-----
      DB    021H           ;0. BEB Table 001. Sunlit high density, Aft AXB Sunlit
      DB    022H           ;1. BEB Table 002. Eclipse high density, Aft AXB Sunlit
      DB    023H           ;2. BEB Table 003. Sunlit low density, Aft AXB Sunlit
      DB    024H           ;3. BEB Table 004. Eclipse low density, Aft AXB Sunlit
      DB    025H           ;4. BEB Table 005. Sunlit high density, Aft AXB Shadow
      DB    026H           ;5. BEB Table 006. Eclipse high density, Aft AXB Shadow
      DB    027H           ;6. BEB Table 007. Sunlit low density, Aft AXB Shadow
      DB    028H           ;7. BEB Table 008. Eclipse low density, Aft AXB Shadow
      DB    0              ;8.
      DB    0              ;9.
      DB    0              ;A.

```



```

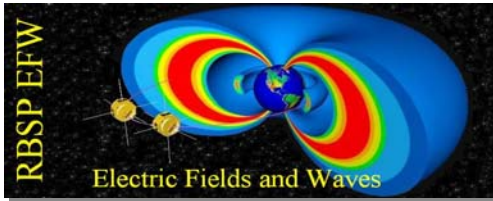
DB      0      ;B.
DB      0      ;C.
DB      0      ;D.
DB      0      ;E.
DB      0      ;F.
;
DB      PP0-ST/16,PP1-ST/16 ;PARAGRAPH ADDRESSES
DB      PP2-ST/16,PP3-ST/16 ;
DB      PP4-ST/16,PP5-ST/16 ;
DB      PP6-ST/16,PP7-ST/16 ;
DB      PP8-ST/16,PP9-ST/16 ;
DB      PP10-ST/16,PP11-ST/16 ;
DB      PP12-ST/16,PP13-ST/16 ;
DB      PP14-ST/16,PP15-ST/16 ;
;
ST      EQU    $
ORG     $+15&0FFF0H ;
PP0:   INCLUDE BEB_T01.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP1:   INCLUDE BEB_T02.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP2:   INCLUDE BEB_T03.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP3:   INCLUDE BEB_T04.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP4:   INCLUDE BEB_T05.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP5:   INCLUDE BEB_T06.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP6:   INCLUDE BEB_T07.A ;
DW     EOL ;
;-----
ORG     $+15&0FFF0H ;
PP7:   INCLUDE BEB_T08.A ;
DW     EOL ;

```

**\*\*etc through PP15 with a blank where the include is in the above paragraphs\*\***

Now here is an example of one of the BEB table scripts. First it says in the comments what values each DAC should be set to, and then defines them as variables, then breaks each value into a 'high' and 'low' (msb, lsb) then goes through and sets all the dacs to those values.

=====

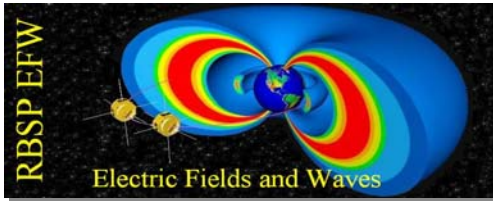


```

; BEB_TABLE_01.A - Set BEB Table 001. Sunlit high density, Aft AXB Sunlit
;
;-----
;      BIASn set to 0x8c4d
;      USHERn set to 0x7ff8
;      GUARDn set to 0x7ff8
;
BMID0 EQU    08C4DH
UMID0 EQU    07FF8H
GMID0 EQU    07FF8H
;
BMIDL0      EQU    BMID0&0FFH
BMIDH0      EQU    BMID0>8
UMIDL0      EQU    UMID0&0FFH
UMIDH0      EQU    UMID0>8
GMIDL0      EQU    GMID0&0FFH
GMIDH0      EQU    GMID0>8
;
DW          ACTESTLOW+0; ACTEST all off.
DW          ACTESTHIGH+0      ;
;
DW          BIAS+100H+BMIDH0,BIASL+BMIDL0      ; BIAS1 DAC
DW          USHER+100H+UMIDH0,USHERL+UMIDL0    ; USHER1 DAC
DW          GUARD+100H+GMIDH0,GUARDL+GMIDL0    ; GUARD1 DAC
;
DW          BIAS+200H+BMIDH0,BIASL+BMIDL0      ; BIAS2 DAC
DW          USHER+200H+UMIDH0,USHERL+UMIDL0    ; USHER2 DAC
DW          GUARD+200H+GMIDH0,GUARDL+GMIDL0    ; GUARD2 DAC
;
DW          BIAS+300H+BMIDH0,BIASL+BMIDL0      ; BIAS3 DAC
DW          USHER+300H+UMIDH0,USHERL+UMIDL0    ; USHER3 DAC
DW          GUARD+300H+GMIDH0,GUARDL+GMIDL0    ; GUARD3 DAC
;
DW          BIAS+400H+BMIDH0,BIASL+BMIDL0      ; BIAS4 DAC
DW          USHER+400H+UMIDH0,USHERL+UMIDL0    ; USHER4 DAC
DW          GUARD+400H+GMIDH0,GUARDL+GMIDL0    ; GUARD4 DAC
;
DW          BIAS+500H+BMIDH0,BIASL+BMIDL0      ; BIAS5 DAC
DW          USHER+500H+UMIDH0,USHERL+UMIDL0    ; USHER5 DAC
DW          GUARD+500H+GMIDH0,GUARDL+GMIDL0    ; GUARD5 DAC
;
DW          BIAS+600H+BMIDH0,BIASL+BMIDL0      ; BIAS6 DAC
DW          USHER+600H+UMIDH0,USHERL+UMIDL0    ; USHER6 DAC
DW          GUARD+600H+GMIDH0,GUARDL+GMIDL0    ; GUARD6 DAC
;
DW          LDAC+1              ; update BEB DAC (BEBLDAC)
DW          CONFIG0+001H       ; RECORD CONFIGURATION

```

To turn all of this into a python script, you have to run in your command line:  
scriptgen.bat scr\_0003

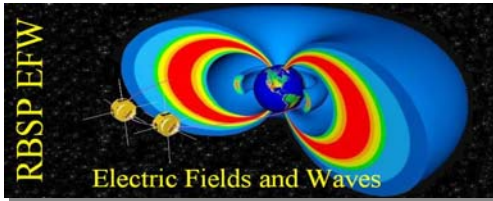


**\*\*NB if there are any empty lines in your scripts or twice assigned variables you will have a problem with running the scriptgen.bat\*\***  
This will give you a cpb file, which looks like this:

```
#  
# scr_0003.cpb  
#  
EFW_CMDS(COUNT= 8)  
  
after 0,00:00:01 efw.idpu_load("00006000", " 21 22 23 24 25 26 27 28 00 00 00 00 ...  
after 0,00:00:01 efw.idpu_load("00006080", " 00 69 00 6a 7f 51 fe 50 7f 59 f8 58 ...  
after 0,00:00:01 efw.idpu_load("00006100", " 86 5b 5e 58 86 63 5e 60 67 54 61 ...  
after 0,00:00:01 efw.idpu_load("00006180", " 7f 56 fe 50 7f 5e f8 58 7f 66 f8 60 01 ...  
after 0,00:00:01 efw.idpu_load("00006200", " 00 69 00 6a 7f 51 fe 50 7f 59 f8 58 ...  
after 0,00:00:01 efw.idpu_load("00006280", " 86 5b 5e 58 86 63 5e 60 67 54 61 50 ...  
after 0,00:00:01 efw.idpu_load("00006300", " 7f 56 fe 50 7f 5e f8 58 7f 66 f8 60 01 68 ...  
after 0,00:00:01 efw.idpu_load("00006380", " 00 00 00 00 00 00 00 00 00 00 00 00 ...
```

It is basically a list of 8 commands, loading all the tables into the right places in memory. You can clean one of these up and make it into a python script by deleting the 'after...:01' stuff from the beginning of each line and adding some commands to turn off the sram write protection so the above cpb file looks like this python script:

```
""""  
SCR_0003    Loading BEB Tables Into Onboard Scripts  
REV-, 10/20/11 RAH  
""""  
  
from efw import *  
from UTIL import *  
  
def main():  
  
    cmd.EFW_SRMWRTCTL(PROTECT=0)  
    sleep(1)  
    cmd.EFW_CMDS(COUNT= 8)  
    sleep(1)  
    efw.idpu_load("00006000", " 21 22 23 24 25 26 27 28 00 00 00 00 00 00 00 00 ...  
    sleep(1)  
    efw.idpu_load("00006080", " 00 69 00 6a 7f 51 fe 50 7f 59 f8 58 7f 61 f8 60 7f ...  
    sleep(1)  
    efw.idpu_load("00006100", " 86 5b 5e 58 86 63 5e 60 67 54 61 50 86 5c 5e 58 86 ...  
    sleep(1)  
    efw.idpu_load("00006180", " 7f 56 fe 50 7f 5e f8 58 7f 66 f8 60 01 68 04 40 00 00 ...  
    sleep(1)  
    efw.idpu_load("00006200", " 00 69 00 6a 7f 51 fe 50 7f 59 f8 58 7f 61 f8 60 7f 52 ...  
    sleep(1)  
    efw.idpu_load("00006280", " 86 5b 5e 58 86 63 5e 60 67 54 61 50 86 5c 5e 58 86 ...
```



```
sleep(1)
efw.idpu_load("00006300", " 7f 56 fe 50 7f 5e f8 58 7f 66 f8 60 01 68 08 40 00 00 ...
sleep(1)
efw.idpu_load("00006380", " 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00")
sleep(1)
verify_cmdcount()
sleep(1)
cmd.EFW_SRMWRTCTL(PROTECT=1)

cmd.efw_dumptabl(12,0)
```

NOW, when the instrument is on you can run the above script and it will load the beb table scripts into the sram. To run one of those run the command `cmd.efw_script(0x21)` Where the value passed in is the script address of the one you want. Eg, 0x21 is beb table 1, 0x22 is beb table 2... etc. Now all your bias values are 8c4d and all ushers and guards are 7ff8.

# SCRIPTS

SCRIPT	SLOT															Revision	Description	
COLLECTION	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Date	
0001	E0	E1	0	0	0	0	0	0	0	0	0	0	0	0	EE	EF	<a href="#">7/21/2009</a>	FWS TESTING SCRIPTS
0002	B0	B1	B2	B3	0	0	0	0	0	0	0	0	0	0	0	0	<a href="#">11/18/2009</a>	FWS FLIGHT
0003	T_01	T_02	T_03	T_04	T_05	T_06	T_07	T_08	0	0	0	0	0	0	0	0	9/13/2011	BEB Tables

SCRIPTS

IDENTS

IDENT	SYSTEM	ECL	RBT	PSP	SHK	SWB	HMF	PGP	APS	GBO	C4D	DDC	DESCRIPTION	TIME (Secs)	STATUS	REVISION DATE
1																
21													beb table 001			
22													beb table 002			
23													beb table 003			
24													beb table 004			
25													beb table 005			
26													beb table 006			
27													beb table 007			
28													beb table 008			
29																
2A																
2B																
2C																
2D																
2E																
2F																
30																
31																
32																
33																
34																
35																
36																
37																
38																
39																
3A																
3B																
3C																
3D																
3E																
3F																

SCRIPTS

IDENTS

IDENT	SYSTEM	ECL	RBT	PSP	SHK	SWB	HMF	PGP	APS	GBO	C4D	DDC	DESCRIPTION	TIME (Secs)	STATUS	REVISION DATE
40																
41																
42																
43																
44																
45																
46																
47																
48																
49																
4A																
4B																
4C																
4D																
4E																
4F																
50																
51																
52																
53																
54																
55																
56																
57																
58																
59																
5A																
5B																
5C																
5D																
5E																
5F																



SCRIPTS

IDENTS

IDENT	SYSTEM	ECL	RBT	PSP	SHK	SWB	HMF	PGP	APS	GBO	C4D	DDC	DESCRIPTION	TIME (Secs)	STATUS	REVISION DATE
80	EFW															
81	EFW															
82	EFW															
83	EFW															
84	EFW															
85	EFW															
86	EFW															
87	EFW															
88	EFW															
89	EFW															
8A	EFW															
8B	EFW															
8C	EFW															
8D	EFW															
8E	EFW															
8F	EFW															
90	EFW															
91	EFW															
92	EFW															
93	EFW															
94	EFW															
95	EFW															
96	EFW															
97	EFW															
98	EFW															
99	EFW															
9A	EFW															
9B	EFW															
9C	EFW															
9D	EFW															
9E	EFW															
9F	EFW															

SCRIPTS

IDENTS

IDENT	SYSTEM	ECL	RBT	PSP	SHK	SWB	HMF	PGP	APS	GBO	C4D	DDC	DESCRIPTION	TIME (Secs)	STATUS	REVISION DATE
A0	FGM															
A1	FGM															
A2	FGM															
A3	FGM															
A4	FGM															
A5	FGM															
A6	FGM															
A7	FGM															
A8	FGM															
A9	FGM															
AA	FGM															
AB	FGM															
AC	FGM															
AD	FGM															
AE	FGM															
AF	FGM															
B0	SCM												BEB LOW DENSITY SUNLIT	0.688	WRITTEN	11/18/2009
B1	SCM	X											BEB LOW DENSITY ECLIPSE	0.688	WRITTEN	11/18/2009
B2	SCM												BEB HIGH DENSITY SUNLIT	0.688	WRITTEN	11/18/2009
B3	SCM	X											BEB HIGH DENSITY ECLIPSE	0.688	WRITTEN	11/18/2009
B4	SCM															
B5	SCM															
B6	SCM															
B7	SCM															
B8	SCM															
B9	SCM															
BA	SCM															
BB	SCM															
BC	SCM															
BD	SCM															
BE	SCM															
BF	SCM															

SCRIPTS

IDENTS

IDENT	SYSTEM	ECL	RBT	PSP	SHK	SWB	HMF	PGP	APS	GBO	C4D	DDC	DESCRIPTION	TIME (Secs)	STATUS	REVISION DATE
C0	FGM															
C1	FGM															
C2	FGM															
C3	FGM															
C4	FGM															
C5	FGM															
C6	FGM															
C7	FGM															
C8	FGM															
C9	FGM															
CA	FGM															
CB	FGM															
CC	FGM															
CD	FGM															
CE	FGM															
CF	FGM															
D0	SCM															
D1	SCM															
D2	SCM															
D3	SCM															
D4	SCM															
D5	SCM															
D6	SCM															
D7	SCM															
D8	SCM															
D9	SCM															
DA	SCM															
DB	SCM															
DC	SCM															
DD	SCM															
DE	SCM															
DF	SCM															

SCRIPTS

IDENTS

IDENT	SYSTEM	ECL	RBT	PSP	SHK	SWB	HMF	PGP	APS	GBO	C4D	DDC	DESCRIPTION	TIME (Secs)	STATUS	REVISION DATE
E0	TEST												ACTUATOR DISABLE TEST	4.031	WRITTEN	7/21/2009
E1	TEST												ACTUATOR STOP TEST	4.031	WRITTEN	7/22/2009
E2	TEST															
E3	TEST															
E4	TEST															
E5	TEST															
E6	TEST															
E7	TEST															
E8	TEST															
E9	TEST															
EA	TEST															
EB	TEST															
EC	TEST															
ED	TEST															
EE	TEST												TELEMETRY SIMULATOR (2 PACKETS/SEC)	INF	WRITTEN	7/21/2009
EF	TEST												LED TEST SEQUENCE	9.000	WRITTEN	7/22/2009
F0	IDPU															
F1	IDPU															
F2	IDPU															
F3	IDPU															
F4	IDPU															
F5	IDPU															
F6	IDPU															
F7	IDPU															
F8	IDPU															
F9	IDPU															
FA	IDPU															
FB	IDPU															
FC	IDPU															
FD	IDPU															
FE	IDPU															
FF	IDPU															

ECL Earth & Lunar Shadows

RBT Inner & Outer Radiation Belts (RBT)  
PSP Deep Plasma Sphere (PSP)  
SHK Foreshock Solar Wind (SHK)  
SWB Solar Wind Beam (SWB)  
HMF High Mag Field (HMF)  
PGP Perigee (PGP)  
APS Average Plasma Sheet (APS)  
GBO North American Sector (GBO)  
C4D Probe Conjunctions (C4D)  
DDC Dawn/Dusk Conjunctions (DDC)