

# GOL Test Board Manual

## Introduction

The GOL test board is used to test the transfer of data from via the GOL chip. The FPGA is configured in a way that a packet of data can be send. This data has the CSM data format and can be received and processed in the MROD-In when a GOL board is mounted at the place of the input S-Link.

## Push button operation

The GOL Test Board has three push button switches with LEDs. The table below explains their behaviour.

		LED On:	LED Off:
SW1	RESET	GOL and FPGA in Reset	Not in Reset
SW2	FF0	Sending data packet may be triggered by pushing the button	GOL not READY or data packet is being send
SW3	ERR	Arm the generation of an error on word 21	No Error will be generated

Table 1: Push button switch behaviour

Note that a Reset can also be generated when URESET\_n is applied. This will also light the LED.

The data packet that is send corresponds to 3 events numbered [1..3] with 18 TDCs being send to the MROD-In. The data format does correspond to the data format that is used in the CSM (see table 2).

	'1'	'0'
Bit 27	CSM signals that there was a TDC parity error detected	No error
Bit26	Parity such that Bit [31..0] have an <b>odd</b> number of ones	

Table 2: Data format highlights

Here is a HEX dump of the Event ROM content:

```

Addr      +0      +1      +2      +3      +4      +5      +6      +7
00      D0000000  A000108B  A5001022  A2001025  04000000  A40010F7  04000000  A200103E
08      A700103B  A000109F  04000000  A20010E6  A30010E7  04000000  04000000  A20010EA
10      A30010EB  04000000  A50010ED  D0000000  34000000  35000001  04000000  A7001026
18      30000004  04000000  32000006  04000000  30000008  A10010E5  3200000A  3300000B
20      A00010E8  04000000  3600000E  04000000  04000000  31000011  D0000000  34000000
28      04000000  36000002  37000003  30000004  A50010AF  32000006  33000007  30000008
30      31000009  3200000A  3300000B  3400000C  A10010E9  04000000  3700000F  A40010EC
38      31000011  D0000000  C4001004  04000000  36000002  37000003  C4001004  31000005
40      C2001004  33000007  C4001004  31000009  C2001004  C7001004  3400000C  3500000D
48      04000000  3700000F  30000010  C1001004  D0000000  A000208B  35000001  C2001004
50      C7001004  04000000  31000005  04000000  C7001004  A000209F  04000000  A20020E6
58      A30020E7  C4001004  3500000D  3600000E  C7001004  30000010  A50020ED  D0000000
60      34000000  C1001004  A2002025  A7002026  04000000  C1001004  04000000  A700203B
68      30000008  C1001004  3200000A  3300000B  A00020E8  C1001004  C2001004  A30020EB
70      C4001004  31000011  D0000000  C0002003  A5002022  36000002  37000003  A40020F7
78      A50020AF  A200203E  04000000  04000000  A10020E5  C6002003  04000000  3400000C
80      A10020E9  A20020EA  04000000  A40020EC  C5002003  D0000000  04000000  35000001
88      C6002003  C3002003  30000004  31000005  32000006  33000007  C0002003  31000009
90      04000000  C3002003  C0002003  3500000D  3600000E  3700000F  30000010  A10030ED
98      D0000000  A400308B  C5002003  A6003025  A3003026  C0002003  C5002003  C6002003
A0      C3002003  A400309F  C5002003  A60030E6  A70030E7  A40030E8  C5002003  C6002003
A8      C3002003  C0002003  31000011  D0000000  34000000  A1003022  36000002  37000003
B0      A00030F7  A10030AF  A600303E  A300303B  30000008  A50030E5  3200000A  3300000B
B8      3400000C  A50030E9  A60030EA  A70030EB  A00030EC  04000000  D0000000  34000000
C0      35000001  36000002  37000003  30000004  31000005  32000006  33000007  30000008
C8      31000009  3200000A  3300000B  3400000C  3500000D  3600000E  3700000F  30000010
D0      04000000  D0000000  C0003004  35000001  C6003004  C3003004  30000004  31000005
D8      32000006  33000007  C0003004  31000009  C6003004  C3003004  C0003004  3500000D
E0      3600000E  3700000F  30000010  31000011  D0000000  04000000  C5003004  04000000
E8      04000000  C0003004  C5003004  C6003004  C3003004  04000000  C5003004  04000000
F0      04000000  04000000  C5003004  C6003004  C3003004  C0003004  C5003004  D0000000
F8      00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

D          :Separator
A          :TDC Header
C          :TDC Trailer
001       :Event ID
003       :Word Count
30000000  :When armed, this word will be signalled having an LDERR

```

This data does not contain any errors that signal a TDC Parity error (Bit 27 is always ‘0’). This data is such that for every word, there is odd parity generated (Bit 26). When an error is armed with SW3 then an error propagate is generated in the GOL and TLK1501 connection. The GOL board will assert LDERR\_n and will output the error propagation code, thus the MROD will receive 0xFEFE as data. This will signal a GOL parity error (0xFEFE is even parity).

Note that Byte 2 is always 0x00. This byte is not stored in ROM but set as 0x00 by default. The Altera FLEX device (EPF10K10A) on the GOL Test Board only can accommodate 24 bits and not 32 bit wide data because it has only 3 EABs.

Sending the content of this event ROM once, will generate the following events on the MDOD-In (Version 1.1):

```
A000108B 30000000 30000000 C0001004
A1001022 31000001 31000001 C1001004
A2001025 32000002 32000002 C2001004
A3001026 33000003 33000003 C3001004
A40010F7 30000004 30000004 C0001004
A50010AF 31000005 31000005 C1001004
A600103E 32000006 32000006 C2001004
A700103B 33000007 33000007 C3001004
A800109F 30000008 30000008 C0001004
A90010E5 31000009 31000009 C1001004
AA0010E6 3200000A 3200000A C2001004
AB0010E7 3300000B 3300000B C3001004
AC0010E8 3000000C 3000000C C0001004
AD0010E9 3100000D 3100000D C1001004
AE0010EA 3200000E 3200000E C2001004
AF0010EB 3300000F 3300000F C3001004
B00010EC 30000010 30000010 C0001004
B10010ED 31000011 31000011 C1001004
```

```
A000208B 30000000 C0002003
A1002022 31000001 C1002003
A2002025 32000002 C2002003
A3002026 33000003 C3002003
A40020F7 30000004 C0002003
A50020AF 31000005 C1002003
A600203E 32000006 C2002003
A700203B 33000007 C3002003
A800209F 30000008 C0002003
A90020E5 31000009 C1002003
AA0020E6 3200000A C2002003
AB0020E7 3300000B C3002003
AC0020E8 3000000C C0002003
AD0020E9 3100000D C1002003
AE0020EA 3200000E C2002003
AF0020EB 3300000F C3002003
B00020EC 30000010 C0002003
B10020ED 31000011 C1002003
```

```
A000308B 30000000 30000000 C0003004
A1003022 31000001 31000001 C1003004
A2003025 32000002 32000002 C2003004
A3003026 33000003 33000003 C3003004
A40030F7 30000004 30000004 C0003004
A50030AF 31000005 31000005 C1003004
A600303E 32000006 32000006 C2003004
A700303B 33000007 33000007 C3003004
A800309F 30000008 30000008 C0003004
A90030E5 31000009 31000009 C1003004
AA0030E6 3200000A 3200000A C2003004
AB0030E7 3300000B 3300000B C3003004
AC0030E8 3000000C 3000000C C0003004
AD0030E9 3100000D 3100000D C1003004
AE0030EA 3200000E 3200000E C2003004
AF0030EB 3300000F 3300000F C3003004
B00030EC 30000010 30000010 C0003004
B10030ED 31000011 31000011 C1003004
```