

E570 report

2005/11/15 S.Okada

1 Inspection of SDDs

In the E570 first cycle, three SDDs have been worked well and others could not worked. These SDD's status are summarized as follows.

SDD operating status	
Working well :	three SDDs (SDD#2,#5,#9)
Working (bad resolution) :	one SDD (SDD#3)
Not working :	two SDDs (SDD#1,#8)
Cracking (ceramic board part) :	three SDDs (SDD#4,#6,#7)

SDD#	port#	S/N	Repairing	Status	Ownership
#1	#8	V2-8-5.3	-	having very low rate signal	RIKEN
#2	#2	V2-8-5.4	wire re-bonding	working well	RIKEN
#3	#3	V2-8-3.4	FET replacing	working (bad resolution)	RIKEN
#4	-	V2-7-4.2	uner inspection	in KETEK for inspection	RIKEN
#5	#5	V2-9-5.4	-	working well	RIKEN
#6	#6	V2-7-4.4	-	ceramic board cracking	SMI
#7	#7	V2-9-3.3	-	ceramic board cracking	SMI
#8	#1	V2-8-4.3	-	having strange signal shape	SMI
#9	#4	V2-7-5.4	-	working well	SMI

I went to SMI and KETEK to inspect and repair the following five SDDs which could not be worked well at the last experiment and to bring new orderd five SDDs to Japan.

SDD#1 : In ^{55}Fe source calibration, the signal rate was much lower than expected.

SDD#3 : having bad resolution probably due to replacing the FET. (see page #5)

SDD#6 : ceramic board cracking for two parts (see page #6)

SDD#7 : ceramic board cracking for one parts (see page #6)

SDD#8 : In ^{55}Fe source calibration, the signal shape was not like x-ray from ^{55}Fe . (see page #7)

In SMI, we checked these SDDs by microscope and took the pictures. The magnified pictures for each parts are shown in page #4. We found that "RingX" wire of SDD #1 is detached (see page #5).

In KETEK, they checked all the SDDs and found that SDD #8 had bad contact at "last ring" bonding which could not be seen by microscope. The wire re-bonding and the operation check for SDD #1, #7 and #8 have been done during my stay at Munich. So I brought back these repaired SDDs (#1, #7, #8) and newly ordered five SDDs. Now we have 11 available SDDs !!

SDD #3 and #6 are still in KETEK for inspection, and unfortunately SDD #4 could not be repaired by KETEK. The present SDD status are summarized as follows.

SDD#	S/N	Repairing	Status	Notes	Ownership
#1	V2-8-5.3	wire re-bonding	○ (repaired)	(very low rate signal)	RIKEN
#2	V2-8-5.4	wire re-bonding	○	working well	RIKEN
#3	V2-8-3.4	FET replacing	in KETEK	working (bad resolution)	RIKEN
#4	V2-7-4.2	broken	×	dead	RIKEN
#5	V2-9-5.4	-	○	working well	RIKEN
#6	V2-7-4.4	under inspection	in KETEK	ceramic board cracking	SMI
#7	V2-9-3.3	wire re-bonding	○ (repaired)	ceramic board cracking	SMI
#8	V2-8-4.3	wire re-bonding	○ (repaired)	(strange signal shape)	SMI
#9	V2-7-5.4	-	○	working well	SMI
#10	V2-6-3.2	-	○	newly ordered	RIKEN
#11	V2-6-4.2	-	○	newly ordered	RIKEN
#12	V2-6-4.3	-	○	newly ordered	RIKEN
#13	V2-6-5.2	-	○	newly ordered	RIKEN
#14	V2-6-5.3	-	○	newly ordered	RIKEN

2 Test input

In the last meeting, we have discussed about monitoring test pulse at the preamp in order to monitor the SDD gain stability during data taking. Unfortunately there was no test input in our preamp according to the persons in charge of the SDD in KETEK. Instead, they recommended us to add a test input line for Ring1 as follows. (They have already performed such a test input line at another SDD products.) In this case, it will be possible to monitor the gain stability not only from preamp but SDD itself.

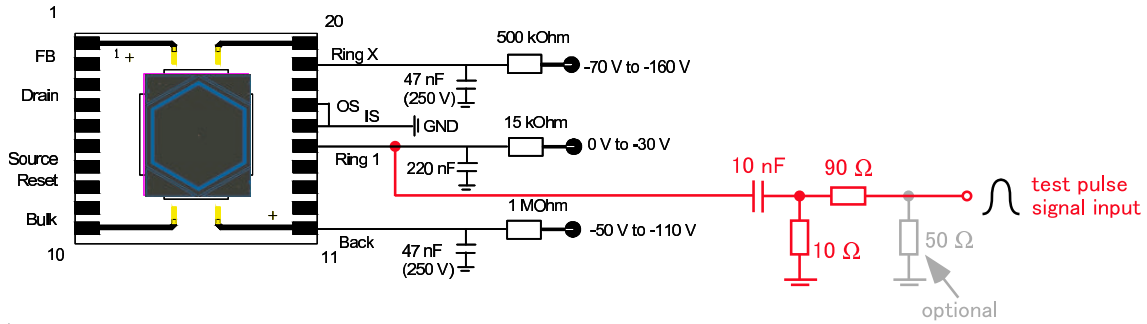


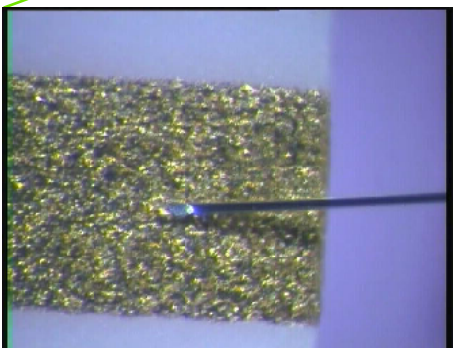
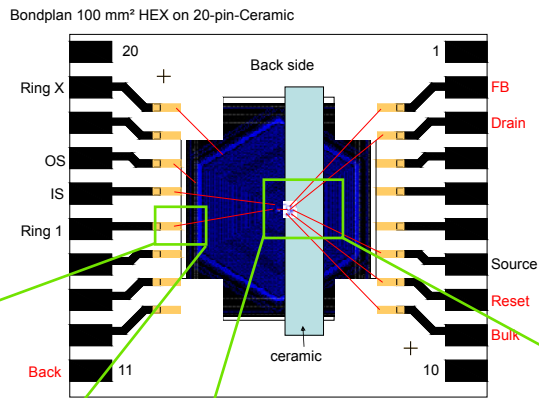
Figure 1: Circuit schematic of test pulse input for "Ring 1"

Of course, we must be check whether the test line deteriorate the energy resolution or not. It will be checked also at SMI side from next week.

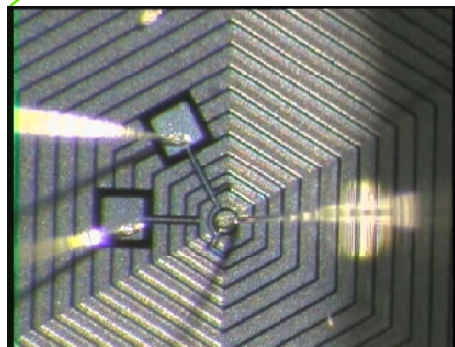
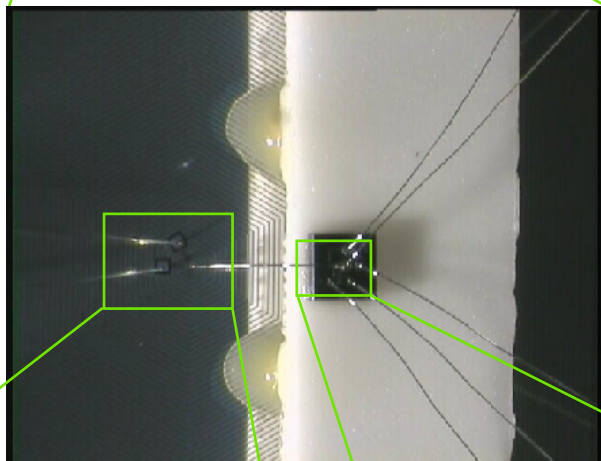
KETEK 100mm² SDD

These pictures are took by microscope at SMI.

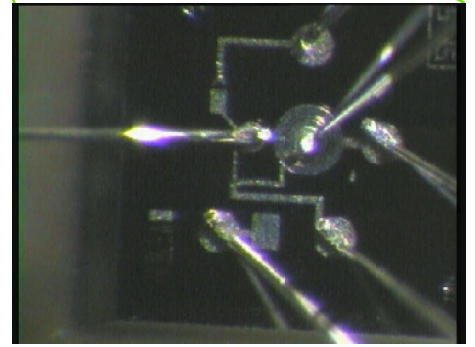
Back side



wire bonding

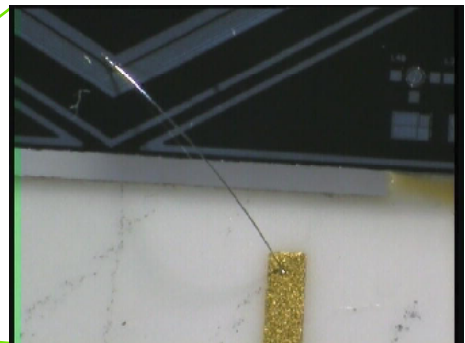
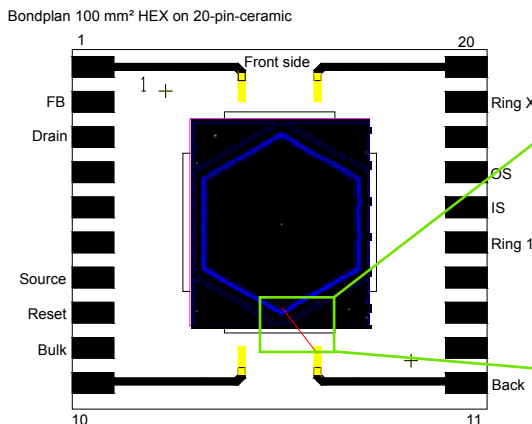


anode



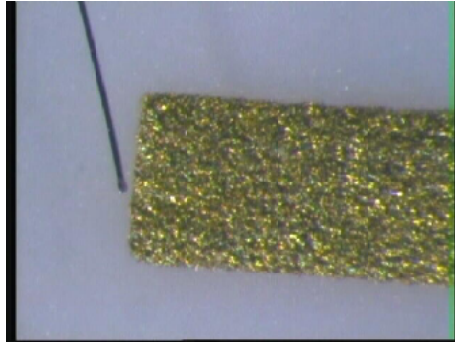
FET

Front side



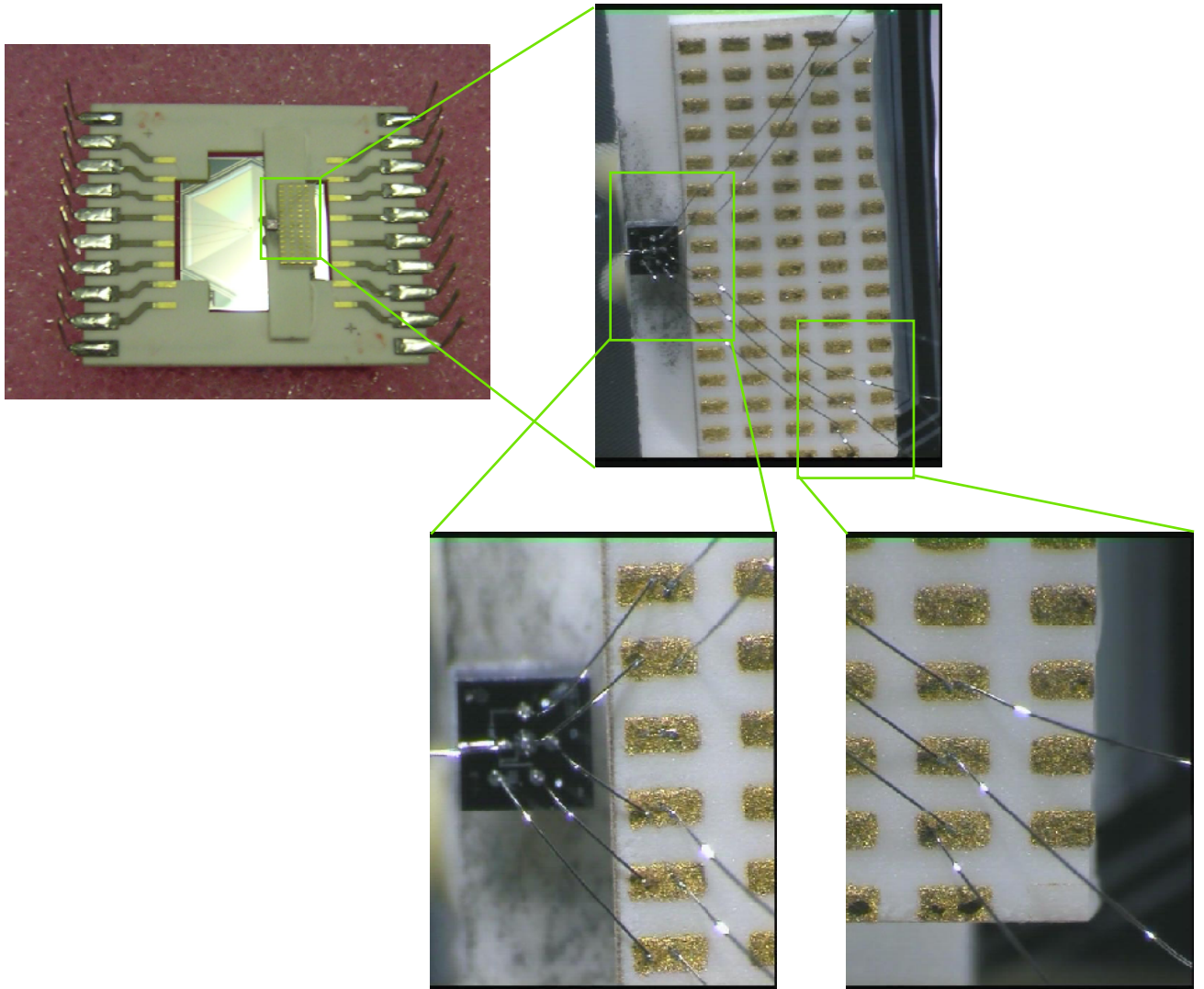
back wire

SDD #1 : "Ring X" wire has been detached.

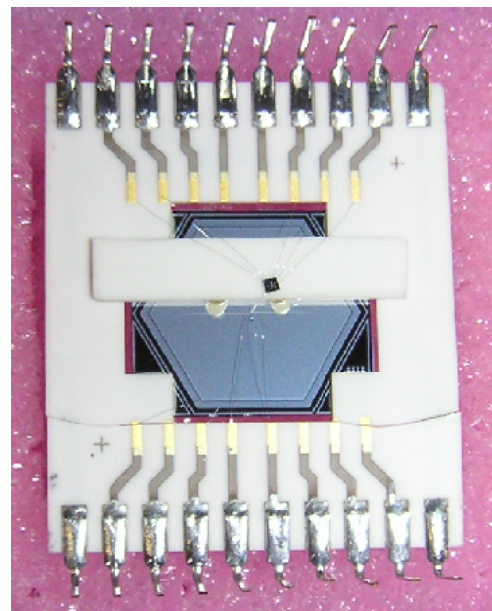
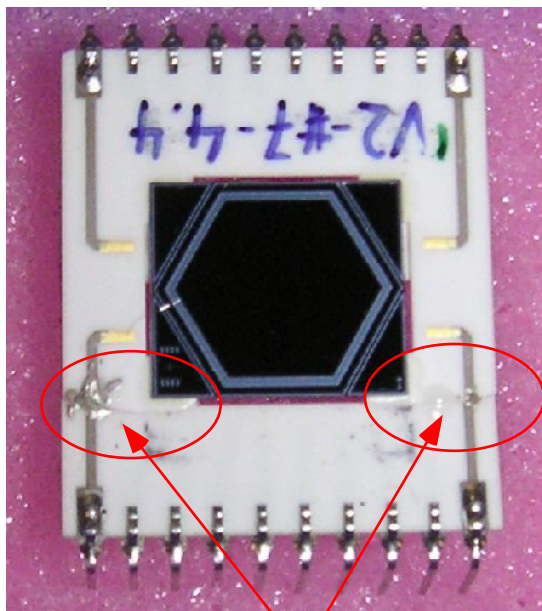


SDD #3 : having bad resolution

The FET of SDD #3 has been replaced by KETEK and the wires were connected to side connector pins through additional ceramic board as follows.



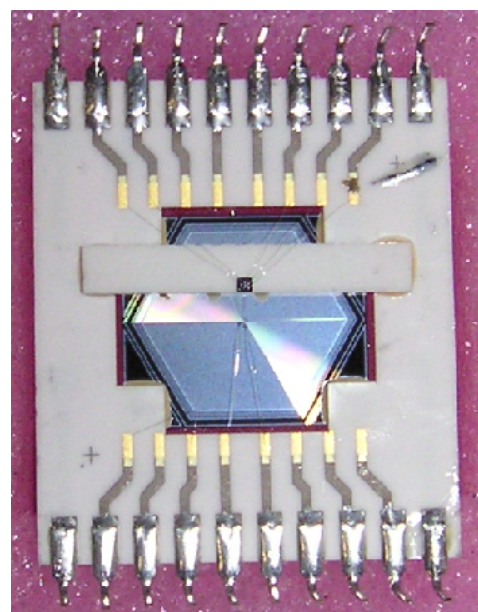
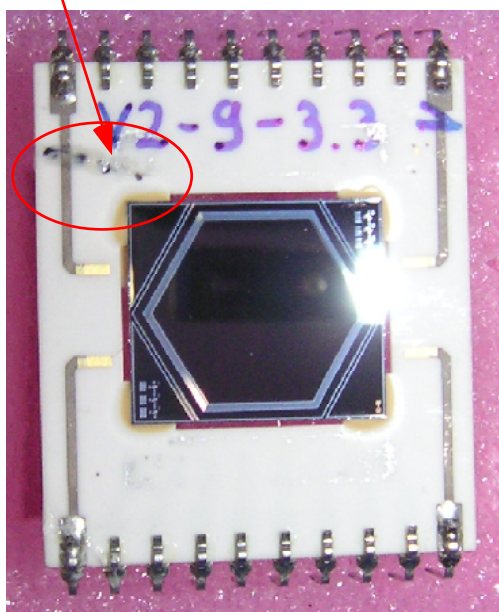
SDD #6 : cracked the ceramic board



cracking

SDD #7 : cracked the ceramic board

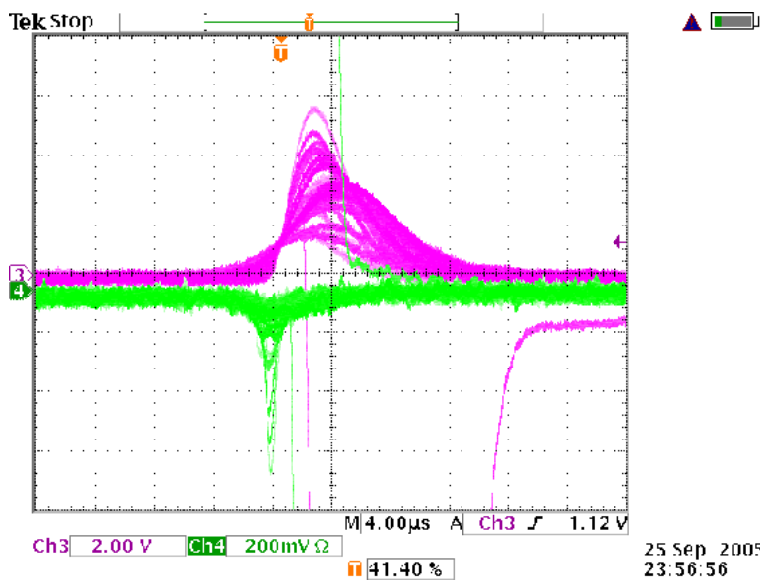
cracking



SDD #8 :

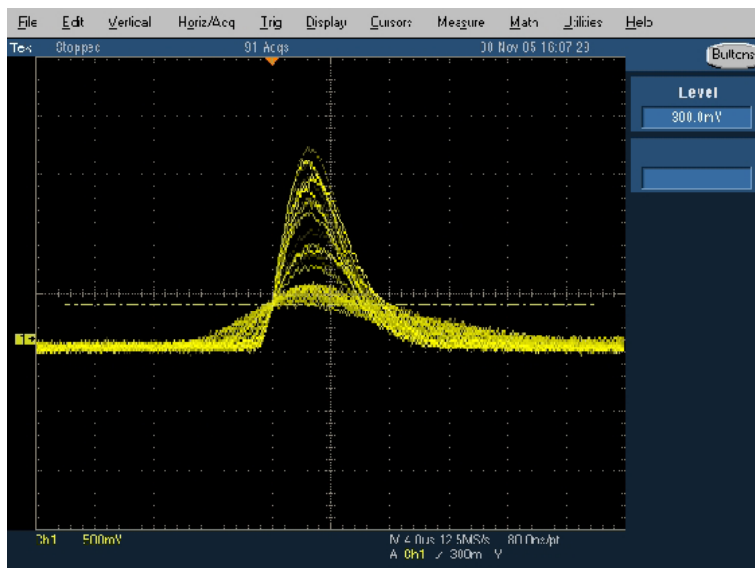
The typical pulse shape in the ^{55}Fe source calibration is shown in the following pictures. These pulses are outputs from the shaping amp "CAEN N568BD" for 3 μsec (CH3) and 0.2 μsec (CH4) shaping time.

The pulse height was continuous, which is not like x-ray from ^{55}Fe . Furthermore there were two types of width.



@ KEK (before the beamtime)

To confirm that the SDD #8 was really broken before going to KETEK for inspection, we checked the signal again in SMI. The signal was reproduced as follows.



@ SMI (2005/11/08)