

# QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 1016

## 5V TRIPLE HIGH SPEED VIDEO AMPLIFIER

LT6557 / LT6558

### DESCRIPTION

Demonstration Circuit 1016 (DC1016) is a 5V Triple High Speed Video Amplifier featuring the LT6557 or LT6558 in DFN packaging. The DC1016A–A version demonstrates the gain-of-two LT6557, while the DC1016A–B features the unity-gain LT6558. The board is designed to demonstrate AC-coupled performance in 5V single-supply operation.

The LT6557 and LT6558 include automatic internal biasing that is programmable with one resistor. Table 1 indicates the performance that is achieved with this evaluation board.

**Design files for this circuit board are available. Call the LTC factory.**

**Table 1. Performance Summary ( $T_A = 25^\circ\text{C}$ )**

PARAMETER	CONDITION	VALUE
Supply Voltage	Recommended Min/Max	+5V/+10V
Supply Current	$V^+ = 5V$	65mA
Input Impedance, INR, ING, INB		75 $\Omega$ to ground, ac-coupled internal signals
Output Impedance, OUTR, OUTG, OUTB		75 $\Omega$ , ac-coupled
CAL trace Impedance		75 $\Omega$ nominal
Gain (–A version)	Outputs terminated into 75 $\Omega$	0dB nominal
	Outputs terminated into High impedance	+6dB nominal
Gain (–B version)	Outputs terminated into 75 $\Omega$	–6dB nominal
	Outputs terminated into High impedance	0dB nominal
Frequency Response	$V_{IN} = 125mV_{PP}$ (–16dBm), –3dB, $R_L = 75\Omega$	7Hz to 380MHz typical
	$V_{IN} = 125mV_{PP}$ (–16dBm), $\pm 0.1$ dB, $R_L = 75\Omega$	7Hz to 130MHz typical
Crosstalk	Worst-case All Hostile, 10MHz	–75dB typical
	Worst-case All Hostile, 100MHz	–55dB typical
Input Signal Voltage Range	+5.0V Supply, No Output Clipping	$\pm 0.6V$ about average dc (–A)
		$\pm 1.2V$ about average dc (–B)
On/Off Control Input	Logic Low Voltage (Amplifiers ON)	$\leq (V^+ - 2)V$
	Logic High Voltage (Amplifiers OFF)	$\geq (V^+ - 0.5)V$ or open circuit

### OPERATING PRINCIPLES

DC1016 provides three identical channels of wideband signal amplification suitable for driving HDTV or high-resolution RGB video display cables. The LT6557 provides a gain of two for driving terminated video cables and the LT6558 has unity gain for use with high-impedance loads. Each amplifier section is provided with

series “back-termination” at the outputs (included on the board), which results in unity gain transmission of a video signal to a destination load (75 $\Omega$  for –A; 1k $\Omega$  or more for –B). Each input is dc terminated to analog ground to properly load the input signal cable. The inputs are ac-coupled after termination to eliminate input

biasing requirements. The outputs are also ac-coupled to eliminate the amplifier bias from passing to the load.

The dc-biasing at the amplifier inputs is programmed by the R7 resistor value. The internal input biasing circuitry behaves as a soft clamp, minimizing the need for external components in the signal path. The bias point is relatively fixed and independent of supply voltage changes. R7 and the input coupling capacitors may be removed if direct dc drive to the amplifiers is desired.

A jumper, JP1, allows the LT6557 or LT6558 to be forced to an ENABLE condition. If JP1 is left in the EXTERNAL position, then enabling the LT6557 or LT6558 is accomplished by pulling down the EN connection at least 2V below V+ by connection to E1 or J1. A 40k $\Omega$  pull-up resistor

internal to the IC will provide a default shutdown mode of operation if the control input is left open-circuit; this allows open-collector type control of the amplifiers.

A CAL trace is also provided on DC1016 to provide a means of precision calibration for a Network Analyzer (use the CAL connections when performing the "THRU" transmission calibration). The CAL trace has the same electrical performance and delay as the transmission lines of the three signal channels, thereby allowing most circuit board and connector effects to be eliminated from the transmission measurements.

Figure 4 shows the material list of the components used by DC1016, and Figure 5 shows the electrical interconnection.

## QUICK START PROCEDURE

Demonstration Circuit 1016 is easy to set up to evaluate the performance of the LT6557 or LT6558. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

**NOTE:** Due to the Ultra High Frequencies (UHF) involved, RF measurement practices are required to accurately evaluate the performance of the board.

1. Place jumpers in the following positions:

**JP1**    ENABLE

2. Prior to connecting the power supply, preset the output voltage to +5V, or to the desired level, if different.
3. With power off, connect the power supply to V+ and GND using banana-plug cables.
4. If using a Network Analyzer, perform the THRU transmission cal with all cabling, adapters, impedance

converters, etc. in place, and using the DC1016 CAL trace as the reference 0dB path.

5. Energize the power supply.
6. Connect the Network Analyzer (if used) to the appropriate channels to measure frequency response and crosstalk as desired. Figure 2 shows a typical transmission plot.
7. For video-signal evaluation, connect a component-video signal source to the inputs and a monitor and/or video analyzer to the outputs, using equal-length cabling amongst the three video channels. Figure 3 shows a typical pulse response.
8. To evaluate the shutdown mode, disconnect or relocate the JP1 jumper to the EXT position (with no connections made at EN, or if present, a logic high provided).



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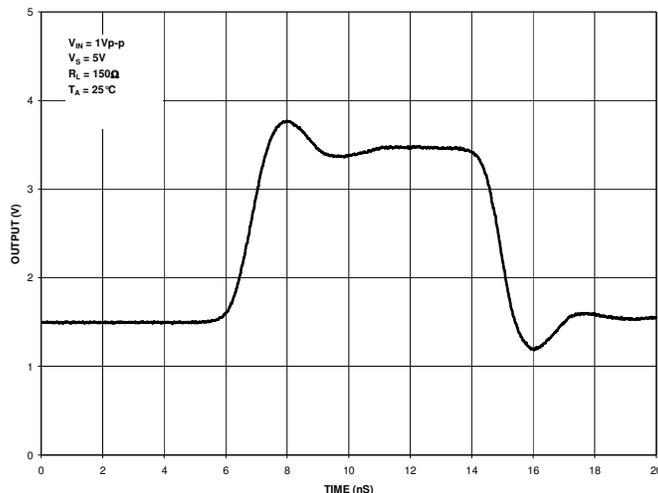


Figure 3. Typical Time-Domain Transmission Response

Item	Qty	Ref - Des	Desc	Manufacturer's Part Number
1	1	C1	CAP, 0402 100nF 10% 16V X7R	MURATA GRM155R71C104KA88B or D
2	3	C2,C3,C11	CAP, 0402 10nF 10% 25V X7R	AVX 04023C103KAT
3	1	C4	CAP, 1210 10uF 20% 16V X5R	TAIYO YUDEN EMK325BJ106MN
4	3	C5,C6,C7	CAP, 1206 10uF 20% 6.3V X5R	TDK C3216X5R0J106M
5	3	C8,C9,C10	CAP, SVP 220uF 20% 6.3V ELEC	SANYO 6SVP220MX
6	1	C12	CAP, 0603 2.2uF 20% 10V X5R	TDK C1608X5R1A225M
7	2	E3,E1	TURRET	MILL-MAX 2501-2
8	1	JP1	HEADER, 3 PINS 2mm	SAMTEC TMM-103-02-L-S
9	1	J1	CONN, BNC 5 PINS	CONNEX 112404
10	2	J3,J2	JACK, BANANA	KEYSTONE 575-4
11	8	J5-J12	CONN, BNC, RIGHT ANGLE	CANARE BCJ-BPLH
12	6	R1,R2,R3,R4,R5,R6	RES, 0402 75 OHM 1% 1/16W	AAC CR05-75R0FM
13	1	R7	RES, 0402 412 OHMS 1% 1/16W	AAC CR05-4120FM
14	3	R8,R9,R10	RES, 0402 1 OHM 5% 1/16W	AAC CR05-1R0JM
15	1	R13	RES, 0402 51 OHM 5% 1/16W OPT	AAC CR05-510JM
16	1	U1	IC, LT6557CDHC	LINEAR TECH LT6557CDHC
17	1	JP1	SHUNT	SAMTEC 2SN-BK-G

Figure 4. DC1016 Bill of Material (–A version shown)

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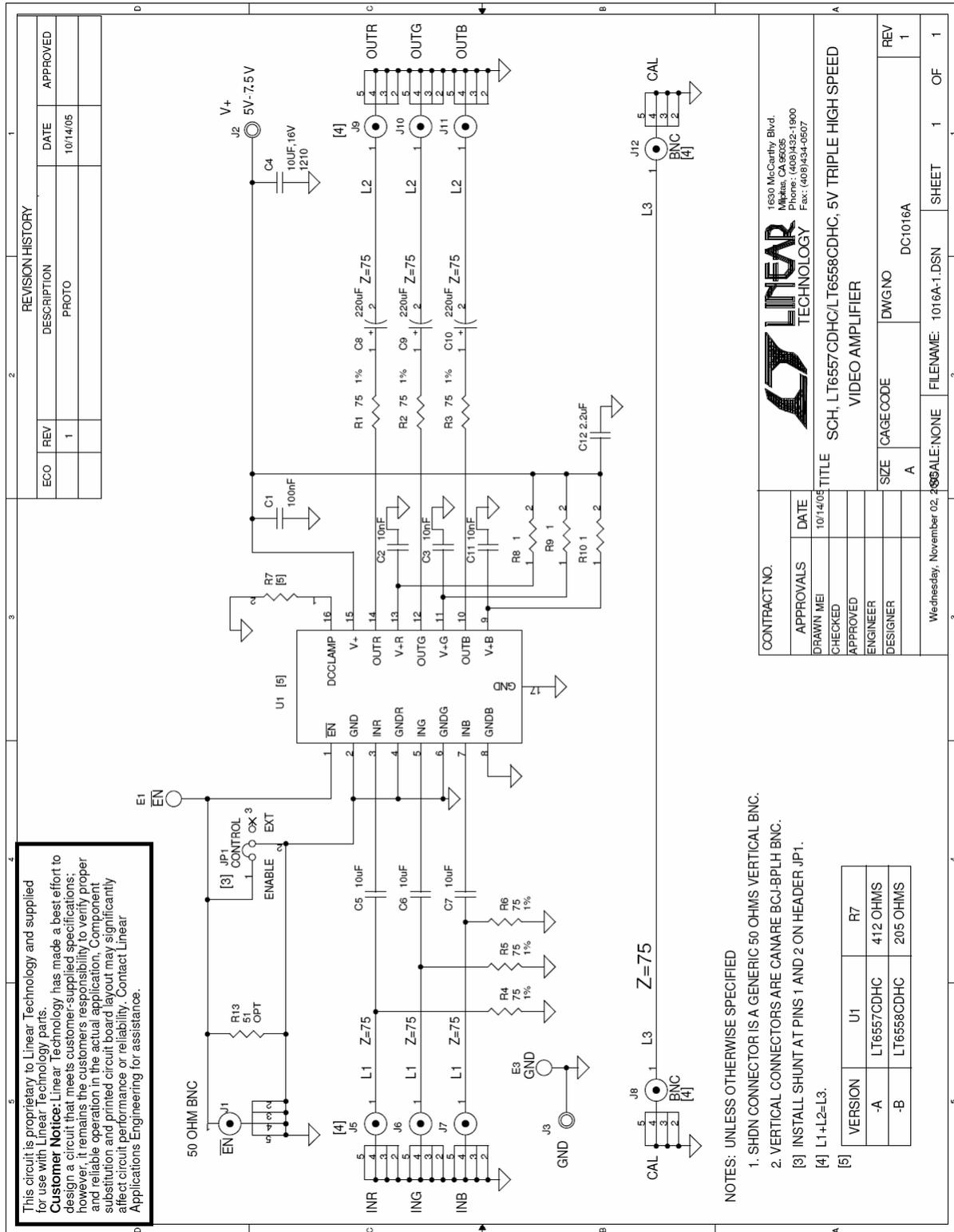


Figure 5. DC1016 Electrical Schematic Diagram

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