

TG-5130 User Guide



General

The TG-5130 is a full featured, multi-pattern, multi-format, SMPTE 259M/292M SD/HD-SDI test signal generator with embedded 16-Channel voice ID's, audio tones, on-screen-display (OSD) and internal Li-ion battery pack. The TG-5130 expands upon the Maxtron TG-5120 products by adding control over the embedded audio and the addition of one-line of up to 20 characters of text OSD.

The pattern lineup was specifically chosen to expose system weakness and limitations. For example, a moving zoneplate is used to qualify video compression and scaling. The pathological pattern is used to stress the PLL's in the signal path. There is even the traveling wizard that moves smoothly about the screen to reveal dropped or repeated frames. Then there are the classic patterns: SMPTE RP 219 color bars, 75% full-field color bars, projector alignment and convergence grid, RGB color fields, and color difference ramps. There is even a 4-pixel checkerboard pattern for checking 3D image alignment. Included is a A/V test pattern used to measure the video-to-audio delay. And, a user selectable circle overlay can be added to some patterns for checking for proper display aspect ratios.

Connections

The TG-5130 has all the I/O connections clearly labeled on the top of the unit. Below is the birds-eye view of the TG-5130 Front Panel.



Push-wheels

Format:

The top push-wheel switch selects the video standard of the SD/HD-SDI output.

Audio:

The middle push-wheel switch selects the various embedded audio modes.

Pattern:

The bottom push-wheel, along with the A/B pattern modifier toggle switch selects the pattern to be displayed in the format that's selected.

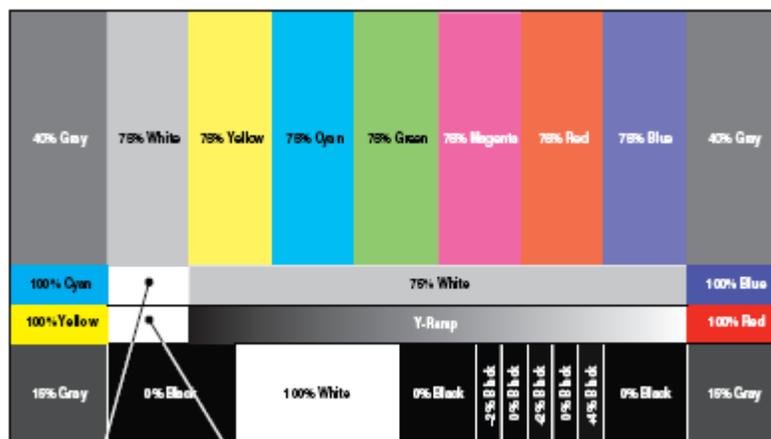
Label

- **Format:** The numbers to the right of the format position number indicates the standard selected, then the frame rate for progressive patterns or the field rate for the interlaced patterns. Next to the pattern toggle switch is a **POWER LED** which also indicates whether the selected standard is progressive or interlaced. For progressive standards the light is steady and for interlaced standards the LED has flashes at a rapid but noticeable rate. The last number in the Format column is the number of active horizontal pixels in that format.
- **Audio:** The center column controls the embedded audio. The choice is None (no embedded audio packets), Mute (embedded audio packets, all set to zero), Voice IDs with various tone combinations, and tone only combinations.
- **Pattern:** The pattern column shows the pushwheel selected pattern as it relates to the pattern modifier A/B switch position. For example, if RP219, pattern 0, is selected then the A/B switch turns ON/OFF a circle overlay. If the White field pattern 6 is selected then the B (down) position changes the pattern from a flat 75% White field to 10-step Stairsteps.

Patterns

There are 10 basic patterns available in the TG-5130 increasing to 19 when including the A/B modifier. The following is a list of these patterns and some of their uses.

- 0 SMPTE Recommend Practice HDTV Colorbars (RP219) is formatted for 16:9 aspect ratio and includes fixed gray levels and a Y-Ramp, as shown below. Also, included with this pattern is a traveling Wizard, which bounces like the ball in the game Pong when it reaches the edge of the raster. This motion is useful for checking for dropped frames as sometimes occurs with video compression schemes or in scaling engine malfunctions. A circle can be added to this pattern to confirm proper aspect ratio.



- 1 75% Colorbars, because it's the de facto standard test pattern in the video transmission world. A circle overlay can be added to this pattern using the A/B switch.
- 2 The moving Zoneplate was developed by the BBC to reveal scaling artifacts. If the native resolution of your display is the same as the selected format then there will be concentric

- circles moving like still water where a pebble was dropped. The appearances of faint circles outside the center are scaling artifacts – the stronger their appearance and their number indicate a poor scaling engine. The A/B switch has no effect on this pattern.
- 3 75% Red Flat-field was used in the past to check purity of CRT's – some patterns die hard. The A/B switch changes the flat field to a Cr Ramp used to check transmission path transparency. If a bit is not transmitted correctly then the ramp will be altered.
 - 4 75% Green Flat-field. The A/B switch selects a 4-pixel by 4-pixel black/white checkerboard pattern for alignment of 3D projection systems
 - 5 75% Blue Flat-field. The A/B switch changes the flat field to a Cb Ramp used to check transmission path transparency. If a bit is not transmitted correctly then the ramp will be altered.
 - 6 White Flat-field is a 75% grayscale. The A/B switch changes this to a 10-step grayscale stairstep pattern.
 - 7 Black Flat-field as the name suggest is luminance (Y) at zero level. The A/B switch changes this to a continuous grayscale ramp. In this ramp there is a black line marker indicating where 100% luminance is reached. The pattern then continues at 100% gray level until the edge of raster.
 - 8 Pathological test pattern. This pattern was designed to check the quality of clock recovery PLL's necessary for decoding SDI data streams. They invented this pattern because it contains data word that can't exist in real world video. It's called pathological for the mental state of engineers whose designs can't pass the test! The A/B switch changes this pattern to an A/V Sync test pattern, a video flash with a simultaneous tone burst. The audio and video happen precisely at the same time and people who like to test for audio/video delay (aka lip-sync or MPEG encoders) can use the video flash to trigger a scope while monitoring the tone burst and tell the exact A/V time relationship.
 - 9 Convergence cross-hatch is a requirement when doing multiple project alignment. It can also be used to converge your old CRT projectors. The A/B switch adds a circle for checking aspect and centering.

A YouTube[®] video is available which showcases the TG-5000 series test patterns including those available in the TG-5130. Click [here](#) to view.

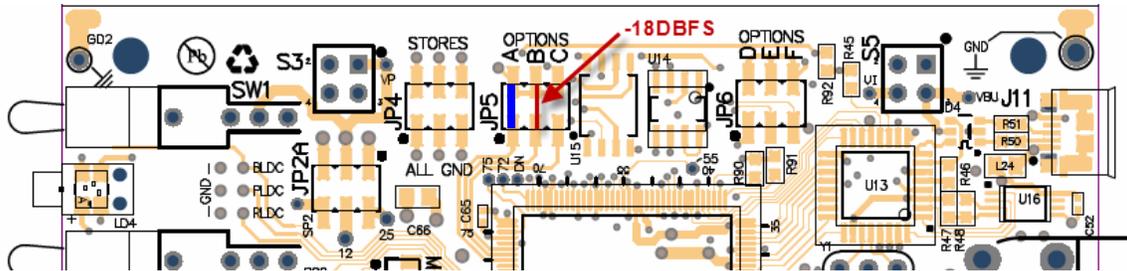
Custom Settings – Programmable Jumpers

There are a number of options offered to the user using internal 2mm jumpers. Spare jumpers are provided on JP4 on the main board and labeled "Stores", as in stores spare jumpers. JP5 and JP6 are main board option headers with positions labeled ABC and DEF respectfully. JP1 is the options header on the battery board - labeled HJKL. Please pay attention to the illustrations below because some jumpers go vertically (main board) and some go horizontally (battery board). Factory defaults are realized when all main board jumpers are: (1) on JP5 position "A" (vertically between pins 1 & 2); (2) all three spare jumpers are on SPARES, JP4; and, (3) battery board jumper is on K position (horizontally between pins 1 & 3).

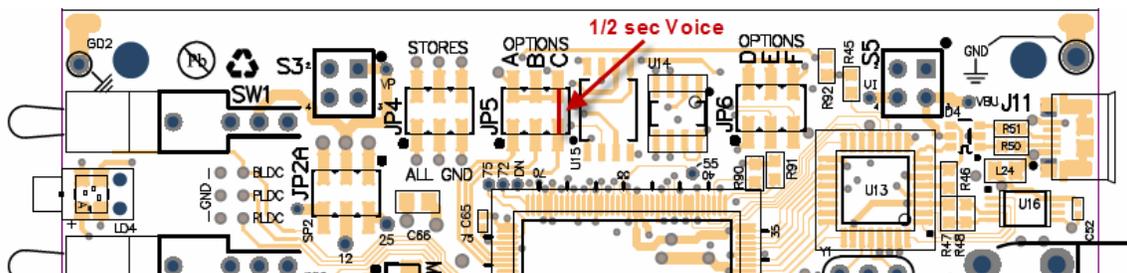
Audio Notes

The TG-5130 offers audio channel voice ID's and tone combinations for all 16 stereo channels allotted in the SD/HD-SDI specifications. When the voice ID's are enabled they repeat a specific channel ID every 15 seconds, leaving no doubt or confusion about the audio channel being monitored. Between the voice ID's, there are standard level audio tones for the RIGHT and LEFT channels within each group. The inclusion of standard level tones permits very accurate system leveling - both the US -20dBFS and the European -18dBFS full-scale levels are supported.

The selection between the US and European full-scale audio levels is by a jumper selection and cannot be changed without removing the case. After removing the case and battery board, locate the options header JP5. Using one of the spare jumpers on the SPARES header, JP4, jumper pins at the JP4 "B" position for -18dBFS levels. NOTE: The jumper at position JP5.A must be installed for normal operation.



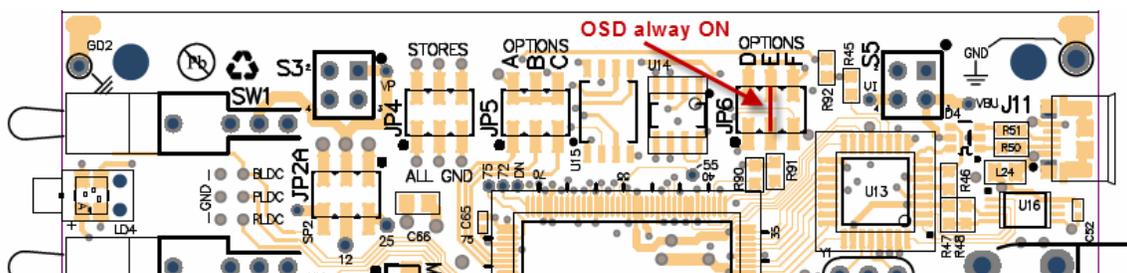
The Voice ID factory default is set for 1 second announcements and 14 seconds of tones which yield a 15 second cycle time. There is a jumper selection to cut the voice announcement time in half, basically by removing the word "Channel" from the voice tags. This yields a cycle time of 7.5 seconds. After removing the case and battery board, locate the options header JP5, and move the jumper to short pins at the "C" position for 0.5 second voice IDs.



NOTE: The audio tones and voice IDs are controlled for most patterns by means of the middle pushwheel, however in Pattern 8, A/V Flash, the audio is only a tone burst and the voice is always suppressed.

OSD

The unique feature of the TG-5130, when compared to the rest of the TG-5000 family, is its ability to insert a 20 character line of text on the screen. As shipped from the factory, this text appears only on the color-bar patterns; however, there is a user option to keep the OSD on all patterns. After removing the case and battery board, locate the options header JP6, and move the jumper to short pins at the "E" position to turn the OSD on for all patterns.



OSD Editor/Loader

The OSD Editor/Loader is a software application used to program the text string into the TG-5130. It is a simple interface with few options. It will NOT check your spelling, correct errors, or fetch and display the existing OSD text. This is a Microsoft OS program supporting Windows XP, 7, or 8 only. [Download](#) (←here) and install the program **WITHOUT** the TG-5130 connected to any USB port. If you are using a 64-bit machine the program will install in the following directory: C:/Program Files (86)/Maxtron Products/TG_OSD. After the software is installed, do NOT launch the program just yet, do this...

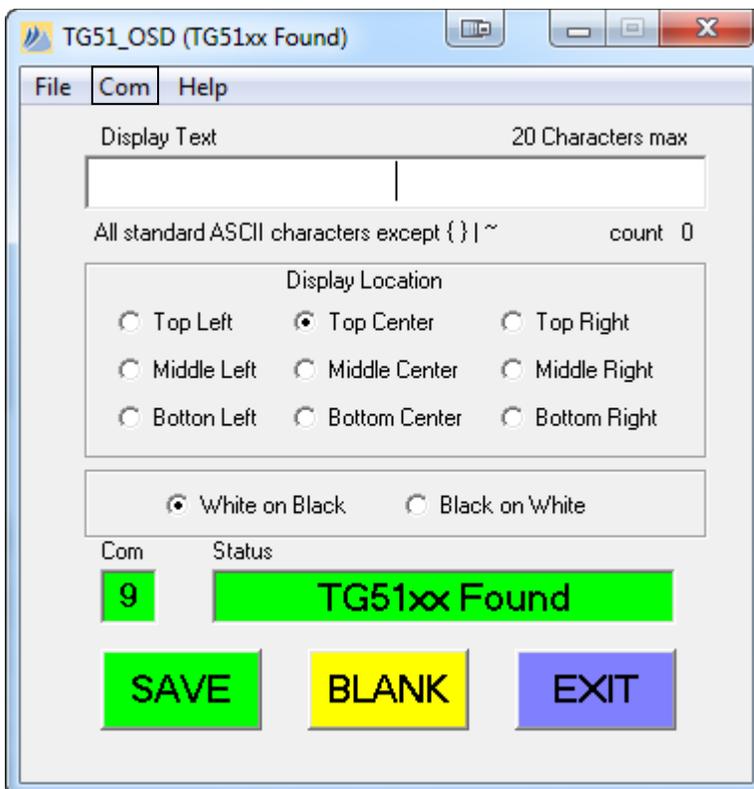
(1) Turn ON the TG-5130 set it to either pattern 0 or 1 (the OSD is not displayed on all test patterns) - it would be nice if the battery was charged! Now...

(2) Plug-in the USB cable from the TG-5130 to a spare USB port on the computer. If you are using Win 7/8 it should just install the correct driver, sometimes Win XP will want you to download a driver. The TG-5130 uses the FT245BT USB interface chip from FTDI and you can find the drivers here (www.ftdichip.com/FTDrivers.htm) - if you end up in a flower shop then you are in the wrong place. When the system is happy with the driver, you can...

(3) Launch the program (there will be an icon on the desktop).



(4) You will have no idea which COM port your computer chose to connect to the TG-5130 USB port, and neither do we. But we can help you find it - it usually is NOT COM1. Notice below that there is a "Com" menu item. Click on it and it will display all "in use" COM ports. Choose the highest numbered port to start. When you've found the right port you will see something like in the picture below. Chances are it will not be the same COM port that is in the picture - we don't care and neither should you.



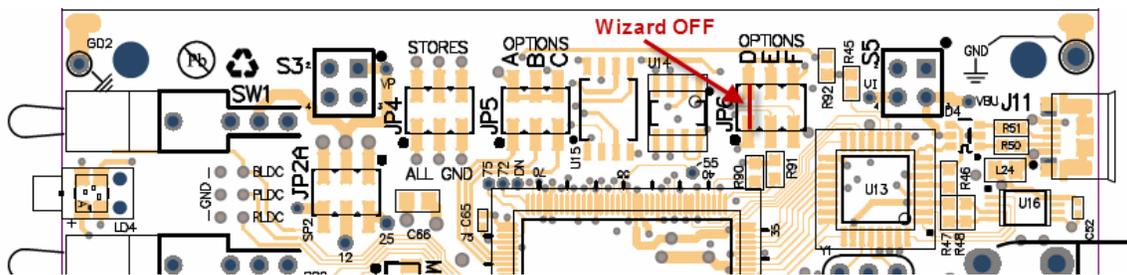
(5) Looking at the screen shot above, notice that little text box with the "|" in the middle. This is where you can enter the text you want displayed. ALL CAPS – no shift required! You may NOT use these characters { } | ~ or any accented characters. If you want to start over - hit BLANK. 20 characters MAX and, yes, "spaces" and "punctuation" count. Once you have the text like you like - choose where in the raster you would like for the text to appear. Good. Now decide if you want "White on Black" or "Black on White". Once you have all the options set, you can...

(6) SAVE - writes to the internal ROM in the TG-5130, and do check that it was written correctly by cycling the TG-5130 power. If it's all good - hit EXIT - and you are done.

(7) Remember, by default, the OSD does NOT appear on most of the TG-5130 patterns - just the with color bar patterns. And, if you don't want any text on any pattern at anytime; go to Step 5 and select BLANK, SAVE, power cycle to make sure it's blank, and then EXIT.

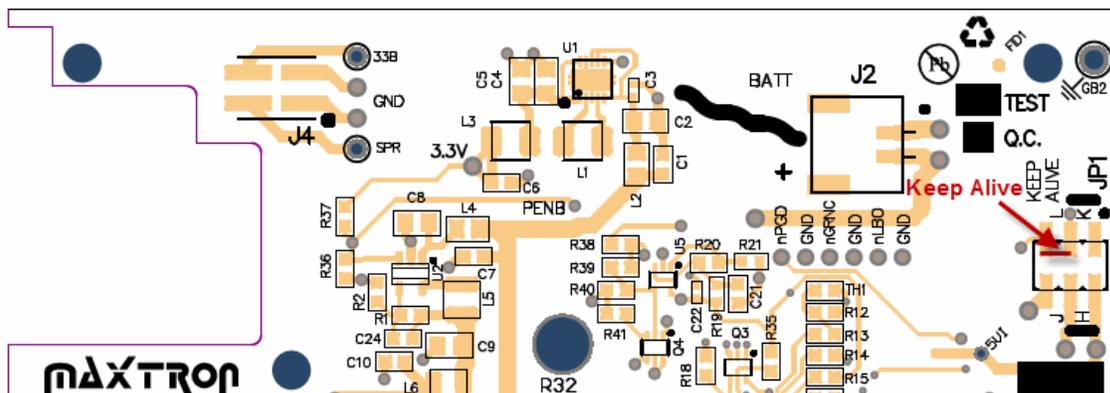
Traveling Wizard

Pattern 0 adds motion with a travelling wizard. The speed of the wizard and its direction change each time it hits a raster edge. If the user wants to eliminate the wizard, sadly there is an options jumper to do that. After removing the case and battery board, locate the options header JP6, and move the jumper to short pins at the "D" position to OFF the wizard.



Power

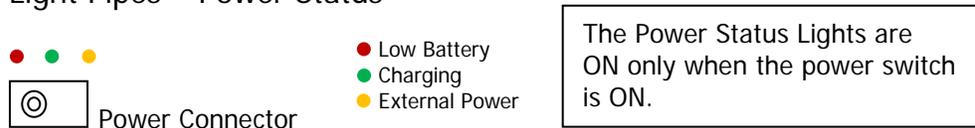
The TG-5130 includes a Li-ion battery pack and a SMART power circuit. If the unit is powered by the AC adapter and the power switch is ON when the mains are turned OFF, the unit will NOT switch over to battery. However, if maintaining power is desirable, an internal jumper can be set to select the battery power when input power fails. After removing the case locate the header JP1 on the battery board and move the jumper from the factory default "K" position to the "L" position to maintain power when input DC power is OFF – called KEEP ALIVE.



The TG-5130 internal Li-Ion battery charging circuitry protects and maximizes the life of the battery pack. The following information applies to battery operation.

- The external power supply both operates unit and charges battery at the same time.
- The charge time is faster if the unit is turned OFF.
- Battery type: 3.6V Li-Ion, typical run time is 4-5 hours when operated continuously.
- Typical battery charge time is 2-3 hours when unit is OFF.
- **Green** LED above the POWER connector is ON while charging and turns OFF when charging is complete.
- Complete suite of redundant protection circuits are provided to protect against:
 - Over-charge, over-discharge, and charging outside allowable temperatures.
- **Power Fail operation:** If AC power fails to the external power supply and KEEP ALIVE is enabled, the unit will automatically change over to battery. For this reason, in bench operation, it's wise to turn the unit OFF by its POWER switch, rather than using an external AC plug strip switch, as this will only needlessly discharge/charge the battery.

Light Pipes – Power Status



The TG-5130 rear panel adds three light pipes on top of the POWER connector to provide power status. The LED to the right is **Red** and lights when internal battery needs to be charged. The LED in the middle is **Green** and indicates that the battery is charging and within its allowable temperature and time range. To maximize battery operation the unit should be fully charged, as indicated by the **Green** LED being OFF when the unit is connected to an external power source. The LED to the left is **Yellow** and indicates that the unit is connected to an external 5V source.

Ordering Information

TG-5130 Base model with internal Li-Ion battery
PS-1512 Ultra Miniature power supply 5VDC, 1A, 100-240VAC, DC plug type EIAJ-2, 1.7mm x 4.0mm, center positive. This item is **included** with all TG-5000 series products.

Specifications & Features

- 2 SMPTE 259M/292M complimentary outputs
- 10 basic patterns / 19 including A/B modifier
- 2 SD formats and 8 HD formats
- Full 10-bit SD, 20-bit HD pattern generation
- 16-Channels of embedded audio with voicing ID and test tones
- Designed for Portable or Bench applications with lab quality
- Extremely small size - 4 x 2.5 x 1.25 inches
- 100-240VAC to 5V DC power supply included

Patterns A/B:

- RP219 with Moving Wizard/+Circle
- Full Field 75% Color bars/+Circle
- Moving Zoneplate
- Red/Cr Ramp

- Green/Checkerboard
- Blue/Cb Ramp
- White/10 Stairstep
- Black/Y Ramp
- Pathological/A/V Sync Flash
- Convergence/+Circle

Formats:

- 486i59.94 (NTSC)
- 576i50 (PAL)
- 720p59.94
- 1080i59.94
- 720p50
- 1080i50
- 1080p29.97
- 1080p23.98
- 1080(sF)24
- 1080p25

Audio:

- None
- Mute
- 1K/1K
- 1K/.4K
- .4K/1K
- .4K/.4K
- 1K/1K + Voice
- 1K/.4K + Voice
- .4K/1K + Voice
- 4.K/.4K + Voice

Warranty

Maxtron warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Maxtron will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to the address found at our website. www.maxtronproducts.com

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling, electrical or mechanical abuse, abnormal operating conditions or unauthorized modification to the product.

Units must be returned insured, with shipping charges prepaid. If not insured, shipper assumes the risk of loss or damage during shipment. Returned units must include a description of the problem, as well as the name of the person to contact in case there are any questions.

Maxtron makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Maxtron be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Maxtron has been advised of such damage.

Regulations & Compliance

Maxtron designs follow industry standard methods for minimizing the effects of EMI and RFI interferences as either the source or a victim of such interferences. However, there were no measurements made or required to indicate the degree of compliance to any standard or recommendation. Also, no warranties are made as to the public safety of the design as this product uses a commercially supplied or specified power supplies and PCB materials. No Underwriters Laboratory approvals are suggested or inferred, except for the supplied external power supply.

Basic Disclaimer!

Maxtron reserves the right to change or modify the features or specifications of this product at anytime without notice or the obligation to update or modify previously shipped products. While every effort is made to insure accuracy, Maxtron is not responsible for typographical errors in this document.