DCM_VME Interface

DCM's are designed to reside in VME64 extension (VME64X) crates. The VME bus will be used to perform low speed downloading, configuring and status checking. The high speed data output and L1 primitives input will use simple high speed synchronized protocol. The data output port will use the P0 connector user defined data space. L1 primitives, Busy and additional +5V power will use the P2 connector used defined pins..

DCM's will observe A24 address and D32 data VME standards. VME will use Address Modifiers to classify the VME transfer mode. In order to avoid possible conflict, DCM's will use one bank (a set of 4) of user defined address modifiers. Address fields A24 will be further divided into three separate areas: (1) Broadcast, (2) DCM Address and (3) Operation Code field. Data fields D32 are divided into L1 table/test data space and DSP, zero suppression data space.

Broadcast will be used to write VME data to all DCM boards. The Operation code will define the command state.

24 bit address				32 bit data field	
23	22-18	17-14	13-0	31-16	15-0
Broadcast	DCM address	Operation Code (OP)	Don't Care	L1 table/test data	VME-DCM command /status

DCM-VME Interface Operation Code Definition (*defined by address bit (17-15)****)***

OP code	Definition	* note
1	Write DCM Configuration Word	Define DCM state
2	Define LINK Input DSP #, Word size	Define which DSP VME talk to and word size
3	Define LINK out DSP #, Word size	Define which DSP VME take data from and word size
4	Write data to DCM Link Port	Send data/program word to DSP
5	Write to L1 Primitive Look-up table	VME D 16-31 as table address
6	Write test data to L1 input FIFO	VME D 16-31 as test data input
7	Interrupt DSP	Signal DSP
8	Read DCM-VME link port status word	
9	Read data from DSP link port	Send data/program word to DSP
10	Read DCM status	
11	Read Compressor port status	

Operation Code 1
DSP Configuration word (use data bits 0-11)

Bit	Definition	Note
0	Clear ADSP	1 == remove clear
1-4	Clear Compressor (1-4)	1 == remove clear
5	Clear L1 port	1 == remove clear
6	Clear output port	1 == remove clear
7	Clear L1 Link Port	1 == remove clear

8	Set L1 Port Online	0 == online 1==offline
9	Force L1 test	1 == write L1 test data
10	L1 Table Data in	1 == write 0 0 == write 1
11	Output Port Off	1 == pass 0==on

Operation Code 2 & 3
Define LINK Input/output DSP #, Word size (use data bits 0-3)

Data bit (0-2)	Definition
1	Read from/ Write to DSP 1 Link Port
2	Read from/ Write to DSP 2 Link Port
3	Read from/ Write to DSP 3 Link Port
4	Read from/ Write to DSP 4 Link Port
5	Read from/ Write to DSP 5 Link Port
6	Write to DSP 1,2,3,4 Link Port
7	Write to DSP 1,2,3,4,5 Link Port

Data bit 3	1- 48 bits data word (3 16 bits VME read/write cycle) 0 - 32 bits data word(2 16 bits VME read/write cycle)

Operation Code 4
Write data to DCM link port (use data bits 0-15)
(OP code 2 define which link port, i.e. DSP, active)

Data bit	0-15	Note
	Data word	for 32 bits data/parameters require 2 write operation for 48 bits program, 3 write operation is necessary

Operation Code 5
Load L1 primitive Lookup Table (use data bits 16-31)
(OP code 1, DCM configuration word bit 10 determines whether to write 0 or 1 into table)

Data bit	0-15	Note
	L1 table address	Bits 16-31 serve as address for the lookup table This also active the write strobe

Operation Code 6
Load Test data into L1 primitive FIFO (use data bits 16-31)

Data bit	0-15	Note

	Test data	Bits 16-31 load into Test data into input before Lookup Table This also active the write strobe

Operation Code 7
Interrupt all 5 DSP into the addressed DCM module
(No VME data required)

Operation Code 8
DSP-VME Link port status Word (use data bits 0-15)

Data bit	0	1-3	4-6	7-9	10-12	13-15
	0	DSP 1 Com LNK status	DSP 2 Com LNK status	DSP 3 Com LNK status	DSP 4 Com LNK status	DSP 5 Com LNK status

DSP Communication Link Status word

Bit	0	1	2
	Com. Input Link ready (ACK Line)	Com. Output Link ready (LCK Line)	Output FLG to VME

Operation Code 9
Read data form DCM link port (use data bits 0-15)
(OP code 3 defines which link port, i.e. DSP, active)

Data bit	0-15	Note
	Data word	for 32 bits data / parameters requires 2 read operation for 48 bits program, 3 read necessary

Operation Code 10
DCM Status Word (use data bits 0-15 bits)

Byte 0

Data bit	0	1	2	3	4 - 7
	GND	DSP 1-4 Boot state	DSP 5 Boot state	L1 port FIFO Overflow	ADSP BUSY Flag

Byte 1

Data bit	8	9	10	11	12	13	14-15
	L1 Link	Data	Data OutPort	Compressor	DSP DCM-VME	DSP DCM-	GND

	Port ACK.	OutPort Token	Multiple Token	Error	Link Port ACK (OR ALL)	VME FLAG (OR ALL)	

Operation Code 11
DCM Compressor Port Status Word (use data bits 0-15)

Data bit	0	1-3	4-6	7-9	10-12	13-15
	GND	compressor 1 status	compressor 2 status	compressor 3 status	compressor 4 status	GND

Compressor status

Bit	0	1	2
	Optical Port Ready	FPGA Boot status	Compressor Error