

## BOC Versions and Identification - and Firmware Releases

### Introduction

This note lists the different versions of the Atlas SCT Back-Of-Crate modules; it summarises their features and specifies which will continue as current. It describes a new format for the information parameters that can be read via the corresponding ROD module. It also shows which Firmware Releases are available for each version of BOC.

### History, Status and Plans

The Series Prototype (once tagged "BOC 1p0") and the Series BOCs are covered by this note. The proof of principle prototype ("BOC 0") is not. Two revisions of the Series BOC exist ("RevA" and "RevB"), and the "RevC" is currently being produced. **Table 1** shows the status of the different versions.

It is planned that the Series Prototypes will continue to be used. The 2 RevA BOCs will not be used outside Cambridge. The RevBs are about to be deployed at assembly and test laboratories. It is expected that from now on only RevC BOCs will be made.

BOC Model Name:	Series Prototype	Series BOCs		
		RevA	RevB	RevC
Original Name:	BOC 1p0	BOC 1p1	-	-
Number Built	11	2	18	0
Serial Numbers:	1 - 11	0 - 1	2 - 19	32 - ???
Number at CB	4	2	18	0
Number in Field	7	0	0	0
Monitoring?	No	Yes	Yes	Yes
PlugIns with Samtec connectors ?	With Adaptor	Yes	Yes	Yes

**Table 1 - BOC Models**

### The Use of the Information Bytes

All the BOCs have 5 information bytes that can be read by ROD via the Set-Up Bus. These are:

- Manufacturer -  $CB_{Hex}$  for all BOCs
- Type -  $44_{Dec}$  for Series Prototype, and  $46_{Dec}$  for Series BOCs
- Serial Number - 000:255
- Hardware Info Byte - New Scheme to be adopted for this (see below)
- Firmware Release - 000-255 -for Series BOCs, 004-255 (see below)

BOC Serial Numbers start at 000 for each BOC PCB Revision.

The use of the Hardware Information Byte has been changed: instead of using it as a single parameter 000-255, it is split into two parameters: the 3 MSBits specify the printed circuit board (PCB) Revision, and the remaining 5 bits specify the Hardware Version. Thus all RevB BOCs conforming with this scheme will report PCB# 2. The move to a 12-bit

Monitor ADC as described below results in a different HW\_Vers: those fitted with the 10-Bit Monitor ADC will have HW\_Vers 0, those with a 12-Bit ADC will report HW\_Vers 1.

The Firmware Release Byte will remain a single 8-bit parameter, but will be used somewhat differently. Up to now FW\_Release has counted up separately for the different Versions of BOC. Now a particular Firmware Release will serve all appropriate Versions of BOC by having a download set for each. In this context "BOC\_Version" means a combination of PCB Revision and HW\_Vers. This is illustrated in Table 2 below.

### Transition to the New Conventions:

This scheme should allow existing BOCs to co-exist with ones that have been upgraded, but in practice all but the Series Prototypes have already been upgraded.

- The Series Prototype BOCs (Type 44) already conform to the scheme, in that their HW Information Byte is 1, which will be interpreted as PCB 0, HW\_Vers 1. No upgrade is planned for these: they report FW\_Release 3.
- For the Series BOCs, the new convention requires the Control CPLD to report different values for the HW Information Byte. FW\_Release 04 and later do this.

### Monitor ADC Upgrade:

The ability to monitor the RX PlugIn PIN current has proved very useful in the testing of BOCs and Opto PlugIns. The monitor has to accommodate the maximum expected current for the group of 12 streams, which can be 25mA. With a 10-bit ADC, this gives a resolution of 24uA, which corresponds to an average optical power of about 40uW. This is not adequate when characterising individual lasers delivering perhaps 400uW. So we are moving to a pin-compatible 12-bit ADC. This gives a useful 6uA / 10uW resolution.

FW\_Release 5 supports 12-bit ADCs - and reports HW\_Vers 1.

### Summary:

Table 2 shows the various BOC Versions and the compatibility of the FW\_Releases currently available or planned:

BOC Model Name:		Series Prototype	RevA		RevB		RevC
Manufacturer:		CB <sub>Hex</sub>	CB <sub>Hex</sub>		CB <sub>Hex</sub>		CB <sub>Hex</sub>
Type:		44	46		46		46
PCB:		0	1		2		3
HW_Rev:		1	0	1	0	1	1
FW_Release	3	OK	n/a	n/a	n/a	n/a	n/a
	4	n/a	OK	n/a	OK	n/a	n/a
	5	n/a	n/a	Avail-able	n/a	OK	Avail-able

Table 2 – BOC Versions and Compatible FW Releases

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