

# The LUM. “contact” problem solved and the next improvement

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## I. The Lum. “contact” problem solved

### 1. What is the problem ?

- Some Luminosity gone.  
Fig. 1 LUM. vs Time
- Some scaler input lost  
Fig. 2 Readout from scaler

### 2. Phenomenons

- Come quite often N times/per shift       $N > 1$
- go easily
  - a. Take the connecting off and put it on at the signal cable, LUM.— OK.
  - b. Take the connecting off and put it on for Models Delayer, Fan., Discriminator, LUM. —OK.
  - c. Automatically recover; LUM.— OK.

### 3. To find the reason cost time

- a. Cable connecting ?  
Using new Contact (Male, Female) convert, cable —No effect
- b. Model ?  
Using new Fan in/out(428F), Discriminator,(715,623B)—No effect
- c. NIM Bin ?  
Using new NIM Bin → No effect
- d. Signals ?

Make the S. P. Counter's Signal exchange for read out:

S Signal ----- OK.  
P Signal ----- Problem  
Before the exchange:  
P signal ----- OK.  
S Signal ----- Problem

Fig. 3 Cross test for P, S counters readout

So Problem is in the S counter's channel

### e. Simulations

- ✓ generate a signal: 180mv/40ns(S counter's signal level)
- ✓ generate a To signal: same frequency as the S counter simulation signal.
- ✓ all simulation signal go into the LUM. readout system.
- ✓ Make the all LUM. System work correctly.

- ✓ Several hours later, the S's signal got a problem.
- ✓ find the Time Delayer can not work correctly,like  
Signal: Yes $\longleftrightarrow$ No,  
Or change [30mv, 180mv]
- ✓ Using cable to delay instead of the Delayer,  
To simulate again,  
LUM. system work correctly as normal,  
No problem within one week.
- ✓ It has worked correctly in colliding case since the 31/3/2000

#### 4. Summary and thanks

- ✓ We should not keep a same way to think,like
- ✓ “contact” problem
- ✓ The LUM. System is small,  
To run well, require us to know everything in the system.

Fig. 4 Sketch map of readout system includes:

\* 13 Different models /Total 32 models

- 1) Delayer
- 2) Fan in/out ( 2 types )
- 3) Discriminator ( 2 types )
- 4) Coincidence (2 types )
- 5) Register (2 types )
- 6) Scaler
- 7) TDC
- 8) ADC
- 9) Controller.

#### 5. Different Logical relation ship/Total 18 coincidence

( P1 • S1 )	
( P2 • S2 )	
( P3 • S3 )	4
( P4 • S4 )	
( C1 • S1 )	
( C2 • S2 )	
( C3 • S3 )	4
( C4 • S4 )	
( P1 • S1 ) • ( C3 • S3 )	
( P2 • S2 ) • ( C4 • S4 )	
( P3 • S3 ) • ( C1 • S1 )	4
( P4 • S4 ) • ( C2 • S2 )	

( P1 • S1 ) • ( C3 • S3 ) delay	
( P2 • S2 ) • ( C4 • S4 ) delay	
( P3 • S3 ) • ( C1 • S1 ) delay	4
( P4 • S4 ) • ( C2 • S2 ) delay	

( P1 • S1 ) • ( C3 • S3 ) • ( P3 • S3 ) • ( C1 • S1 )	
( P2 • S2 ) • ( C4 • S4 ) • ( P4 • S4 ) • ( C2 • S2 )	2

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* 200 cables	18
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 Beam Test: Li Jiakai

## II. The next improvement

### 1. Circuit integrating

There are 3 ( Delayer+428F+715+623B )

Commercial models cluster

- ✓ To use them, need  $\approx 100$  cables in a very small area. So, it is not very stable and convenient to adjust sometime.
- ✓ To make it to be integrated can be better than now.
- ✓ Cost :

$$8000 \times 6 \approx 48,000 \text{ (RMB yuan)}$$

$$\approx 6000 \text{ (U. S. Dollar) (includes 3 parts)}$$

### 2. reconstruct a controller

- ✓ New controller can not work correctly( 5 problems )
- ✓ Old controller has no spare parts, and it is over 10 years old ,so we must reconstruct a controller as old one aqap.
- ✓ Cost:

$$4000 \times 2 \approx 8000 \text{ (RMB yuan)}$$

$$\approx 1000 \text{ (U.S. Dollar)}$$

### 3. LUM. Detectors

- ✓ the BEPCII will use Mini-  $\beta$  probably
- ✓ If it does, the  $D_{\text{mini-}\beta} \approx 0.9\text{m}$
- ✓ The LUM. Detector has  $L_z \approx 0.3\text{m}$  so, the  $D_{\text{LUM}} \approx 0.6\text{m}$ , is it too close the colliding to use such LUM. Monitor? If yes, what is a new one.