# The GCN Web Page for Real-Time GRB Information: Locations, Intensities, Fluences and Light Curves

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**Abstract.** One of the enhancements of the newly created GRB Coordinates Network (GCN) is a web page that contains all the RA, Dec, Date, Time, Intensity information distributed by the GCN plus some additional information not amenable to the other GCN distribution methods. The web page is a table with all the BATSE-Original, -Final, -MAXBC, and -LOCBURST, RXTE-PCA, RXTE-ASM, COMPTEL and IPN information plus light-curves. The page is automatically updated by the GCN programs in real-time (within a minute after the information is distributed by GCN). This table provides the follow-up observer with a central location where he/she can see the pertinent information summarized so that he/she can make optimal decisions on whether to observe a given GRB, and, if so, then determine the details of the observation. The web page format and contents are described and suggested uses are given.

## INTRODUCTION

The recent afterglow detections of GRBs (x-ray, optical, and radio) [1] [2] [3] have proven that the follow-up observation approach is a productive one for understanding the nature of GRB. This conclusion is also reflected in the scientific community by the fact that the number of GCN sites has doubled since the initial BeppoSAX discovery and that at least five "second generation", fully automated, dedicated instruments are being built which will make rapid follow-up observations in the optical bandpass.

However, the situation shortly after each GRB is dynamic. For observers wishing to make follow-up observations, it is difficult to know what has already been done; which spacecraft have detected the GRB; and if so, what are their locations and sizes of their error boxes, and how do all the various error boxes overlay each other.

## A SOLUTION

The GRB Coordinates Network (GCN) has taken a step towards solving this problem by creating a page within the GCN web site [4] which contains all the pertinent information about any given burst in a single location. Figure 1 shows a section of the web page. It includes all gamma-ray locations derived by CGRO-BATSE and other spacecraft instruments (e.g. RXTE-PCA, RXTE-ASM, CGRO-COMPTEL and Ulysses through the Interplanetary Network (IPN)) which observed the given GRB. It provides the potential follow-up observer with a central location to look for information about the burst. This table is updated in real-time by the suite of GCN programs. As soon as each notice is produced and distributed by GCN, the pertinent information is extracted and added to this dynamic table (with less than a minute additional delay).

This collection of all the pertinent GRB information into a single location provides the follow-up observer with a central location with which to better plan his follow-up observations. This web page is also an archive for all the GCN and related notices about each GRB.

## WEB PAGE TABLE CONTENTS

The table is divided into 3 major sections (GCN, Huntsville, and Miscellaneous) based on the source of the information. Each row in the table contains the information from one of the GCN Notice types. As such, there will quite often be multiple rows for a single GRB, because there are multiple notice types issued by GCN over the course of time for each BATSE trigger.

The GCN section (the first 9 columns) contains: the BATSE trigger number, the date and time of the trigger, the type of GCN notice (Original, MAXBC, failed, etc.), the RA,Dec location (if a solution was possible by the GCN program), the intensity and fluence values, and links to light curves of the trigger/burst. The light curves are available in text, postscript and soon jpeg formats. The peak intensity, fluence, and light curve allow the observer to assess the relative importance of the burst.

The Huntsville section (columns 10 through 15) contains the type of the trigger (GRB, particle event, solar flare, SGR, etc.), the RA,Dec location using the complete "locburst" algorithm [5] (which includes humans-in-the-loop for optimum data selection), the statistical error on the location, and a short description of the trigger/burst. Unfortunately, the Huntsville information is not available until 1-3 days after the trigger/burst. Note that this "Huntsville locburst" information is different from the GCN LOCBURST Notices, which are avaialble at T + 15-35 minutes and appear in the GCN section of the table.

The Miscellaneous section (columns 16 through 18) contains links to any IPN notices (column "I"), to any COMPTEL notices (column "C"), and to other notice information (column "O") where "other" includes the RXTE-PCA and -ASM Notices information.

A more detailed description of the contents of the table is provided by the explanatory note in the actual web page.

## MISCELLANEOUS COMMENTS

The URL for this real-time GRB information web page is: http://gcn.gsfc.nasa.gov/gcn/batse_grbs.html. Remember that this web page is updated quite often and automatically, so hit the <reload> button in your browser to override the cached version every time you visit this page.

The URL for the GCN home page is: http://gcn.gsfc.nasa.gov/gcn. It contains a complete description of all aspects of the GCN system. There is a system-level overview, the distribution methods, technical descriptions and specifications of all the formats (all distribution methods), example software for running a socket connection, plus much much more. There are $\sim$100 pages in the GCN web site which explain the system from many perspectives, however, if you do not find the answer to your question please do not hesitate to contact us.

## THE FUTURE

The incorporation of the RXTE information into the BATSE GRB page is not yet automated, but soon will be. And there will also be an ALEXIS Extreme-UV Transient page, very similar in structure and content to the BATSE GRBs page.

For those GRBs not detected by BATSE and for those pieces of information which are not amenable to the current GCN e-mail format and to the above web page table format, a new capability within GCN is being created. While the details are not yet finalized, the procedure will be that anybody with information (of any type, in prose format) about a given GRB will be able to submit it to the GCN system and it will then be distributed to the list of interested parties. This capability will allow optical, radio and x-ray follow-up observers or anyone with pertinant information about a GRB to get their information out to the GRB community with the minimum possible delay. The person wishing to submit a prose-style message will be able to use either direct e-mail to a central GCN e-mail exploder or a forms-driven page within the GCN web site. This new type of GCN notice will be archived within the GCN web pages and accessible to everyone wishing to review the current observational status of each GRB.

# REFERENCES


1. Costa, E., et al., Nature, 387, 783, 1997.
2. van Paradijs, J., et al.; Nature, 386, 686, 1997.
3. Frail, D., et al.; IAUC #6662, 1997.
4. The GCN web site URL: http://gcn.gsfc.nasa.gov/gcn.
5. Meegan, C.A., et al.; AIP, 384, 291, 1996.


**Recent BATSE Triggers**

| GCN | | | | | | | | | HUNTSVILLE | | | | | | MISC | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Trig | Date | Time UT | Type | RA | Dec | Inten | Flue | L.C. | Trig | Type | RA | Dec | Err | Cmnt | I | C | O |
| 6362 | 97/09/04 | 18:53:26.17 | failed | n/a | n/a | n/a | n/a | n/a | 6362 | SGR | 267.97 | -17.09 | 5.0 | yes | | | |
| 6361 | 97/09/04 | 10:57:05.76 | Maxbc | 77.68 | -23.57 | 400 | n/a | n/a | 6361 | BURST | 95.48 | -55.39 | 7.4 | yes | | | |
| 6361 | 97/09/04 | 10:57:05.76 | failed | n/a | n/a | n/a | n/a | n/a | 6361 | BURST | 95.48 | -55.39 | 7.4 | yes | | | |
| 6359 | 97/09/03 | 17:25:09.47 | Maxbc | 243.85 | -52.16 | 928 | n/a | n/a | 6359 | BURST | 237.67 | -58.46 | 4.7 | yes | | | |
| 6358 | 97/09/03 | 11:38:49.05 | Maxbc | 3.18 | +4.02 | 560 | n/a | n/a | 6358 | BURST | 17.61 | 13.84 | 8.6 | yes | | | |
| 6358 | 97/09/03 | 11:38:49.05 | failed | n/a | n/a | n/a | n/a | n/a | 6358 | BURST | 17.61 | 13.84 | 8.6 | yes | | | |
| 6357 | 97/09/03 | 10:57:52.86 | Final | 351.43 | +59.70 | n/a | 39982 | yes | 6357 | PARTICL | n/a | n/a | n/a | yes | | | |
| 6357 | 97/09/03 | 10:57:52.86 | Original | 359.31 | +61.51 | 1601 | n/a | yes | 6357 | PARTICL | n/a | n/a | n/a | yes | | | |
| 6356 | 97/09/02 | 10:55:46.78 | Maxbc | 277.92 | -18.25 | 4944 | n/a | yes | 6356 | SGR | 269.71 | -20.14 | 0.4 | yes | | | |
| 6356 | 97/09/02 | 10:55:46.78 | Final | 278.29 | -18.92 | n/a | 5099 | yes | 6356 | SGR | 269.71 | -20.14 | 0.4 | yes | | | |
| 6356 | 97/09/02 | 10:55:46.78 | Original | 278.29 | -18.92 | 5099 | n/a | yes | 6356 | SGR | 269.71 | -20.14 | 0.4 | yes | | | |
| 6355 | 97/09/02 | 10:10:20.00 | Maxbc | 93.71 | -25.12 | 800 | n/a | n/a | 6355 | BURST | 74.93 | -30.32 | 2.6 | yes | | | |
| 6355 | 97/09/02 | 10:10:20.00 | failed | n/a | n/a | n/a | n/a | n/a | 6355 | BURST | 74.93 | -30.32 | 2.6 | yes | | | |
| 6354 | 97/09/02 | 04:34:48.54 | Maxbc | 208.05 | +28.48 | 320 | n/a | n/a | 6354 | BURST | 210.88 | 23.97 | 4.2 | yes | | | |
| 6354 | 97/09/02 | 04:34:48.54 | failed | n/a | n/a | n/a | n/a | n/a | 6354 | BURST | 210.88 | 23.97 | 4.2 | yes | | | |
| 6353 | 97/08/31 | 17:39:30.66 | Locburst | 84.17 | -49.23 | 3633 | n/a | yes | 6353 | BURST | 85.79 | -47.36 | 0.68 | yes | | | |
| 6353 | 97/08/31 | 17:39:30.65 | Maxbc | 86.58 | -45.64 | 4064 | n/a | yes | 6353 | BURST | 85.79 | -47.36 | 0.68 | yes | | yes | yes |
| 6353 | 97/08/31 | 17:39:30.65 | Final | 84.72 | -47.70 | n/a | 35583 | yes | 6353 | BURST | 85.79 | -47.36 | 0.68 | yes | | yes | yes |
| 6353 | 97/08/31 | 17:39:30.65 | Original | 87.36 | -44.32 | 854 | n/a | yes | 6353 | BURST | 85.79 | -47.36 | 0.68 | yes | | yes | yes |
| 6352 | 97/08/29 | 18:35:04.80 | fail_max | n/a | n/a | n/a | n/a | n/a | 6352 | ELECTRO | n/a | n/a | n/a | yes | | | |
| 6351 | 97/08/29 | 09:29:38.79 | Locburst | 222.08 | +9.76 | 1052 | n/a | yes | 6351 | BURST | 226.08 | 1.53 | 2.92 | yes | | | |
| 6351 | 97/08/29 | 09:29:38.78 | Maxbc | 219.53 | +7.23 | 1168 | n/a | yes | 6351 | BURST | 226.08 | 1.53 | 2.92 | yes | | | |
| 6351 | 97/08/29 | 09:29:38.78 | Final | 221.94 | +8.15 | n/a | 17804 | yes | 6351 | BURST | 226.08 | 1.53 | 2.92 | yes | | | |
| 6351 | 97/08/29 | 09:29:38.78 | Original | 219.75 | +11.88 | 2218 | n/a | yes | 6351 | BURST | 226.08 | 1.53 | 2.92 | yes | | | |
| 6350 | 97/08/28 | 17:44:36.83 | RXTE | 272.12 | 59.30 | 0.5 | n/a | n/a | 6350 | BURST | 269.22 | 59.42 | 0.6 | yes | yes | | yes |
| 6350 | 97/08/28 | 17:44:36.83 | Maxbc | 252.63 | +61.09 | 11232 | n/a | n/a | 6350 | BURST | 269.22 | 59.42 | 0.6 | yes | | | |
| 6349 | 97/08/27 | 09:55:50.62 | Locburst | 136.88 | -51.88 | 2405 | n/a | n/a | 6349 | BURST | 134.66 | -51.63 | 0.8 | yes | | | |
| 6349 | 97/08/27 | 09:55:50.62 | Maxbc | 128.66 | -50.19 | 2752 | n/a | n/a | 6349 | BURST | 134.66 | -51.63 | 0.8 | yes | | | |
| 6349 | 97/08/27 | 09:55:50.62 | Final | 130.52 | -51.03 | n/a | 38443 | n/a | 6349 | BURST | 134.66 | -51.63 | 0.8 | yes | | | |
| 6349 | 97/08/27 | 09:55:50.62 | Original | 133.34 | -39.81 | 960 | n/a | n/a | 6349 | BURST | 134.66 | -51.63 | 0.8 | yes | | | |

**FIGURE 1.** A sample of the GCN real-time web page of GRB information.