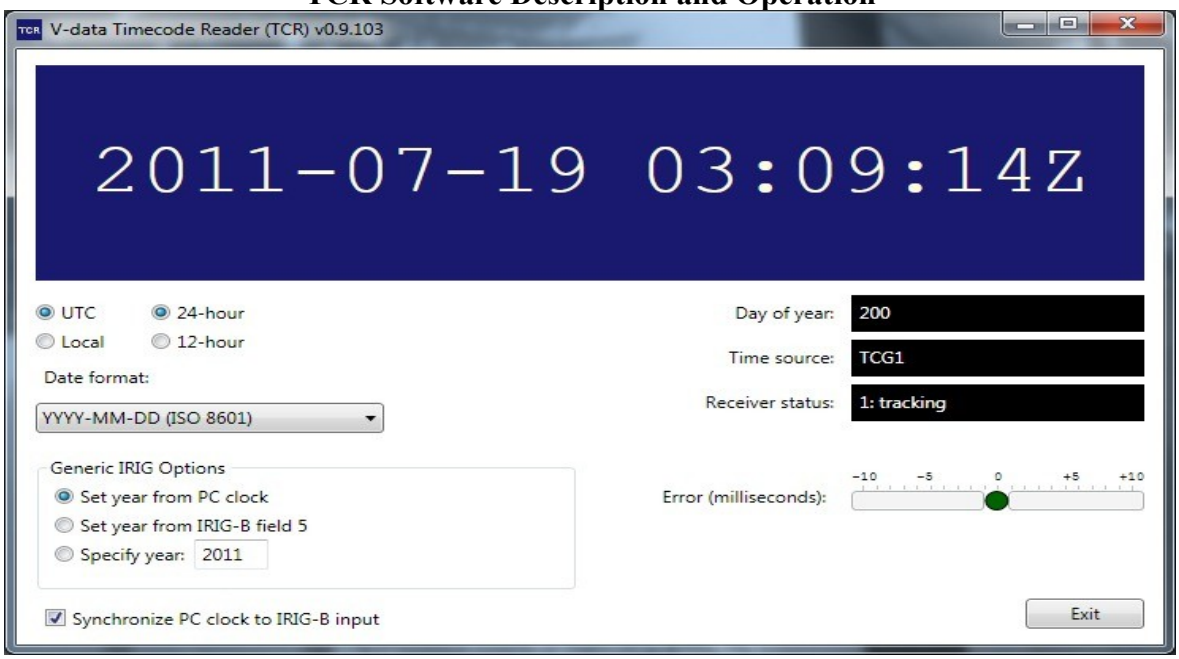
# TCR Software Description and Operation




Time is displayed in the blue window. The "Time Source" window shows the source of the displayed time. The source will be the PC clock if no IRIG-B is detected. If IRIG-B is detected, TCR determines the source to be either generic IRIG-B or one of the V-data TCG formats, TCG1 or TCG2. The generic IRIG-B options provide buttons to choose whether the year is to be obtained from Field 5 of the IRIG-B data, from the PC Clock, or from user input. These options are provided since some generic IRIG-B sources do not contain year data.

The "Day of Year" window shows the day of year, which is available in all IRIG-B formats.

The "Status" window will show GPS receiver status if the IRIG-B source shows a V-data TCG1 or TCG2 format.

The "UTC" and "Local" buttons select whether the time zone is UTC (aka Zero or Zulu) or local. If local time is selected, the time zone is determined by the PC clock settings.

The "12-hour" and "24-hour" buttons select whether the time is in 24 hour (military) or 12-hour (am/pm) format.

A drop-down menu under "Date Format" has several options for the display of date and time zone.

The "Synchronize PC Clock to IRIG-B Input" button causes the PC Clock to be regulated by the IRIG-B input. The TCR software requires administrator privileges for the synchronization function to work. A warning is given if sync is attempted when the difference between IRIG-B time and PC clock exceeds one minute. If the IRIG-B source is a V-data TCG or GTP that has not been tracking since the last power-up, TCR can wait for the status to indicate tracking before synchronizing. These measures help avoid inadvertently syncing the PC Clock to inaccurate IRIG-B inputs. Once checked, the sync button can be clicked again to un-check and end synchronization. When synchronization stops, either by un-checking the sync button, by loss of IRIG-B input, or by exiting the program, the default settings are restored and the PC clock once again free-runs, drifting away from the IRIG-B input.

The "Error" graph shows the error between the IRIG-B input and the PC Clock. The graph has two ranges, +10 to -10 seconds, and +10 to -10 milliseconds. The millisecond range is generally seen only during synchronization, or for some short time after synchronization is ended.

The TCR software version number is shown for easy comparison with the latest version available for download on the V-dataUSA.com website. Future versions may add features such as ability to set TCG time from the PC clock, and capturing time from an external trigger input to a pin on the TCR DB-9M connector.

# TCR Hardware Description and Operation

The TCR hardware converts the IRIG-B signal to USB for input to the PC. The two parts of the TCR hardware work as a unit and must be kept together to maintain the warranty and insure correct operation. The IRIG-B input on the BNC connector is a nominal 3V peak-to-peak sine wave to match the output of the V-data TCG and GTP. Other sources of IRIG-B will work if the voltage is compatible.

The TCR DB-9M connector can also be plugged directly into the COM port of the TCG. This frees up the BNC output on the TCG for other use, and makes demodulated (5V digital) IRIG-B from the TCG available as an output on the TCR BNC. (Note: The TCR BNC is normally an input but changes to an output when the TCR is plugged into the TCG COM port. Do not additionally connect the TCR and TCG together by BNC as that would be connecting two outputs.)

## IRIG-B Format Variations

Originally, and for many years, the IRIG-B format contained no date information other than day-of-year. V-data introduced the IRIG-B generator Model GTP in 1992 with day, month, year, and GPS receiver status added to the original IRIG-B format. The receiver status was placed in the unused BCD character after the hundreds-of-days digit, and the day, month, and year were placed in the user bits (fields 5, 6, and 7). Since no prior format existed for this additional information, V-data chose the GPS date convention (DD-MM-YY) with MSB and MSD first. The V-data Model TCG replacement for the GTP also used this TCG1 format, which is still available and widely used. Later the RCC added an option to the IRIG-B standard which included year (YY) in field 5 with LSB and LSD first. Some IRIG-B readers which have been designed to look for year in accordance with the RCC optional format will not work properly with the original GTP and TCG formats (TCG1) since day is in field 5 instead of year. V-data is now offering an optional TCG2 format which puts the date in fields 5, 6, and 7 in YY-MM-DD order with LSB and LSD first. This format provides RCC compatibility while allowing the TCG to continue supplying full date rather than just the year. The TCR software will recognize the original dateless format, the year-only RCC optional format, and the V-data (full date and status) TCG1 and TCG2 formats.