

The following images were taken using a Tektronix digital oscilloscope monitoring signals from a Finnigan Magnum ion trap.

Page #2 EI mode, AGC Off

Page #3 EI mode, AGC Off, expanded view

Page #4 EI mode, AGC On

Page #5 EI mode, AGC On, expanded view

Page #6 CI mode, Reagent scan

Page #7 CI mode, Reagent scan, expanded view

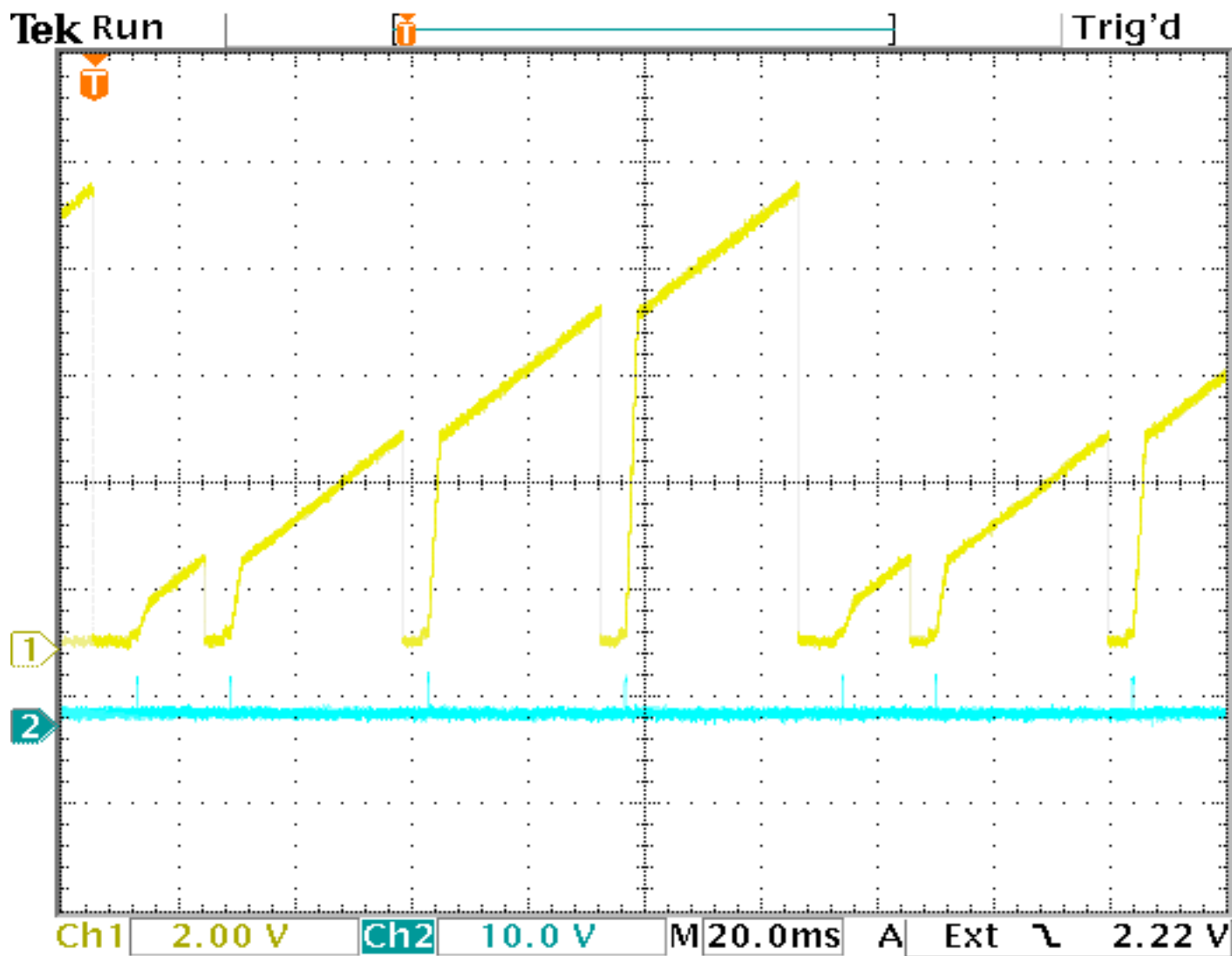
Page #8 CI mode, ARC Off

Page #9 CI mode, ARC On

Page #10 CI mode, ARC On, expanded view

Adron Systems LLC

April 02, 2013



9 Jul 1999
09:27:27

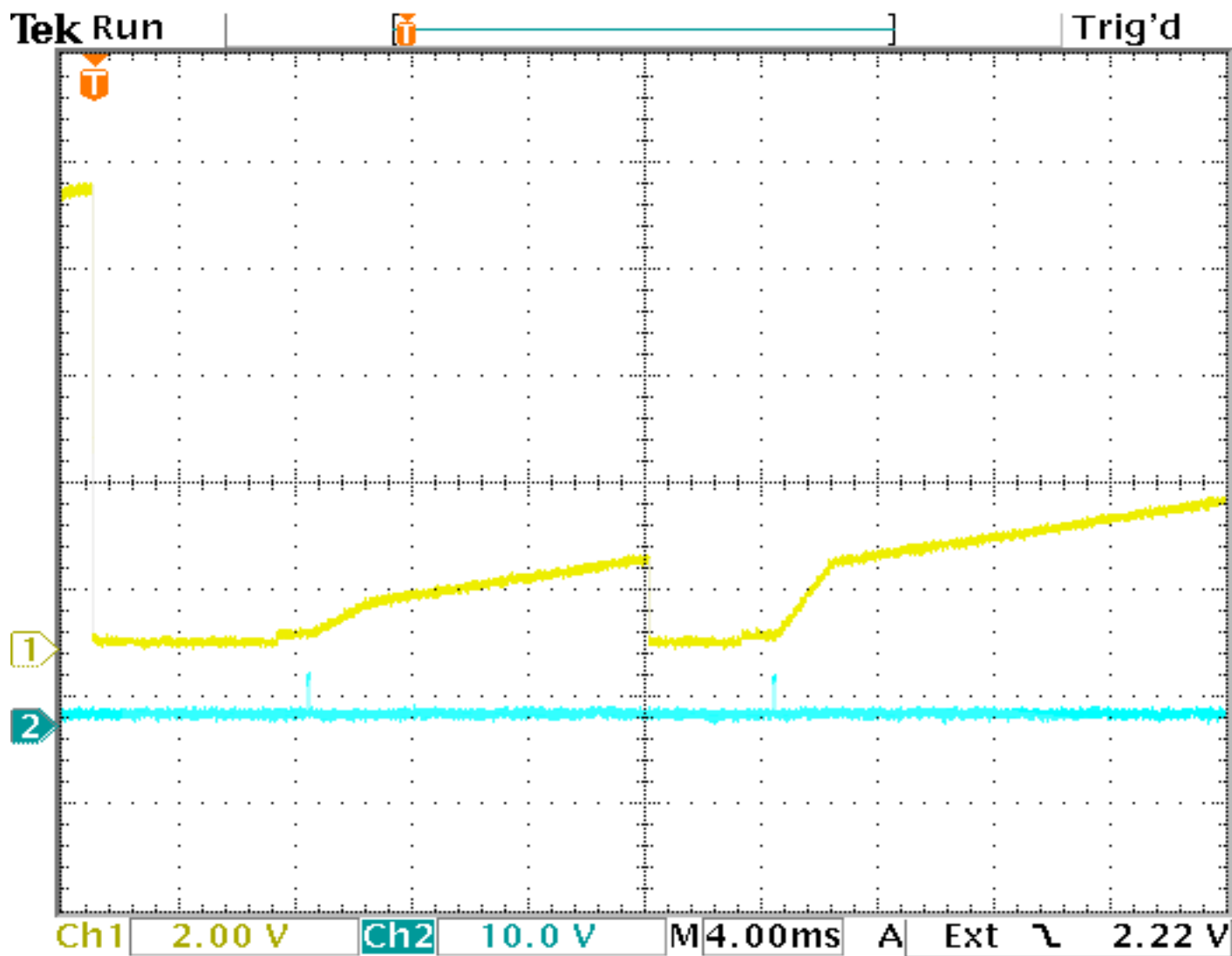
#1 RF sweep
#2 Ion gate

The small blue blips are the "ionization" gate.
Yellow ramps are the four mass regions being swept.

EI with AGC Off

Mass segments are present to allow "tilting" or scaling of mass ranges.
This is to match behaviour to quadrupole instruments.

With AGC off, the ionization gate is constant.



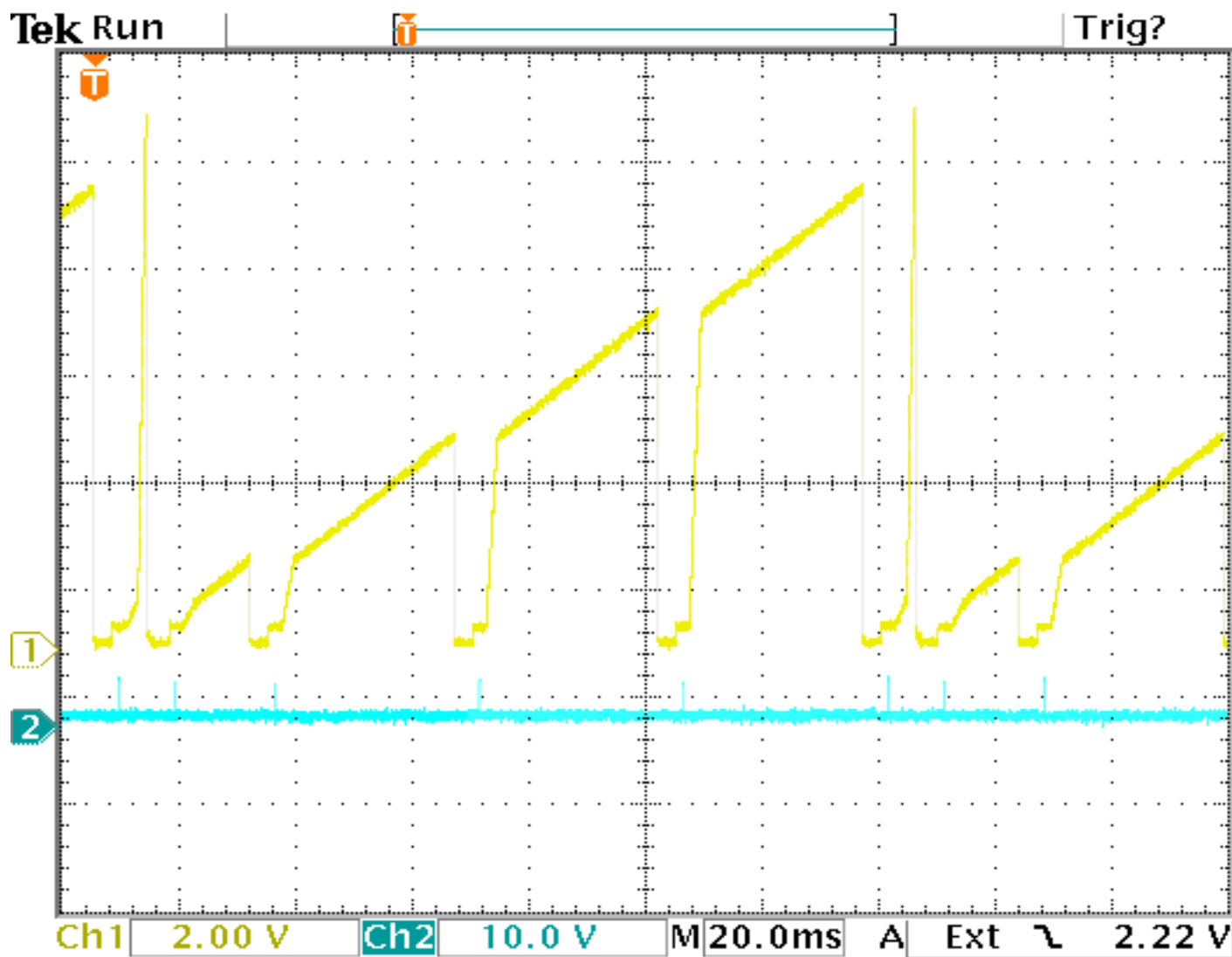
9 Jul 1999
10:01:25

#1 RF sweep
#2 Ion gate

The small blue blips are the "ionization" gate.
Yellow ramps are the four mass regions being swept.

With AGC off, the ionization gate is constant.

EI with AGC Off
Expanded time view.



9 Jul 1999
09:27:45

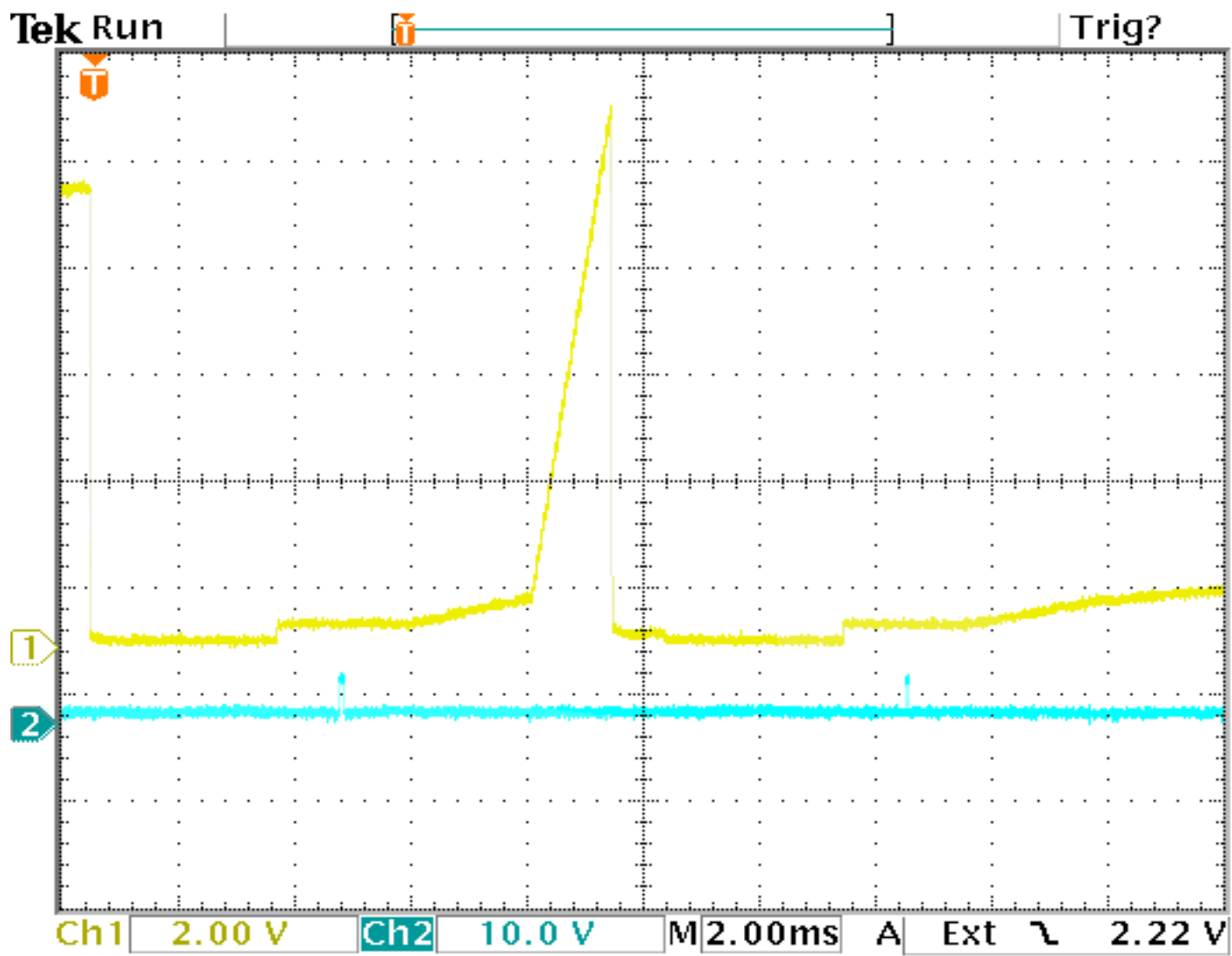
- #1 RF sweep
- #2 Ion gate

The yellow sharp spike at the beginning of the scan is the AGC "Pre-scan".

Based on the pre-scan, the ion gate width is adjusted.
This is the basis of Automatic Gain Control.

EI with AGC On

The small rise (yellow) before the ion gate, is the EI low mass value, at about 20 m/z, followed by a rise to the AGC_ON_BackMass value.



9 Jul 1999
09:50:41

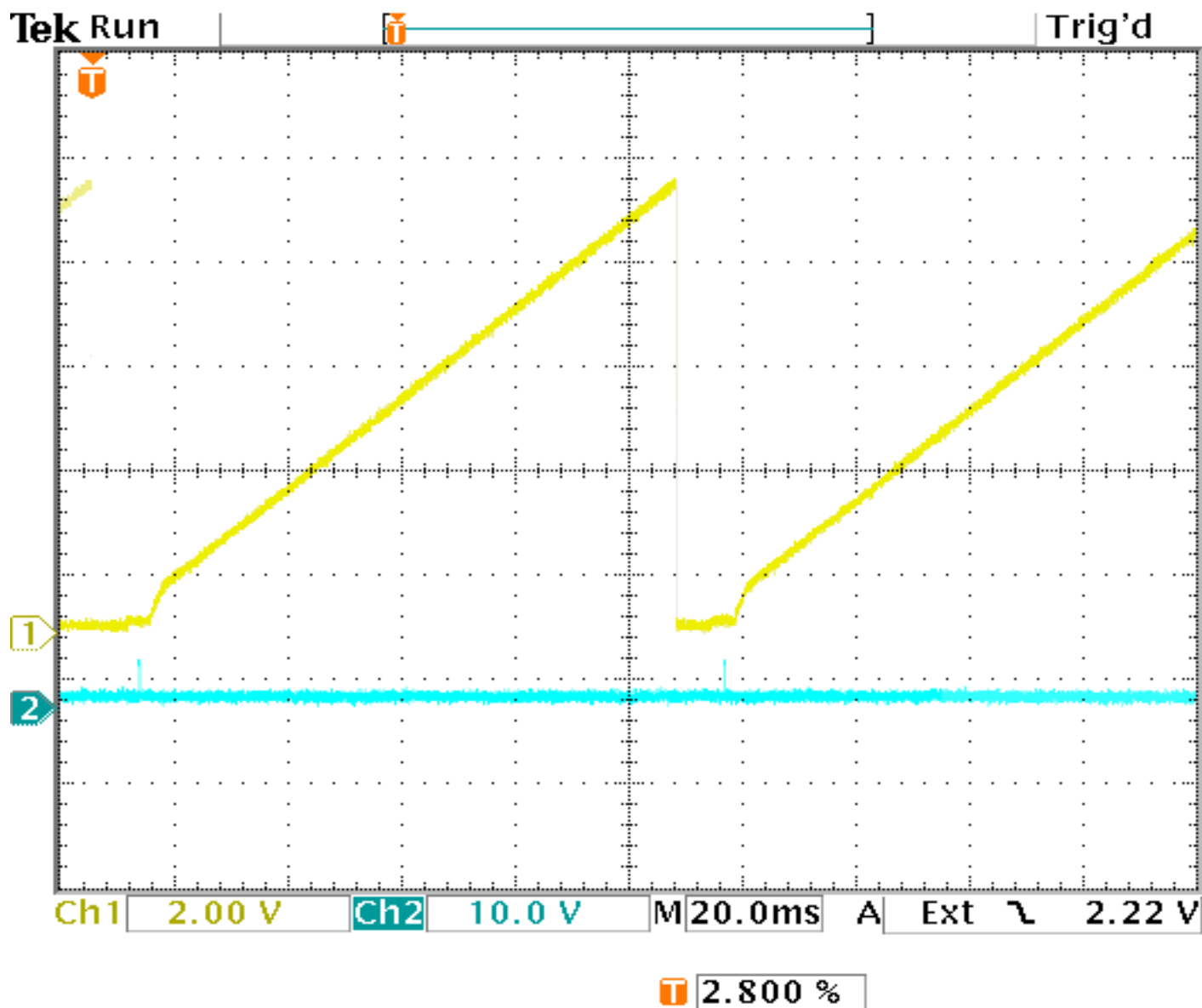
#1 RF sweep
#2 Ion gate

EI with AGC On
Expanded view

Yellow spike is AGC "Pre-scan".

The pre-scan determines how wide the ionization gate should be while scanning. The slight rise before the pre-scan spike, goes to the AGC_ON_BackMass value.

Goal is always ionize the same number of molecules. The number of ions generated is proportional to the AGC_ON_TIC value.



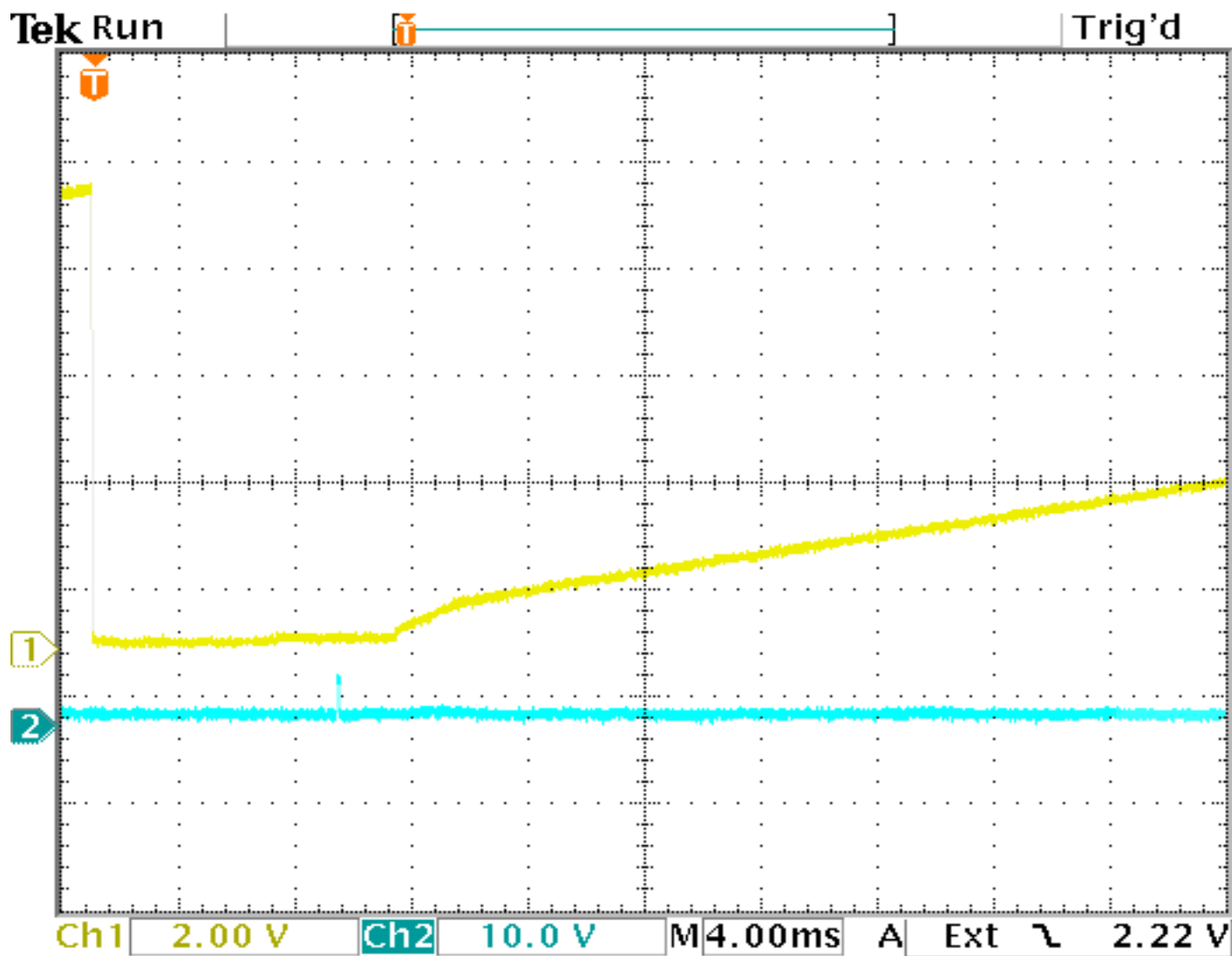
#1 RF sweep
#2 Ion gate

CI mode,
Reagent scan

Blue represents the ionization gate.

In this example, we're sweeping across the reagent masses.
Need to adjust reagent gas pressure for "self-ionization".

In contrast with EI mode, the scan is not broken into mass segments.



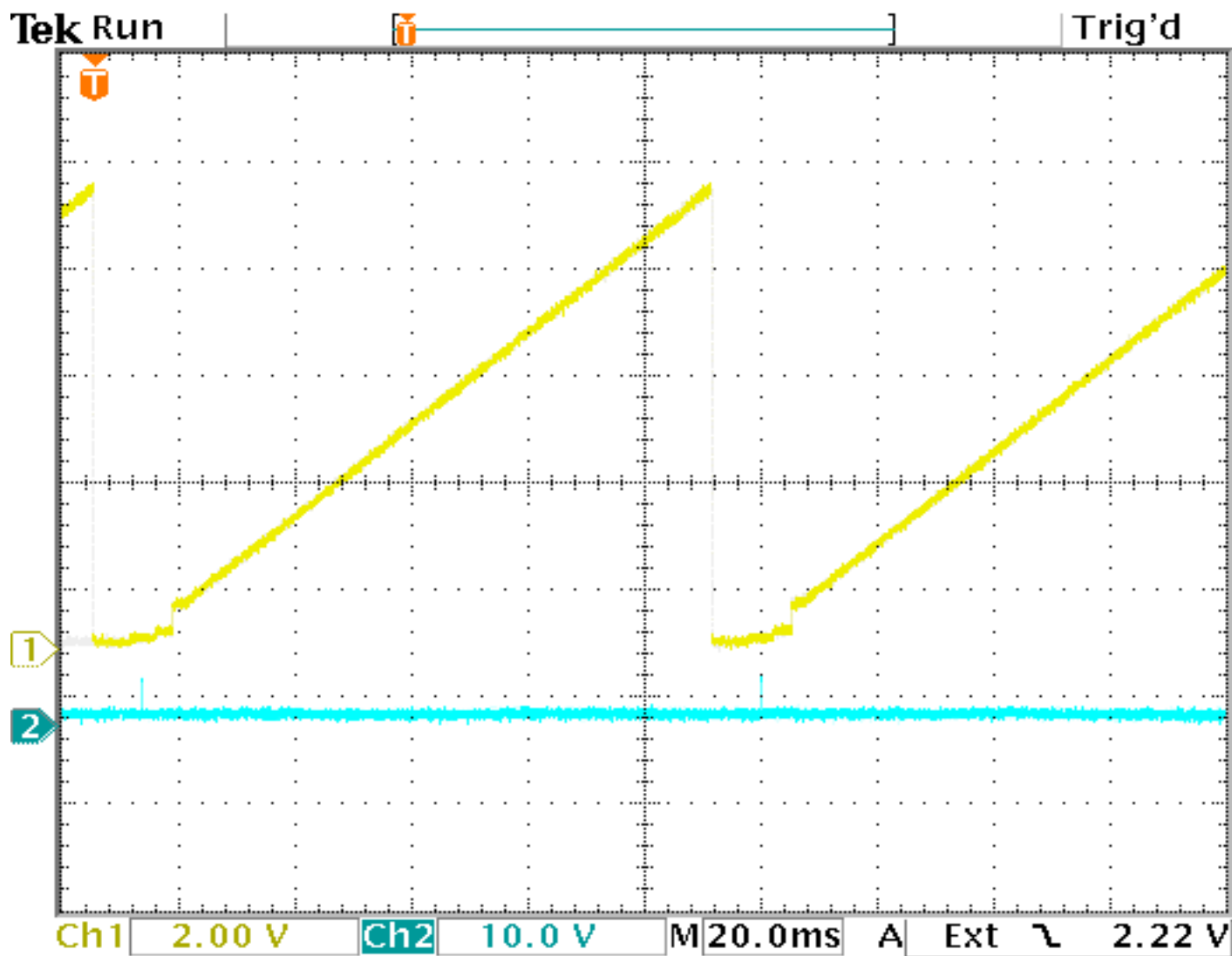
9 Jul 1999
09:55:30

#1 RF sweep
#2 Ion gate

In CI mode, reagent scanning, the mass range is swept in one continuous ramp.

This is the simplest ion trap scanning mode.

CI mode,
Reagent scan,
Expanded view

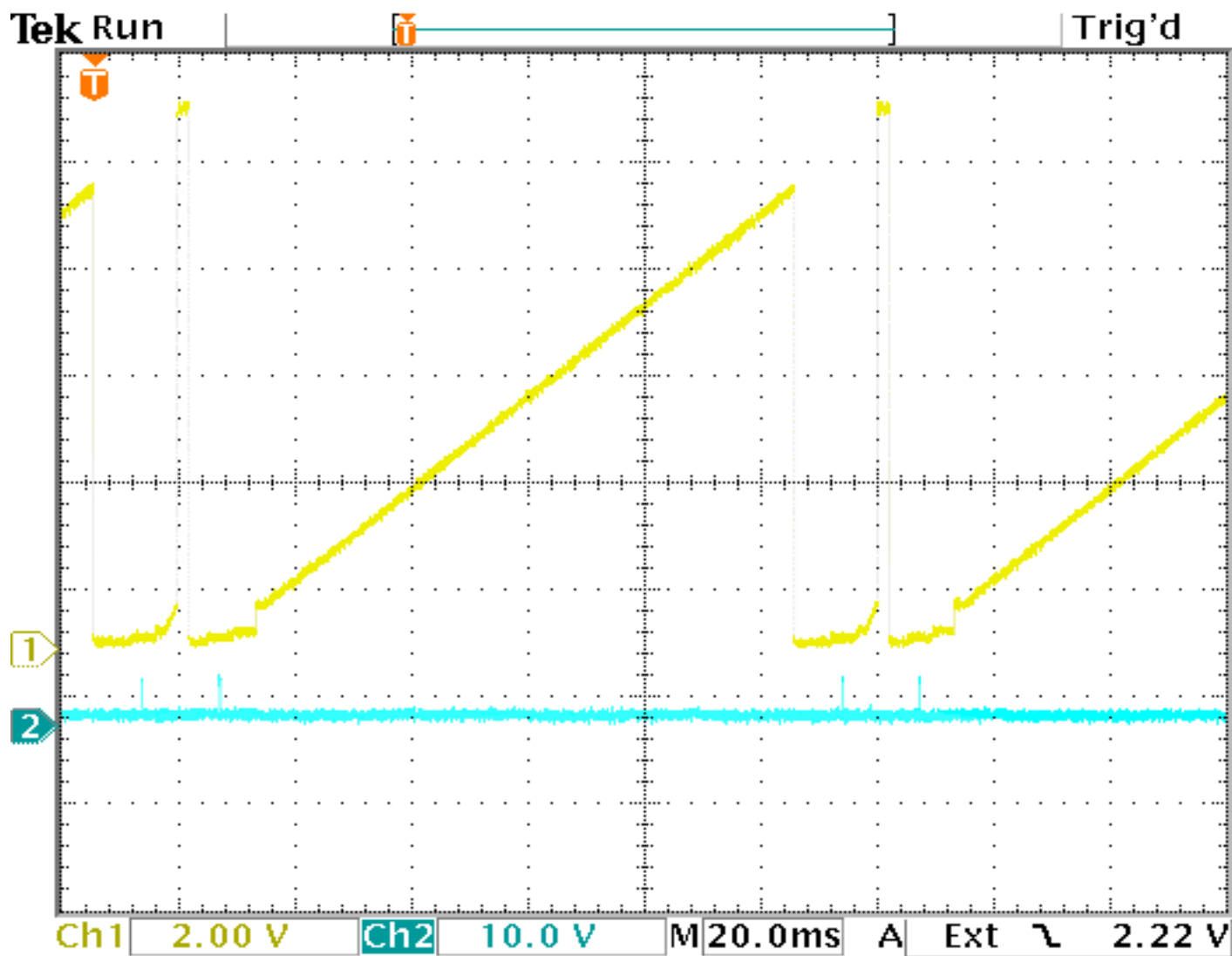


9 Jul 1999
09:28:11

2.800 %

ARC is automatic reagent control.

ARC is similar to AGC by trying to control the amount of ions formed during each scan.



9 Jul 1999
09:28:29

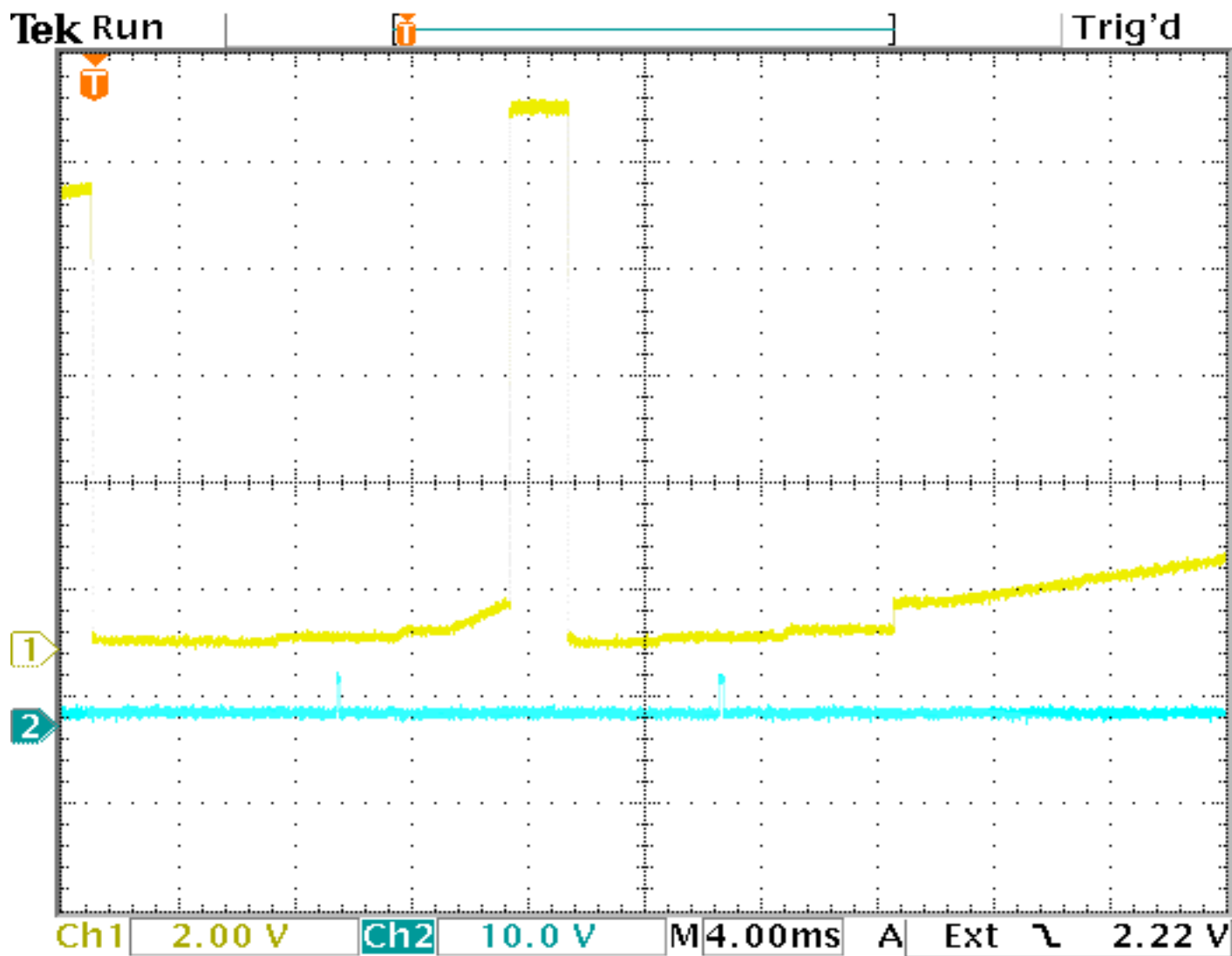
#1 RF sweep
#2 Ion gate

Automatic reagent control (ARC) is on in this example.

CI mode,
ARC is On

The initial yellow spike is the pre-scan event.

This is followed by the mass sweep. Again notice the mass sweep is not broken into segments as in EI mode.



9 Jul 1999
09:51:10

Automatic reagent control (ARC) is on in this example.

- #1 RF sweep
- #2 Ion gate

The initial yellow spike is the pre-scan event.

This is followed by the mass sweep.

CI mode,
ARC is On
Expanded time axis

Ionization occurs at CI_Ionize_Mass. Then, followed by steps to CI_Low_Mass and the CI_Back_Mass.