TOTALFLOW
Technical Bulletin 139

Manual Gating of CO2 on the BTU 8000
For Analyzing Very Low Concentrations of CO2

Totalflow Technical Bulletin

Version 1.0, Revision AA (13 June 2006)

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Purpose

This document describes a procedure for improving the performance of the BTU 8000/8100 gas chromatograph when dealing with gas samples with very low concentrations of CO2.

Description

At times it may become necessary to modify the basic mode of operation of the BTU 8000/8100 to better report very low concentrations of CO2. For this modification to work well your GC must have very little noise on the baseline. If the GC has a noise problem due to power or grounding problems or has bad or marginal detector beads, those problems must be corrected first.

You may want to have available the Modbus/Printer Console document for the BTU 8000 (2100666) and a copy of Hyperterm or other terminal program. A Terminal program is built into the BTU MMI software.

For best results use this method on a Non-Manifold Non-EFR BTU 8000/8100. This version is somewhat more sensitive to very low concentrations of components than the Manifold EFR version.

The Printer/Console command xxGT is used to manually set the gate on and off times for CO2. This allow us to make the gates trigger on and off without relying on the auto gate method that is normally used for all peaks except C6+. As a result, we should be able to measure lower concentrations of CO2. (Actual lower limit of detection will be determined by the amount of noise on the baseline and the accuracy of determining the gate on and off times.)

From the Printer Console Manual(2100666)

xxGT - Gate Timing

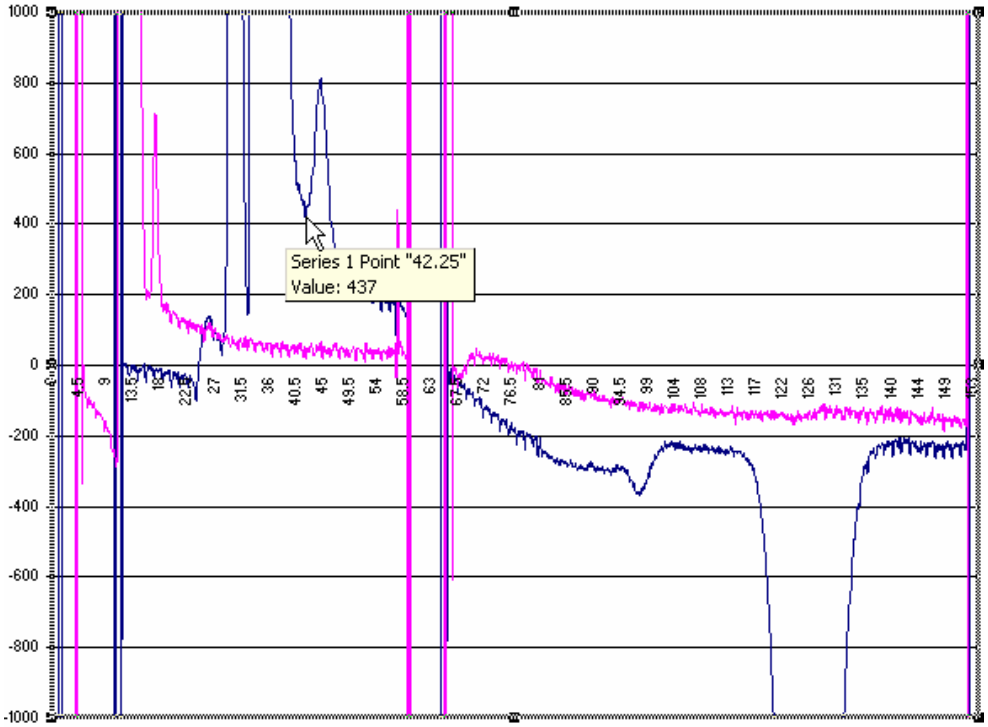
This command sets the gate timing. This value is the number of detector samples into the cycle to operate the gate (20 samples/second). The following is the position of the various gate events for 59/60 modules:

Event	Description	Seconds	Detector Samples
00	Detector 2 Balance	3.5	70
01	Auto-gate Detector 2 On (C2-, C3, IC4, NC4, NEOC5, IC5, NC5)	6	120
02	Detector 1 Balance	10	200
03	Local Baseline Measurement Detector 1	12	240
04	Auto-gate Detector 1 On (N2, C1, CO2)	13.5	270
05	Auto-gate Detector 1 Off	56.85	1137
06	CO2 Timed gate On	56.85	1137
07	CO2 Timed Gate Off	56.9	1138
08	Auto-gate Detector 2 Off	56.9	1138
09	Pre-purge On	61	1220
10	Detector 1 Balance	64	1280
11	Detector 2 Balance	65	1300
12	Gate Detector 1 On C4+, 2nd C3, C2	67	1340
13	Gate Detector 2 On C6+	71	1420
14	Gate Detector 2 Off C6+	132	2640
15	Local Baseline Measurement Detector 2	133	2660
16	Gate Detector 1 Off C2	150	3000
17	Local Baseline Measurement Detector 1	150.5	3010
18	Pre-purge Off	153.5	3070

NOTE: The CO2 timed gates are provided to allow ultra-low CO2 measurement on the order of 100 PPM. Normally, these should be left at the default. If this type of measurement is required, then the

gates will have to be set by hand. Also, any calibration should be done using a certified blend near the levels of CO2 and C1 that are expected.

A chromatogram will show where the gating should be set in your individual case. Use the timeline on the chromatogram to determine where to place the gate on and gate off times and multiply the time by 20 to get the new entered value. (Don't use decimal numbers)



Example; CO2 gate on should begin at 43 seconds and gate off at 52 seconds.

42 X 20 = 840 (05GT=840) Turn off Auto Gating

43 X 20 = 860 (06GT=860) Turn on CO2 Gate

52 X 20 = 1040 (07GT=1040) Turn off CO2 Gate

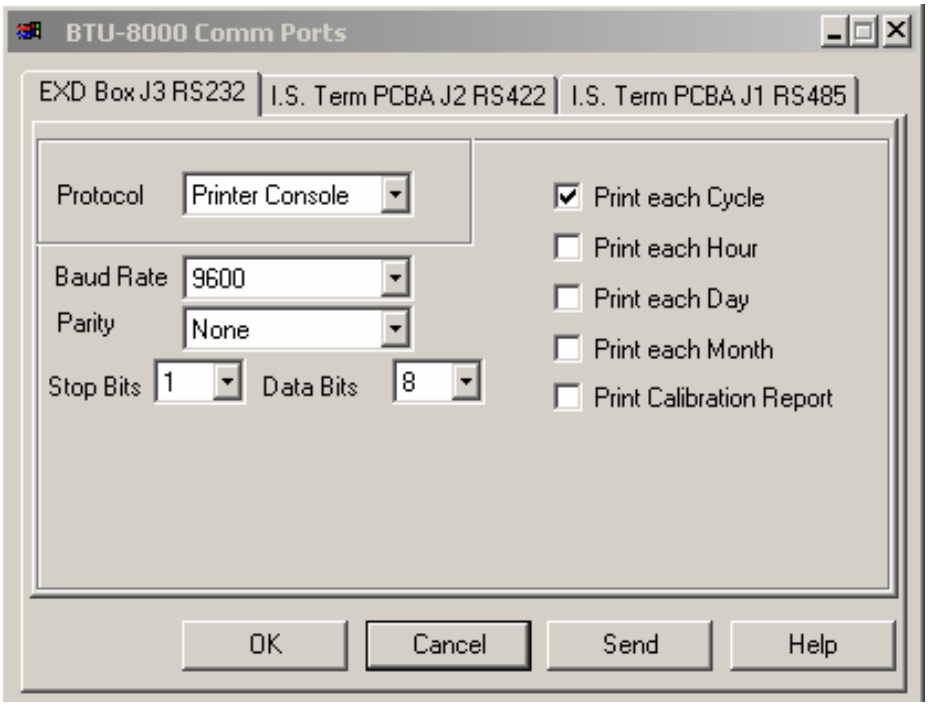
05GT must always be before the gate on time (06GT)

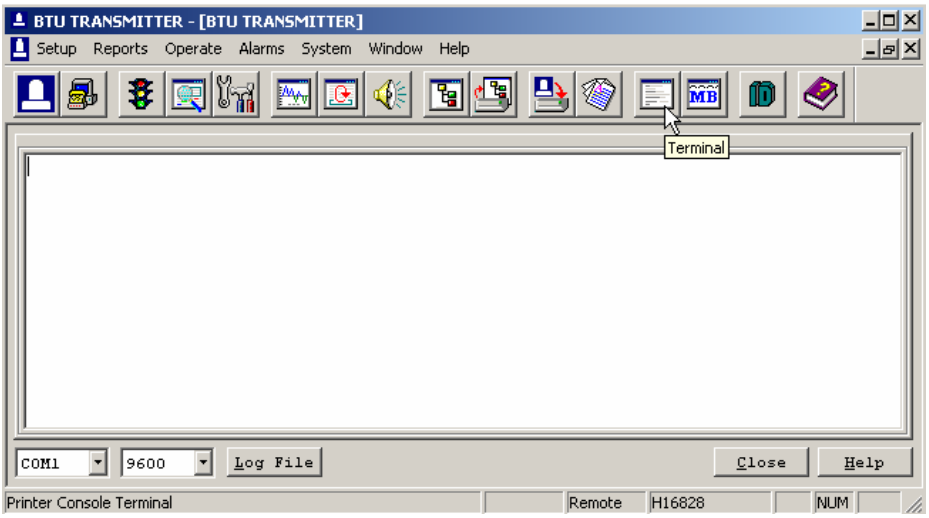
These settings will allow us to gate a CO2 concentration up to approximately 1.0%.

*****IF the CO2 will never see concentration levels of more than .5%, you may want to move the gate off back to 50 seconds (07GT=1000).**

Set the RS232 port of the BTU Transmitter to Printer Console protocol, 9600 baud, 8 data bits, None for parity, 1 stop bit, and use the Printer Console button on the MMI.

You may need to warm start the BTU to reset the communication port so you can talk to it.





Conclusion

If done correctly this should improve the sensitivity of the BTU 8000/8100 to CO2. However, if done improperly, it could effect the measurement of other components. Remember, when working in Printer Console mode, there are no checks and balances. The BTU 8000 will allow any entry even a wrong one. If in doubt about this method please contact Totalflow Customer Service at 1-800-442-3097 or 1-918-338-4880.