Tevatron Ramp Events

Last Updated 5/17/00 (Mike Martens)

These diagrams show the sequence of clock events used to control the Tevatron ramp and to mark important times in the ramp cycle. The events used for this purpose are

Event	Purpose
$41	Ramp Reset
$43	Start of Front Porch
$42	Start of Ramp
$45	Start of Flattop
$6D	Start of Decelerate
$44	Start of Back Porch
$46	End of Beam Operations
$62	DFG Stop
$63	DFG Continue

The delay time and timer reference for some of these events are set by C49 and are triggered by 377 timer channels. The delays and timer references do not change during a shot setup, but the delays would change if the Tevatron energy ramp was changed or if wewere in the ramping state.

Event	Function	Ref. Event	Delay Time
$43	Start of Front Porch	$41	90→150 Gev ramp time
$45	Start of Flattop	$42	150→ Flattop ramp time
$44	Start of Back Porch	$6D	Flattop →150 ramp time

To stop the Tevatron ramp on the front porch, on the flattop, or on the back porch the DFG stop event $62 is used. It is triggered by a 377 timer and the delay time is set by C49. (The nominal value is 2 seconds but can be changed if necessary.) Event $62 will always be enabled except while the Tevatron is in a ramping state.

Event	Function	Ref. Event	Delay Time
$62	DFG stop	$43, $44, $45	Set by C49

Tevatron Ramp Events

Events $41 and $63 are used to ramp the Tevatron from one state to another (or to keep the Tevatron in a ramping state.) These events are triggered by the sequencer except in a ramping state when the $41 event is part of the TLG timeline.

Event	Function	Source
$41	Ramp Reset	Sequencer Trigger or TLG
$63	DFG continue	Sequencer Trigger

The $42 and $6D events, which mark the start of the acceleration ramp and the deceleration portion of the ramp require some manipulation by the sequencer. These events are triggered by a 377 timer but the reference event and time delay are changed by the sequencer whenever the Tevatron is switched between a ramping state and a shot setup. The delay times are stored in ACNET pseudo devices which are set by C49.

While in a Ramping State

Event	Function	Ref. Event	Delay Time
$42	Start of Ramp	$41	T:MKRMPT
$6D	Start of Decelerate	$41	T:MKEOFT

For the Accelerate

Event	Function	Ref. Event	Delay Time
$42	Start of Ramp	$63	T:MKFPRS

For the Decelerate

Event	Function	Ref. Event	Delay Time
$6D	Start of Decelerate	$63	T:MKFTRS

Tevatron Ramp Events

For the clock events whose 377 delay time is set by the sequencer the delay times are kept in ACNET pseudo devices which are set by C49.

ACNET device	Description	Set by
T:MKEOFT	End of Flattop Time	C49
T:MKRMPT	Start of Ramp Time	C49
T:MKFPRS	Front Porch Residual Time	C49
T:MKFTRS	Flattop Residual Time	C49

T:MKRMPT is the time of the start of the Tevatron accelerate ramp with respect to the start of the Tevatron ramp cycle (event $41 while in a ramping state.)

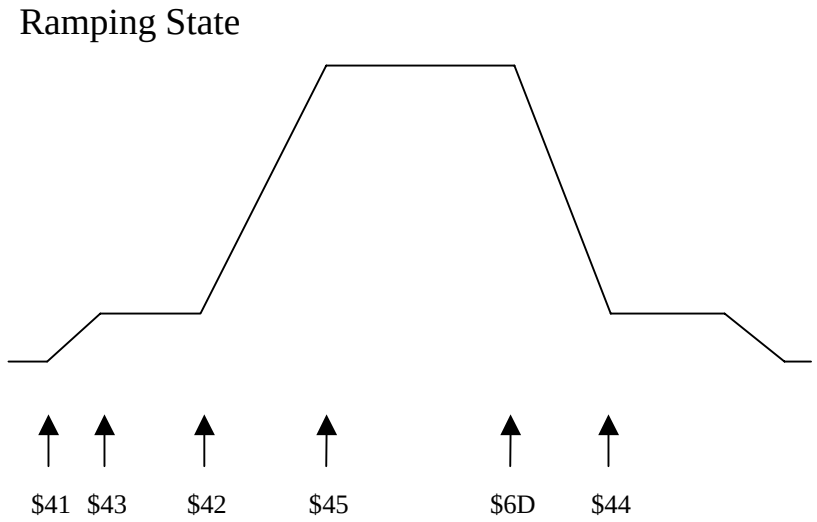
T:MKEOFT is the time of the start of the Tevatron decelerate ramp with respect to the start of the Tevatron ramp cycle (event $41 while in a ramping state.)

T:MKFPRS is the remaining time on the front porch portion of the ramp. This is equal to the length of the front porch minus the delay time on the $62 event set by C49.

T:MKFTRS is the remaining time on the flattop portion of the ramp. This is equal to the length of the flattop minus the delay time on the $62 event set by C49.

The next set of diagrams show the sequence of clock events for the various Tevatron operations. The last diagram shows the relationship between the delay times T:MKxxxx and the Tevatron ramp cycle.

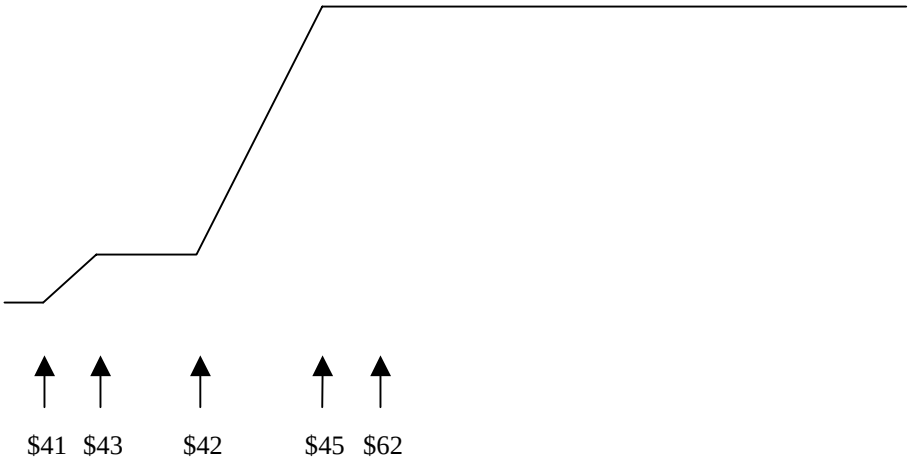
Tevatron Ramp Events



Event	Function	Source	Set By	Delay Time
$41	Ramp Reset	TLG		
$43	Start of Front Porch	$41 + delay	C49	C49 internal
$42	Start of Ramp	$41 + delay	Sequencer	T:MKRMPT
$45	Start of Flattop	$42 + delay	C49	C49 internal
$6D	Start of Decelerate	$41 + delay	Sequencer	T:MKEOFT
$44	Start of Back Porch	$6D + delay	C49	C49 internal

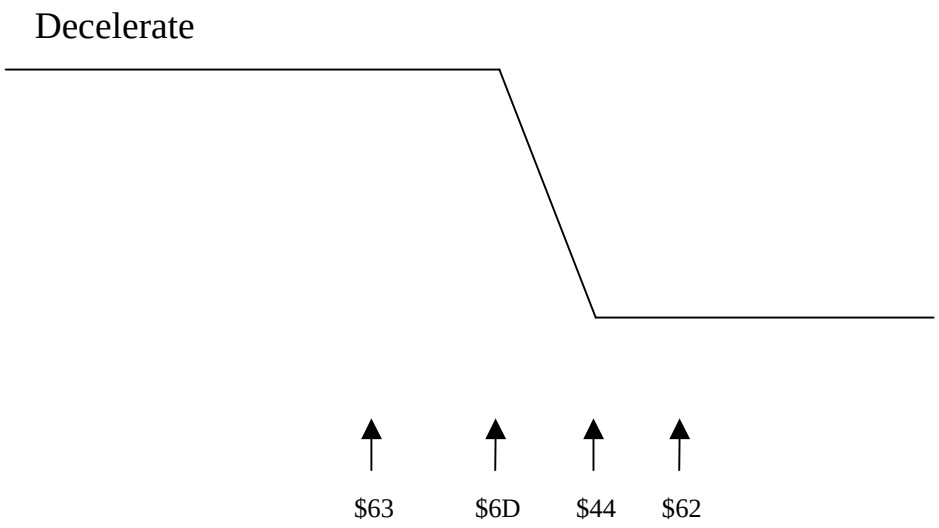
Tevatron Ramp Events

Stop at flattop



Event	Function	Source	Set By	Delay Time
$41	Ramp Reset	TLG		
$43	Start of Front Porch	$41 + delay	C49	C49 internal
$42	Start of Ramp	$41 + delay	Sequencer	T:MKRMPT
$45	Start of Flattop	$42 + delay	C49	C49 internal
$62	DFG Stop	$45 + delay	C49	C49 internal

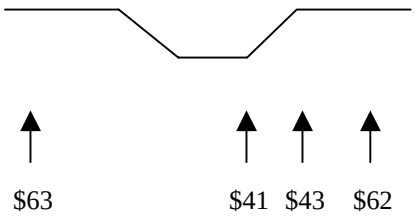
Tevatron Ramp Events



Event	Function	Source	Set By	Delay Time
$63	DFG continue	Sequencer Trigger		
$6D	Start of Decelerate	$63 + delay	Sequencer	T:MKFTRS
$44	Start of Back Porch	$6D + delay	C49	C49 internal
$62	DFG stop	$44 + delay	C49	C49 internal

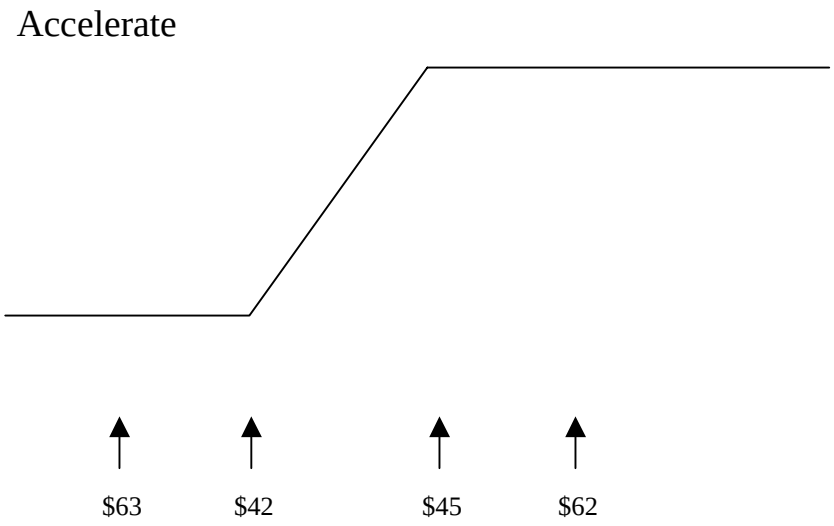
Tevatron Ramp Events

Reset



Event	Function	Source	Set By	Delay Time
$63	DFG Continue	Sequencer Trigger		
$41	Ramp Reset	Sequencer Trigger		(WAIT_FOR SECS 10)
$43	Start of Front Porch	$41 + delay	C49	C49 internal
$62	DFG Stop	$43 + delay	C49	C49 internal

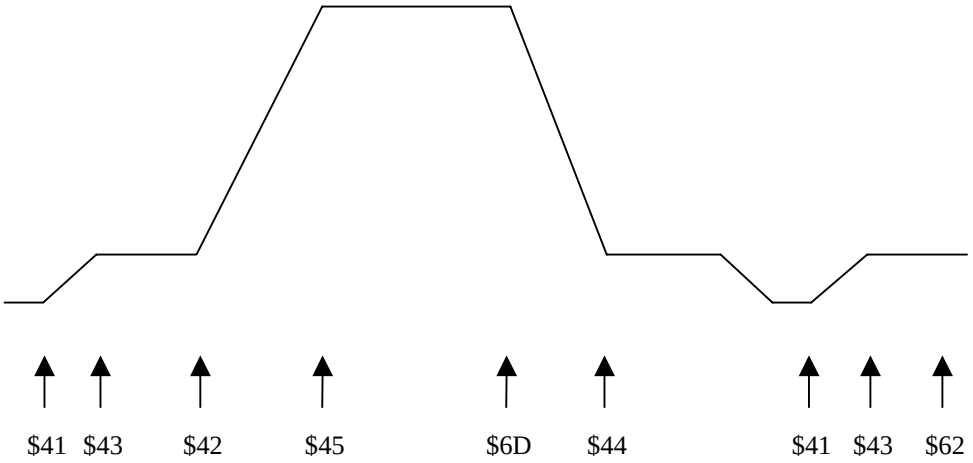
Tevatron Ramp Events



Event	Function	Source	Set By	Delay Time
$63	DFG Continue	Sequencer Trigger		
$42	Start of Ramp	$63 + delay	Sequencer	T:MKFPRS
$45	Start of Flattop	$42 + delay	C49	C49 internal
$62	DFG Continue	$45 + delay	C49	C49 internal

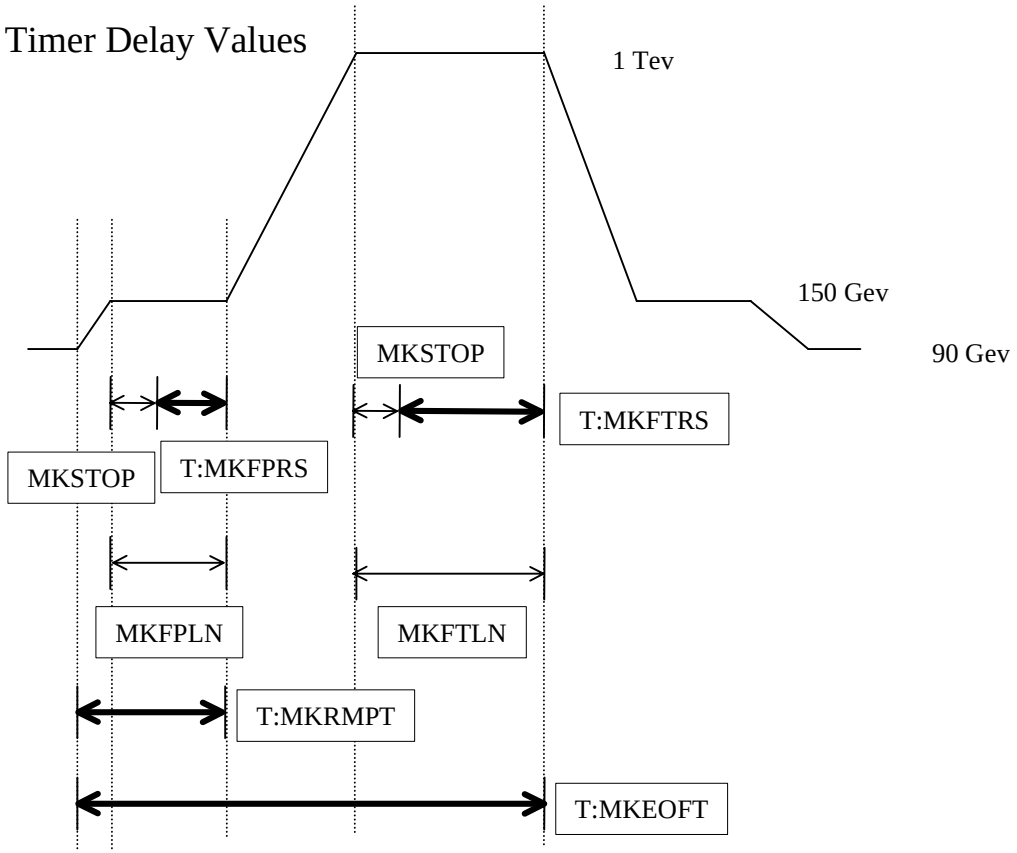
Tevatron Ramp Events

Stop at 150 Gev while ramping



Event	Function	Source	Set By	Delay Time
$41	Ramp Reset	TLG		
$43	Start of Front Porch	$41 + delay	C49	C49 internal
$42	Start of Ramp	$41 + delay	Sequencer	T:MKRMPT
$45	Start of Flattop	$45 + delay	C49	C49 internal
$6D	Start of Decelerate	$41 + delay	Sequencer	T:MKEOFT
$44	Start of Back Porch	$6D + delay	C49	C49 internal
----		WAIT FOR EVENT $44		
----		ENABLE EVENT $62		
$62	DFG Stop	$43 + delay	C49	C49 internal

Tevatron Ramp Events



The delay time for these clock events are kept in ACNET pseudo devices which are loaded by C49. The relationship of these times to the Tevatron ramp cycle is shown in the diagram above. (MKFPLN, MKFTLN, and MKSTOP are just to help understand the diagram. They do not correspond to any ACNET devices.)

ACNET device	Description	Set by
T:MKEOFT	End of Flattop Time	C49
T:MKRMPT	Start of Ramp Time	C49
T:MKFPRS	Front Porch Residual Time	C49
T:MKFTRS	Flattop Residual Time	C49

MKFPLN	Front Porch Length
MKFTLN	Flattop Length
MKSTOP	DFG Stop delay

T:MKFPRS = (MKFPLN - MKSTOP)
T:MKFTRS = (MKFTLN - MKSTOP)