

FEATURES

- automatic cable equalization
- typically greater than 350 m of high quality cable at 270 Mb/s
- capability to drive 50 Ω loads (to V_{TT})
- elimination of differential feedback circuit used on GS9004A
- improved jitter response vs cable length
- fully compatible with SMPTE 259M and operational to 400 Mb/s
- signal strength indicator
- output 'eye' monitor
- 14 pin SOIC packaging
- single +5 or -5 volt power supply operation

APPLICATIONS

- Front-end cable equalization for digital video systems
- Input equalization for serial digital distribution amplifiers, routers, production switchers and other receiving equipment

ORDERING INFORMATION

| Part Number | Package Type | Temperature Range |
|-------------|------------------|-------------------|
| GS9004BCKB | 14 pin SOIC | 0°C to 70°C |
| GS9004BCTB | 14 pin SOIC Tape | 0°C to 70°C |

DEVICE DESCRIPTION

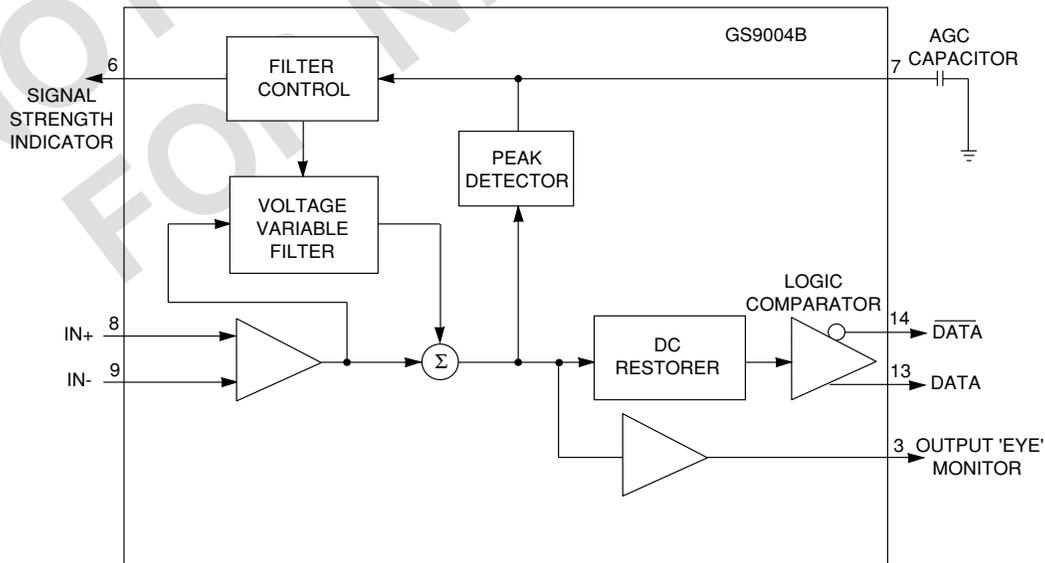
The Gennum GS9004B is an improved monolithic automatic cable equalizer developed for SMPTE/EBU scrambled NRZI Serial Digital Video signals.

While there are no plans to discontinue the GS9004B, Gennum has developed a successor product with improved features and performance called the GS9024. The GS9024 is recommended for new designs.

This device features DC restoration to pass the Pathological Test Signals and fully automatic equalization in order to meet the SMPTE 259M Serial Interface Standard. The DATA and $\overline{\text{DATA}}$ outputs typically deliver 800 mV (p-p) equalized signals into 50 Ω loads (to V_{TT}). These signals can be used to feed cable driver circuits for Serial Distribution Amplifier applications.

This device also incorporates an analog signal strength indicator (SSI) which provides a 0.5 V to 0 V output relative to V_{CC} , indicating the amount of equalization being applied to the signal.

The GS9004B features an OUTPUT 'EYE' MONITOR (OEM), which allows verification of signal integrity after equalization, prior to reslicing. Operating with a single +5 or -5 volt supply, the GS9004B typically draws 52 mA of current.

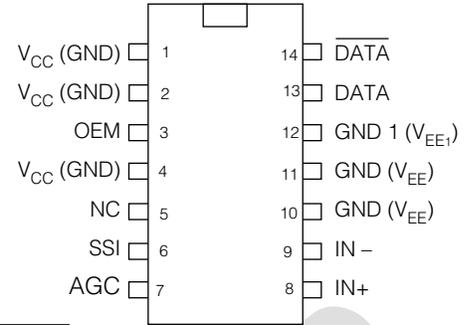


FUNCTIONAL BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

| PARAMETER | VALUE |
|--------------------------------------|---|
| Supply Voltage (V_S) | 5.5 V |
| Input Voltage Range (any input) | $V_{CC}+0.5$ to $V_{EE} -0.5$ V |
| DC Input Current (any one input) | 10 mA |
| Power Dissipation | 500 mW |
| Operating Temperature Range | $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$ |
| Storage Temperature Range | $-65^{\circ}\text{C} \leq T_S \leq 150^{\circ}\text{C}$ |
| Lead Temperature (soldering, 10 sec) | 260°C |

GS9004B PIN CONNECTIONS



PIN DESCRIPTIONS (I = INPUT, O = OUTPUT, S = SUPPLY function)

| PIN NO. | SYMBOL | I/O | DESCRIPTION |
|---------|--------------------------|-----|---|
| 1 | V_{CC} (GND) | S | Most positive supply voltage (ECL outputs) |
| 2 | V_{CC} (GND) | S | Most positive supply voltage (DC Restore/Eye Monitor) |
| 3 | OEM | O | Output 'Eye' Monitor |
| 4 | V_{CC} (GND) | S | Most positive supply voltage (Equalizer) |
| 5 | NC | | No Connection |
| 6 | SSI | O | Signal Strength Indicator |
| 7 | AGC | I | AGC capacitor connection |
| 8 | IN+ | I | Non-inverting signal |
| 9 | IN- | I | Inverting signal |
| 10 | $\text{GND}(V_{EE})$ | S | Most negative supply voltage |
| 11 | $\text{GND}(V_{EE})$ | S | Most negative supply voltage |
| 12 | $\text{GND}1(V_{EE1})$ | S | Most negative supply voltage for EYE MONITOR |
| 13 | DATA | O | DATA (true) |
| 14 | $\overline{\text{DATA}}$ | O | DATA (inverse) |

GS9004B DC ELECTRICAL CHARACTERISTICS Conditions: $V_S = 5$ V, $T_A = 0^{\circ}$ to 70°C , $R_L = 100 \Omega$, to $(V_{CC} - 2)$ volts, unless otherwise shown.

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS | NOTES |
|------------------------------------|----------------------|----------------------------|--------|-----|-------|-------|--------------------------|
| Supply Voltage | V_S | Operating Range | 4.75 | 5.0 | 5.25 | V | |
| Power Consumption | P_D | | - | 285 | 360 | mW | |
| | | With MONITOR active | - | 330 | 415 | mW | |
| Supply Current | I_S | | - | 52 | 72 | mA | |
| | | With MONITOR active | - | 60 | 83 | mA | |
| Serial Data Output - High - Low | $V_{OH \text{ MIN}}$ | $T_A = 25^{\circ}\text{C}$ | -1.025 | - | -0.88 | V | with respect to V_{CC} |
| | $V_{OL \text{ MAX}}$ | $T_A = 25^{\circ}\text{C}$ | -1.8 | - | -1.6 | V | with respect to V_{CC} |

GS9004B AC ELECTRICAL CHARACTERISTICS Conditions: $V_S = 5$ V, $T_A = 0^{\circ}$ to 70°C , $R_L = 100 \Omega$, to $(V_{CC} - 2)$ volts, unless otherwise shown.

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS | NOTES |
|-----------------------------|-----------|--|-----|-----|-----|----------|----------------------------|
| Output Signal Swing | V_O | $T_A = 25^{\circ}\text{C}$ | 700 | 800 | 900 | mV | |
| Input Resistance(IN+, IN-) | R_{IN} | | 4k | 5k | - | Ω | see fig. 8 |
| Input Capacitance(IN+, IN-) | C_{IN} | $T_A = 25^{\circ}\text{C}$ | - | 1.3 | - | pF | see fig. 8 |
| Output 'Eye' Monitor | V_{OEM} | $R_L = 50\Omega$, To V_{CC} | - | 40 | - | mV p-p | |
| Signal Strength Output | V_{SS} | | 4.4 | - | 5 | V | see Fig. 5 |
| GS9004B GAIN | A_V | $T_A = 25^{\circ}\text{C}$ $f = 135$ MHz | 33 | 36 | - | dB | see Fig. 4 |
| JITTER (Added) 270Mb/s | t_j | $T_A = 25^{\circ}\text{C}$, 300m of 8281 cable. | - | 650 | - | ps p-p | Test setup 1 see Fig. 7 |

TYPICAL PERFORMANCE CURVES (unless otherwise shown $V_S = 5V$, $T_A = 25^\circ C$)

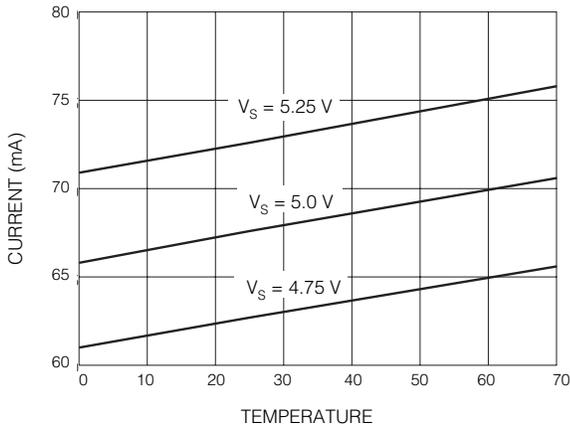


Fig. 3 Supply Current vs Temperature

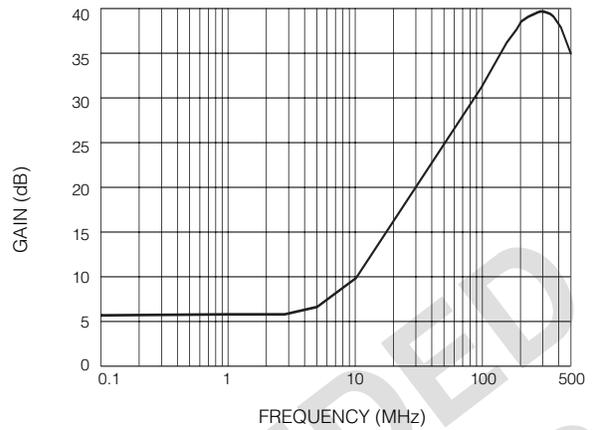


Fig. 4 Equalizer Gain vs Frequency

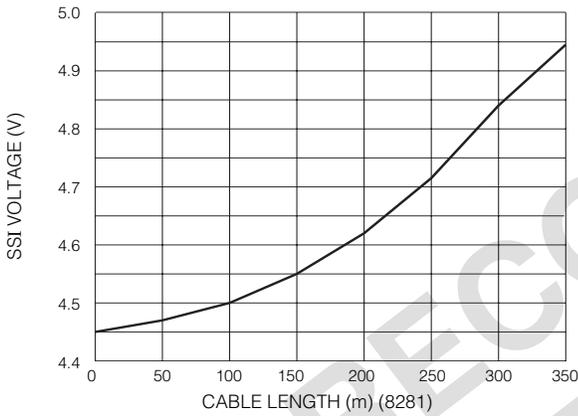


Fig. 5 Signal Strength Output Voltage vs Input Cable Length

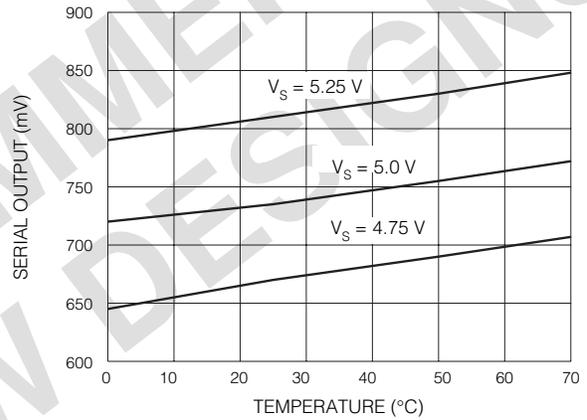


Fig. 6 Data and Data Output Voltage vs Temperature

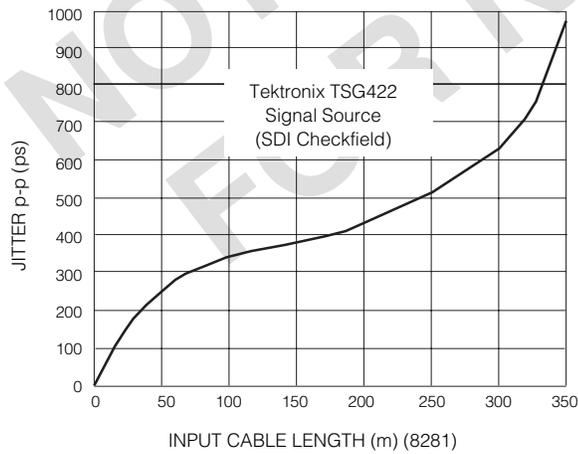


Fig. 7 Additive Jitter vs Input Cable Length at 270 Mb/s

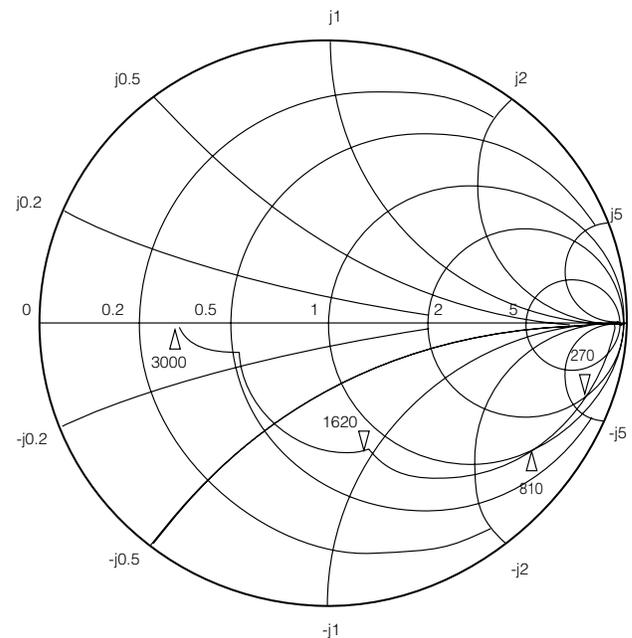
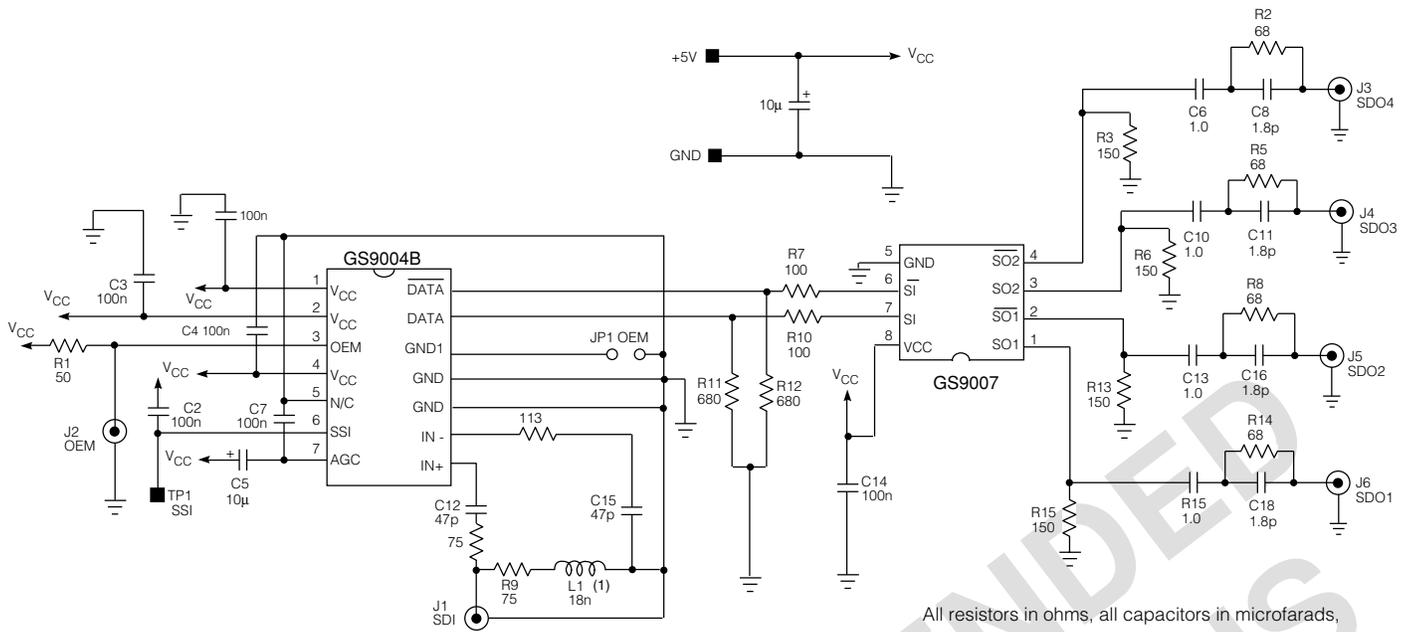


Fig. 8 Equalizer Input Impedance
Frequencies in MHz, impedances normalized to 50 Ω .



All resistors in ohms, all capacitors in microfarads, unless otherwise stated.

(1) L1 provides input return loss compensation.

The choice of value is PCB layout dependant.

Fig. 9 Typical Application Circuit

APPLICATIONS

For information on PCB layout for the GS9004B, please refer to document number 521 - 46 - 01 "EB9004/7A Non - Reclocking Equalizer Evaluation Board".

CAUTION
ELECTROSTATIC
SENSITIVE DEVICES
DO NOT OPEN PACKAGES OR HANDLE
EXCEPT AT A STATIC-FREE WORKSTATION



DOCUMENT IDENTIFICATION: DATA SHEET

The product is in production. Gennum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.

REVISION NOTES:

Watermark added.
For latest product information, visit www.gennum.com

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