

Special Test Request Form	STR Number 8R2
Part 1 – Test Definition Section	
Test Requestor: Su Dong	
<p>Test Purpose and Justification: Test the functionality of the TKR trigger STRTECH_OR and ONE_SHOT option to assist the decision on whether the eventual default flight operations should have them turned on. Without the STRETCH_OR., TKR 3-in-a-row trigger may have some inefficiency due to timing overlap inadequacy. Without the ONE_SHOT option, long saturated CNO signals may cause false vetoing of good events. The MiniLAT TKR timing characteristics are very different from the real tower so that tests need to be performed on the real towers. Present tests are all with these options off. If we decide to turn them on for flight operations, current tests should be changed to with them on by default. We therefore need to get test results very soon.</p>	
<p>Test Description: These tests include 3 parts, to be performed on the first two towers.</p> <ol style="list-style-type: none"> 1) TKR STRETCH_OR extra latency tests: Based on present trigger TREQ test setup on on tower. Trigger on muon telescope. Examine TKR trigger arrival time at the GEM and observe differences between various STRETCH_OR values to verify the STRETCH_OR latency. Total time ~1 hour. 2) TKR STRETCH_OR effect on efficiency: Based on present trigger efficiency test setup. Use muon telescope (vertical over tower B), CAL and TKR triggers to obtain muons at various angles. Only enable 3 XY layer pairs on tower B while tower A in normal operation. Run for 3 different 3-layer combinations in tower B and 3 different STRETCH_OR values to take cosmic muon data. Analyze data offline to evaluate efficiencies for the different settings. Total test time ~5 hours. 3) TKR one-shot verification: Based on present trigger efficiency script, but with significant online modifications through GUI panels for TKR charge injection DAC settings and periodic triggers. Test will be performed on a single tower B. Set TKR charge injection on for part of tower at 100-200 times MIP charge, and selected channels in rest of the tower at 1 MIP. Use periodic triggers separated by ~25μs to drive cal strobe charge injection and readout. Perform tests with one-shot turned off/on in turn. Successive charge injection is intended to hold the saturation high for the large charge injection layers so that the one-shot on/off could affect the TKR trigger output under these conditions. Need to repeat test for various different periodic strobe separations and Qinj pulse heights. The total expected time for the test is ~2 hours. 	
<p>GSE Configuration: GASU based teststand and the muon telescope at building 33. Muon telescope is only needed for 1) and 2). To minimize the need of change of muon telescope positions, test 1) should be performed on tower B also and muon telescope should be vertically positioned over tower B for both test 1 and 2).</p>	
<p>LAT Configuration: With the two towers 0,4 (A,B) in the grid.</p>	
<p>Expected Results/Acceptance Criteria: Expected results: TKR trigger STRETCH_OR extra latency values, TKR STRETCH_OR effects on TKR trigger efficiency and verification of TKR ONE_SHOT behavior for long saturation conditions.</p>	
<p>Expected Duration: 8 hours.</p>	

Expected Analysis Duration:

Part of results will be available online. Efficiency results 3 days after test completion.

Test Procedure:

Similar procedure as official single tower and two tower trigger tests; Test 3) TKR charge injection procedure is similar to TKR trigger jitter tests, for basic equipment setup. For the actual execution of tests, layer mask parameters will be altered for tests 1) and 2), and periodic trigger intervals and TKR charge injection DAC settings will be adjusted by Martin Kocian online.

Test Script:

Test scripts and actually online parameter settings are developed and validated by Martin Kocian on the MiniLAT.

Test 1) TRG/Scripts/triggerTimeIn_new.py

Test 2) TRG/Scripts/triggerdata.py

Test 3) TRG/Scripts/triggerdata.py

Part 2 – Impact Assessment Section

Procedure development:

The procedure is the similar to existing trigger tests for test 1) and 2), only some configuration parameters need to be altered for each test. Test 3) is similar to existing TKR tests using charge injection, but the trigger/DAQ part using periodic triggers is a new development.

Script development and checkout:

Test 1) and 2) scripts are already in place. Test 3) script is being validated on MiniLAT by Martin Kocian.

Impact to schedule:

The total testing time is 1 shift.

Risk Assessment:

Procedure does not have additional risks beyond the standard trigger tests and TKR tests. One aspect which needs confirmation is whether TKR charge injection up to 200 MIP is acceptable.

Required Resources:

GASU based teststand, muon telescope and TKR charge injection associated equipment at building 33. Muon telescope is only needed for tests 1) & 2). Needs Martin Kocian to be present for parameter changes. Needs presence of an operator for equipment power on/off at start and end of the test.

Other Affected Parties:

Desirable to have TKR expert verify the charge injection setup.

Part 3: Signature Approval:

Required Authorizations	Printed Name	Signature	Date
Quality	Joe Cullinan	(Signature on file)	5/5/05
I&T	Elliott Bloom	(Signature on file)	5/4/05
Program Office	Lowell Klaisner or Dick Horn	(Horn Signature on file)	5/6/05
Systems Engineering	Pat Hascall	(Signature on file)	5/6/05
Affected S/S managers	N/A		
Instrument Scientist	Steve Ritz or Eduardo do Couto e Silva	(Signature on file)	5/4/05
Other	N/A		
Other	N/A		
Other	N/A		
Other	N/A		