DESCRIPTION

Demonstration Circuit 714 (DC714) is a Triple High Speed Video Amplifier featuring the LT6553. This circuit is designed to demonstrate DC-coupled performance in either split- or single-supply operation. 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°C)

PARAMETER	CONDITION	VALUE
Supply Voltage	Split supply operation, Min/Max	±2.3V/±6V
	Single supply operation, Min/Max	+4.5/+12V
Input Impedance, INR, ING, INB		75Ω, dc-coupled to ground
Output Impedance, OUTR, OUTG, OUTB		75Ω, dc-coupled
CAL trace Impedance		75Ω nominal
Gain	Outputs terminated into 75Ω	0dB nominal
	Outputs terminated into High impedance	+6dB nominal
Bandwidth	–3dB, Small Signal	600MHz typical
Crosstalk	Worst-case All Hostile, 10MHz	–75dB typical
	Worst-case All Hostile, 100MHz	–50dB typical
Input Signal Voltage Range (note: feedback resistor connections tied to ground on printed circuit)	±3.3V Split Supply, No Output Clipping	±0.7V
	±5.0V Split Supply, No Output Clipping	±1.5V
	+9.0V Single Supply, No Output Clipping	+1.0 to +3.5V
On/Off Control Input	Logic Low Voltage (Amplifiers ON), DGND = 0V	≤0.8V
	Logic High Voltage (Amplifiers OFF), DGND = 0V	≥2.0V (5.5V max)

OPERATING PRINCIPLES

DC714 provides three identical channels of wideband signal amplification suitable for driving HDTV or high-resolution RGB video display cables. Each amplifier section of the LT6553 provides a fixed gain of 2, and with series “back-termination” at the outputs (included on the board), results in unity gain transmission of a video signal to a destination load. Each input is terminated to analog ground to properly load the input signal cable.

To minimize ingress of external digital ground noise, the DGND logic reference input is decoupled from analog ground within the LT6553. DC714 includes a jumper, JP2, which allows the DGND to be strapped to the local analog ground (AGND); for example, when the logic source is floating or none is used during the evaluation. DGND may be left uncommitted with JP2 in the FLOAT position.

Another jumper, JP1, allows the LT6553 to be forced to an ENABLE condition. If JP1 is left in the EXTernal position, then enabling the LT6553 is accomplished by pulling down the EN connection to a level near that of DGND via connection to E1 or J1. A pull-up resistor internal to the LT6553 will provide a default shutdown mode of op-

eration if the control input is left open-circuit. NOTE: DO NOT open-circuit EN if V+ is more than 5.5V above DGND; refer to LT6553 datasheet for application details in this situation.

A CAL trace is also provided on DC714 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 circuit board and connector effects to be eliminated from the transmission measurements.

JP3 is provided as a convenience to eliminate having to externally short V– to GND in the case of SINGLE supply operation. Leave JP3 in the DUAL position when using split supplies.

Figure 4 shows the material list of the components used by DC714, and Figure 5 shows the electrical interconnection.

QUICK START PROCEDURE

Demonstration Circuit 714 is easy to set up to evaluate the performance of the LT6553. 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 LT6553.

1. Place jumpers in the following positions:

   JP1 ENABLE

   JP2 AGND

   JP3 DUAL

2. Prior to connecting the power supply, preset the output voltages to ±5V, or to the desired level, if different.
3. With power off, connect the power supplies to V+, 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 DC714 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).

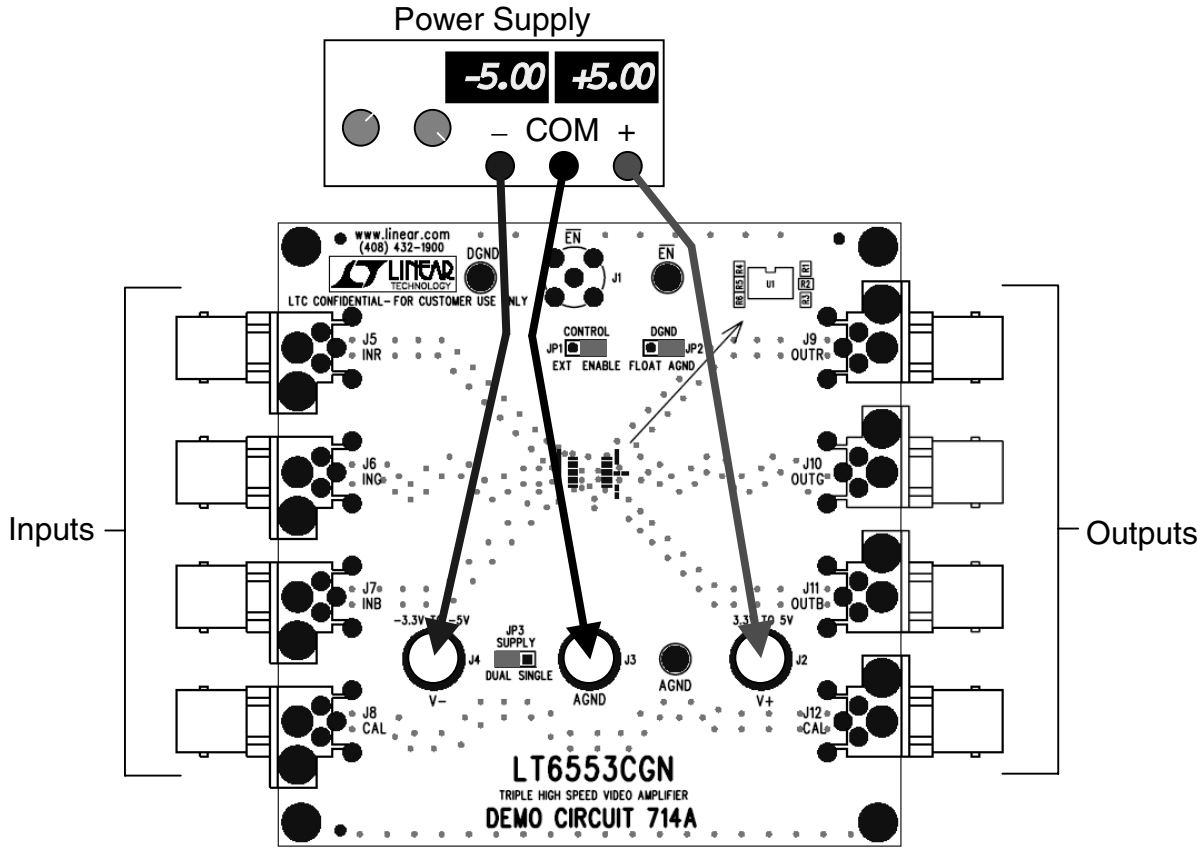

Figure 1. Recommended Demo Circuit Setup

Figure 2. Typical Transmission Frequency Response

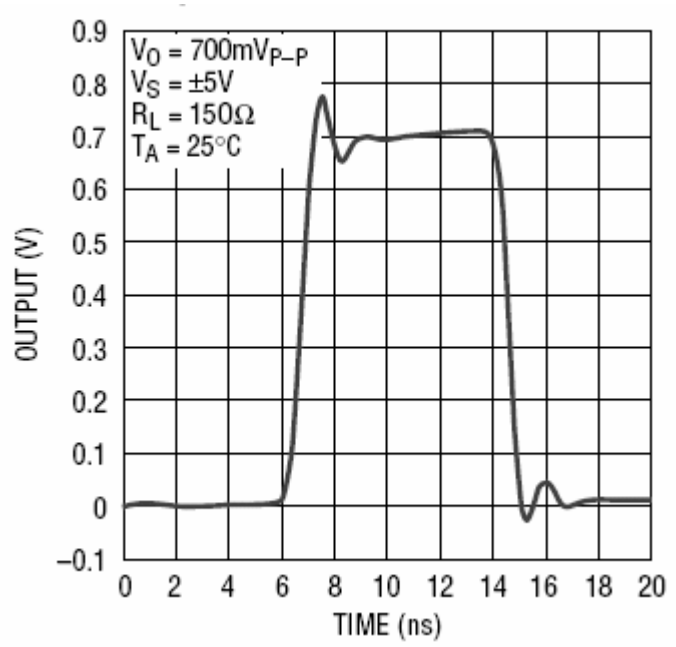

Figure 3. Typical Time-Domain Transmission Response

Item	*Qty*	*Reference*	*Part Description*	*Manufacture / Part #*
1	3	C1,C3,C8	CAP., X7R, 4700PF 50V, 10%, 0402	AVX, 04025C472KAT1A
2	3	C2,C5,C7	CAP., NPO, 470PF 25V, 10%, 0402	AVX, 04023A471KAT1A
3	2	C4,C9	CAP., X5R, 10uF 16V, 20%, 1210	TAIYO YUDEN, EMK325BJ106MN
4	1	C6	CAP., X7R, 1000PF 25V, 10%, 0402	AVX, 04023C102KAT1A
5	3	E1,E2,E3	TP, TURRET, .094"	MILL-MAX, 2501-2
6	3	JP1,JP2,JP3	JMP, 3PIN 1 ROW .079CC	COMM-CON, 2802S-03-G1
7	3	SHUNTS FOR JP1-JP3 (PIN 2 AND 3)	SHUNT, .079" CENTER	COMM-CON CCIJ2MM-138G
8	1	J1	CONN, BNC, 5 PINS	CONNEX, 112404
9	3	J2,J3,J4	JACK, BANANA,KEY-575	KEYSTONE, 575-4
10	8	J5-J12	CONN, BNC, RIGHT ANGLE	CANARE, BCJ-BPLH
11	6	R1,R2,R3,R4,R5,R6	RES., CHIP, 75 OHMS, 1/16W, 5% 0402	AAC, CR05-750JM
12	1	U1	IC., LT6553CGN, SSOP16GN	LINEAR, LT6553CGN
13	4	FOR 4 MTG	SCREW, #4-40, 1/4"	ANY
14	4	FOR 4 MTG	STANDOFF, #4-40 1/4"	MICRO PLASTICS 14HTSP101

Figure 4. DC714 Bill of Material

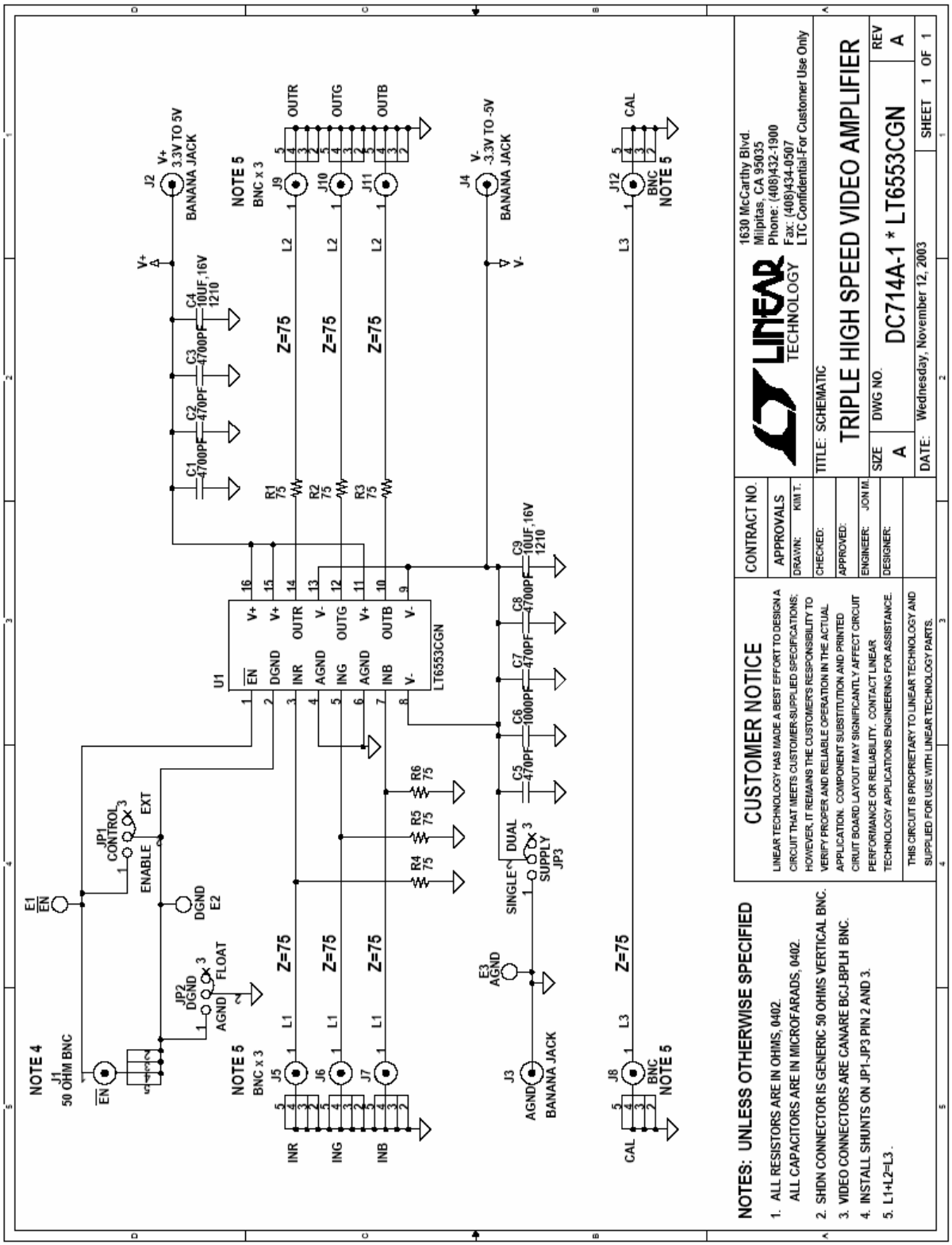

Figure 5. DC714 Electrical Schematic Diagram