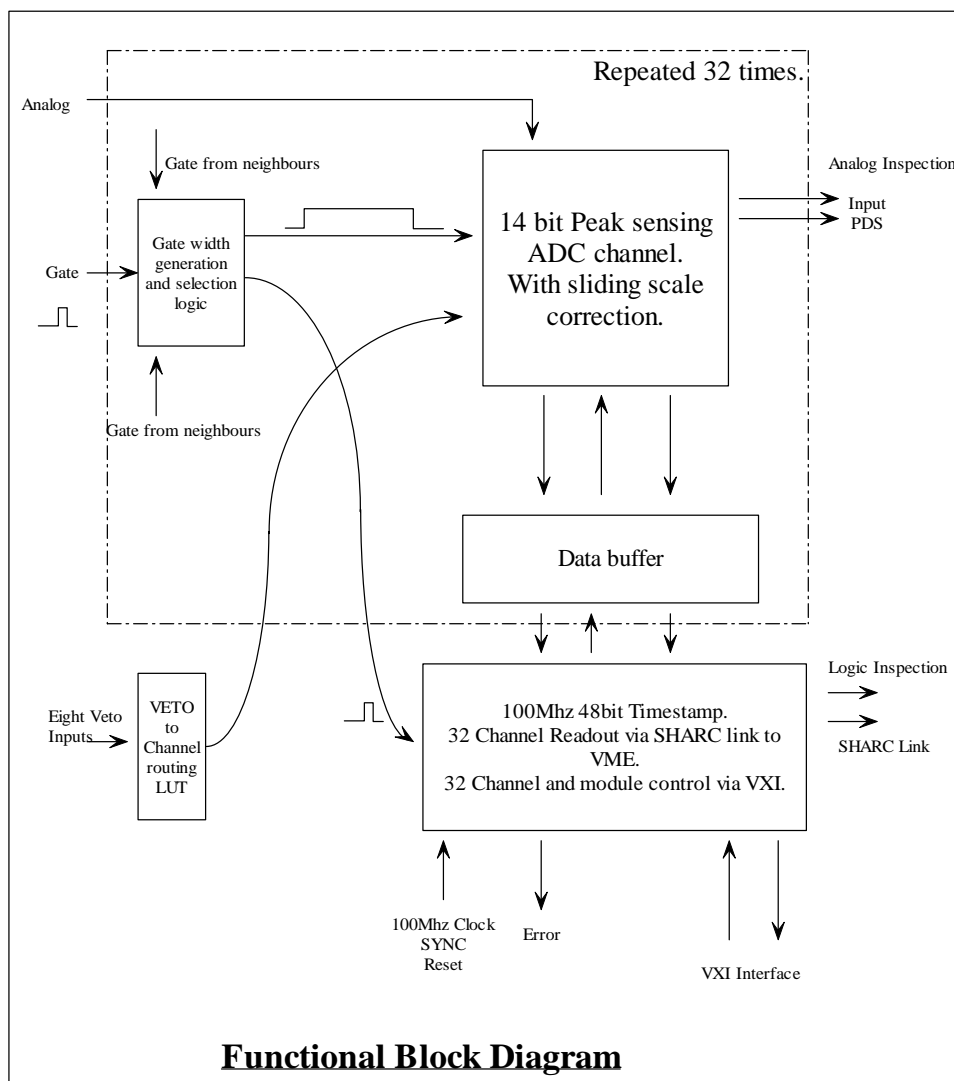


GREAT 32 channel peak sensing ADC module: User Manual

Specification:

32 independent timestamped peak sensing, ADC channels.

- Input range 0 to +8V.
- Sliding scale correction.
- Peaking time greater than 1uS.
- Gate input Fast NIM, and Differential ECL.
- Timestamp derived from a 100Mhz 48 bit counter, synchronized to a Master counter present in the system timing co-ordinator, the VME based Metronome module. The timestamp is the time of the leading edge of the input Gate pulse.



The block diagram above shows the functional layout of the module. There are 32 independent channels. Each channel comprises Gate selection and pulse width generation, an ADC channel card, and a data buffer. The channels are controlled and readout by common logic. Analog and Logic inspection lines allow the function of the channel to be monitored.

The Gate selection and pulse width generation logic is used to route the input Gate signals from the front panel to the ADC. The ADC gate pulse width is determined by a slider on the MIDAS TDR32V control window. It is possible to route other front panel Gate inputs to generate the channels ADC gate in cases such as strip detector neighbour triggering. This is controlled by selecting the 'Channel Mode'. For a more detailed explanation of the different modes see EDOC505.

A Timestamp is stored at the leading edge of the Gate.

The ADC channel converts at the end of the ADC gate signal. The ADC gate signal should be greater than 1 μ S wide for best results.

The input voltage to the ADC card must be in the range 0 to 8V (8V approximately). It must be positive with respect to ground. The Peak detector will only operate with positive inputs and erroneous ADC codes will be generated should the 'peak' happen to pull the input below ground.

After conversion the ADC is readout, and reset. The data is stored in a buffer for transmission with the Timestamp to the Event Collator in a VME crate. The module will run with all 32 channels working with random data at 10K conversions per channel. Should the buffer become full, due to flow control, the entire module is inhibited. A scaler, Blocked Event Scaler, counts every Gate that is missed during this period.

Each module has eight scalers which can be allocated to any of the 32 channels using the main window in MIDAS.

User Interface in MIDAS.

Controls for each channel :

Enable/Disable.

ADC gate pulse width, 50nS to 25.6 μ S.

Gate Selection.

Channel Mode:	Disabled.
	Direct.
	Neighbour.
	Group 1 or More.
	Group only 1.

Analog Inspection:

Input to channel.

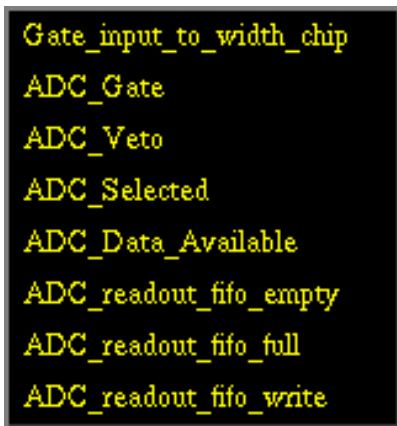
PDS from ADC module. (Peak Detect and Stretch)

Logic Inspection. There are a large number of options on this menu. Three signals provide the best information about the use of the channel.

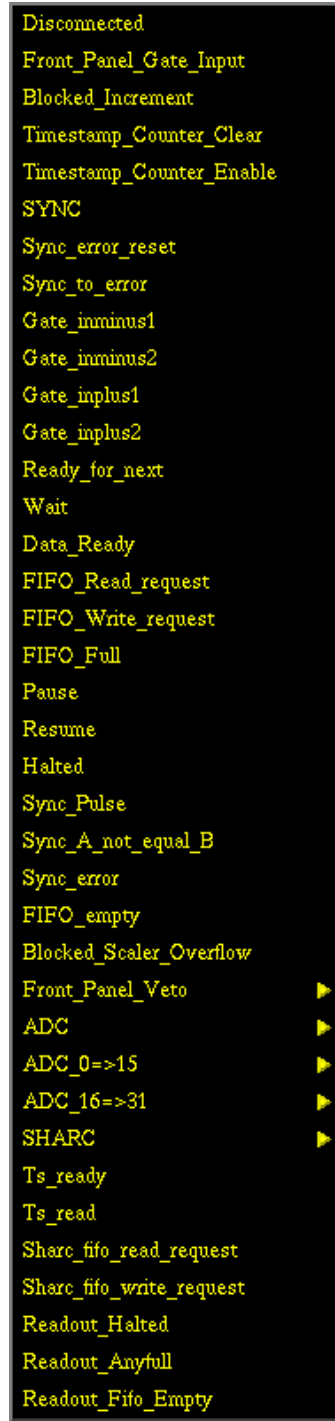
Front_panel_gate_input: Signal into the ADC Gate selection logic.

ADC_Gate: Signal to the ADC. Select through the ADC sub-menu from the main Digital inspection line menu.

Gate_input_to_width_chip Signal within the logic indicates the channel Busy time. Select through the ADC sub-menu from the main Digital inspection line menu.



ADC sub-menu



Main Digital menu

Current Module: Current Channel: Enable:

Act on Modules? Act on Channels?

Gate Width (ns):

Gate selection Channel Mode

Neighbour: enable for channel -2 -1 +1 +2

Group 1 or More: enable for channel 0 1 2 3 4 5 6 7

Group only 1: Front Panel Input

Scalers

Enable	Gate	Value	Enable	Gate	Value
<input checked="" type="checkbox"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input checked="" type="checkbox"/>	<input type="text" value="4"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/>	<input type="text" value="8"/>	<input type="text" value="0"/>	<input checked="" type="checkbox"/>	<input type="text" value="11"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/>	<input type="text" value="9"/>	<input type="text" value="0"/>	<input checked="" type="checkbox"/>	<input type="text" value="12"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/>	<input type="text" value="10"/>	<input type="text" value="0"/>	<input checked="" type="checkbox"/>	<input type="text" value="15"/>	<input type="text" value="0"/>

Blocked Event Scaler

Analogue Inspection 1:

Analogue Inspection 2:

Digital Inspection 1:

Digital Inspection 2:

Digital Inspection 3:

Digital Inspection 4:

Main card setup window. Launched by selecting TDR32V from the VXI module menu in the Base frame.

Readout FIFO

Events in readout FIFO

Readout FIFO

Readout Ident Store

0	0xc0000000	1	0xc0010000	2	0xc0020000	3	0xc0030000	4	0xc0040000	5	0xc0050000	6	0xc0060000	7	0xc0070000
8	0xc0080000	9	0xc0090000	10	0xc00a0000	11	0xc00b0000	12	0xc00c0000	13	0xc00d0000	14	0xc00e0000	15	0xc00f0000
16	0xc0100000	17	0xc0110000	18	0xc0120000	19	0xc0130000	20	0xc0140000	21	0xc0150000	22	0xc0160000	23	0xc0170000
24	0xc0180000	25	0xc0190000	26	0xc01a0000	27	0xc01b0000	28	0xc01c0000	29	0xc01d0000	30	0xc01e0000	31	0xc01f0000
32	0xc80100000	33	0xc80100001	34	0xc80100002	35	0xc80100003	36	0xc80100004	37	0xc80100005	38	0xc80100006	39	0xc80100007
40	0xc80100008	41	0xc80100009	42	0xc8010000a	43	0xc8010000b	44	0xc8010000c	45	0xc8010000d	46	0xc8010000e	47	0xc8010000f
48	0xc80100010	49	0xc80100011	50	0xc80100012	51	0xc80100013	52	0xc80100014	53	0xc80100015	54	0xc80100016	55	0xc80100017
56	0xc80100018	57	0xc80100019	58	0xc8010001a	59	0xc8010001b	60	0xc8010001c	61	0xc8010001d	62	0xc8010001e	63	0xc8010001f
64	0xc80400000	65	0xc80300000	66	0xc80200000	67	0xc80000000	68	0xc80000000	69	0xc80000000	70	0xc80000000	71	0xc80000000
72	0xc80000000	73	0xc80000000	74	0xc80000000	75	0xc80000000	76	0xc80000000	77	0xc80000000	78	0xc80000000	79	0xc80000000
80	0xc80000000	81	0xc80000000	82	0xc80000000	83	0xc80000000	84	0xc80000000	85	0xc80000000	86	0xc80000000	87	0xc80000000
88	0xc80000000	89	0xc80000000	90	0xc80000000	91	0xc80000000	92	0xc80000000	93	0xc80000000	94	0xc80000000	95	0xc80000000
96	0xc80000000	97	0xc80000000	98	0xc80000000	99	0xc80000000	100	0xc80000000	101	0xc80000000	102	0xc80000000	103	0xc80000000
104	0xc80000000	105	0xc80000000	106	0xc80000000	107	0xc80000000	108	0xc80000000	109	0xc80000000	110	0xc80000000	111	0xc80000000
112	0xc80000000	113	0xc80000000	114	0xc80000000	115	0xc80000000	116	0xc80000000	117	0xc80000000	118	0xc80000000	119	0xc80000000
120	0xc80000000	121	0xc80000000	122	0xc80000000	123	0xc80000000	124	0xc80000000	125	0xc80000000	126	0xc80000000	127	0xc80000000

The ident attached to the ADC data, and the information sent with the full timestamp is stored here, in the Readout ident store.

0	0x00000001	1	0x00000002	2	0x00000004	3	0x00000008	4	0x00000010	5	0x00000020	6	0x00000040	7	0x00000080
8	0x00000100	9	0x00000200	10	0x00000400	11	0x00000800	12	0x00001000	13	0x00002000	14	0x00004000	15	0x00008000
16	0x00010000	17	0x00020000	18	0x00040000	19	0x00080000	20	0x00100000	21	0x00200000	22	0x00400000	23	0x00800000
24	0x01000000	25	0x02000000	26	0x04000000	27	0x80000000	28	0x10000000	29	0x20000000	30	0x40000000	31	0x80000000
32	0x00000000	33	0x00000000	34	0x00000000	35	0x00000000	36	0x00000000	37	0x00000000	38	0x00000000	39	0x00000000
40	0x00000000	41	0x00000000	42	0x00000000	43	0x00000000	44	0x00000000	45	0x00000000	46	0x00000000	47	0x00000000
48	0x00000000	49	0x00000000	50	0x00000000	51	0x00000000	52	0x00000000	53	0x00000000	54	0x00000000	55	0x00000000
56	0x00000000	57	0x00000000	58	0x00000000	59	0x00000000	60	0x00000000	61	0x00000000	62	0x00000000	63	0x00000000
64	0x00000000	65	0x00000000	66	0x00000000	67	0x00000000	68	0x00000000	69	0x00000000	70	0x00000000	71	0x00000000
72	0x00000000	73	0x00000000	74	0x00000000	75	0x00000000	76	0x00000000	77	0x00000000	78	0x00000000	79	0x00000000
80	0x00000000	81	0x00000000	82	0x00000000	83	0x00000000	84	0x00000000	85	0x00000000	86	0x00000000	87	0x00000000
88	0x00000000	89	0x00000000	90	0x00000000	91	0x00000000	92	0x00000000	93	0x00000000	94	0x00000000	95	0x00000000
96	0x00000000	97	0x00000000	98	0x00000000	99	0x00000000	100	0x00000000	101	0x00000000	102	0x00000000	103	0x00000000
104	0x00000000	105	0x00000000	106	0x00000000	107	0x00000000	108	0x00000000	109	0x00000000	110	0x00000000	111	0x00000000
112	0x00000000	113	0x00000000	114	0x00000000	115	0x00000000	116	0x00000000	117	0x00000000	118	0x00000000	119	0x00000000
120	0x00000000	121	0x00000000	122	0x00000000	123	0x00000000	124	0x00000000	125	0x00000000	126	0x00000000	127	0x00000000
128	0x00000000	129	0x00000000	130	0x00000000	131	0x00000000	132	0x00000000	133	0x00000000	134	0x00000000	135	0x00000000
136	0x00000000	137	0x00000000	138	0x00000000	139	0x00000000	140	0x00000000	141	0x00000000	142	0x00000000	143	0x00000000
144	0x00000000	145	0x00000000	146	0x00000000	147	0x00000000	148	0x00000000	149	0x00000000	150	0x00000000	151	0x00000000
152	0x00000000	153	0x00000000	154	0x00000000	155	0x00000000	156	0x00000000	157	0x00000000	158	0x00000000	159	0x00000000
160	0x00000000	161	0x00000000	162	0x00000000	163	0x00000000	164	0x00000000	165	0x00000000	166	0x00000000	167	0x00000000
168	0x00000000	169	0x00000000	170	0x00000000	171	0x00000000	172	0x00000000	173	0x00000000	174	0x00000000	175	0x00000000
176	0x00000000	177	0x00000000	178	0x00000000	179	0x00000000	180	0x00000000	181	0x00000000	182	0x00000000	183	0x00000000
184	0x00000000	185	0x00000000	186	0x00000000	187	0x00000000	188	0x00000000	189	0x00000000	190	0x00000000	191	0x00000000
192	0x00000000	193	0x00000000	194	0x00000000	195	0x00000000	196	0x00000000	197	0x00000000	198	0x00000000	199	0x00000000
200	0x00000000	201	0x00000000	202	0x00000000	203	0x00000000	204	0x00000000	205	0x00000000	206	0x00000000	207	0x00000000
208	0x00000000	209	0x00000000	210	0x00000000	211	0x00000000	212	0x00000000	213	0x00000000	214	0x00000000	215	0x00000000
216	0x00000000	217	0x00000000	218	0x00000000	219	0x00000000	220	0x00000000	221	0x00000000	222	0x00000000	223	0x00000000
224	0x00000000	225	0x00000000	226	0x00000000	227	0x00000000	228	0x00000000	229	0x00000000	230	0x00000000	231	0x00000000
232	0x00000000	233	0x00000000	234	0x00000000	235	0x00000000	236	0x00000000	237	0x00000000	238	0x00000000	239	0x00000000
240	0x00000000	241	0x00000000	242	0x00000000	243	0x00000000	244	0x00000000	245	0x00000000	246	0x00000000	247	0x00000000
248	0x00000000	249	0x00000000	250	0x00000000	251	0x00000000	252	0x00000000	253	0x00000000	254	0x00000000	255	0x00000000



VXI Registers:

Model Code: 0x180

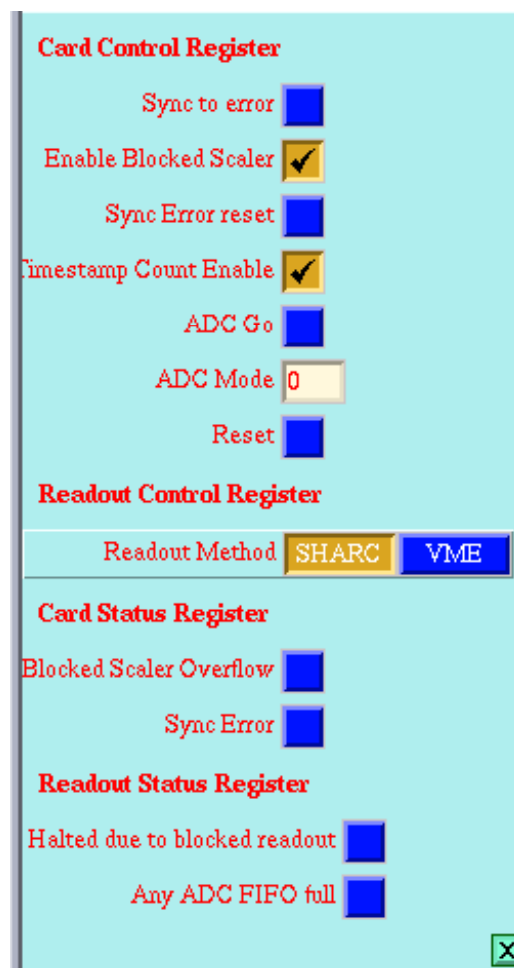
Modification Level: 0x0

Manufacturer ID: 0xf20

Serial Number: 0x3

Offset: 0x2000

The Engineering => electronics selection. The serial number, and modification number of the module are shown here.



Card Control Register

Sync to error

Enable Blocked Scaler

Sync Error reset

Timestamp Count Enable

ADC Go

ADC Mode 0

Reset

Readout Control Register

Readout Method SHARC VME

Card Status Register

Blocked Scaler Overflow

Sync Error

Readout Status Register

Halted due to blocked readout

Any ADC FIFO full

The Expert => setup window. This is used to monitor the status of the SYNC pulse synchronisation. The counter is enabled, and errors reset.

