

DESCRIPTION

The LT[®]1675 is a high speed RGB multiplexer designed for pixel switching and fast workstation graphics. Demonstration Circuit DC240 highlights some of the key characteristics of the LT1675 multiplexer. Foremost in importance is the small, 0.5-square inch footprint. This is accomplished by including six gain-setting resistors internally and using the 16-lead narrow SSOP package. Included on-chip are three SPDT switches and three

current feedback amplifiers. The current feedback amplifiers drive double-terminated 50Ω or 75Ω cables and are configured for a fixed gain of 2. Demonstration board DC240 has BNC connectors for six inputs and three outputs, as well as a Select input, which switches between inputs R₁G₁B₁ and R₂G₂B₂. Also included is an Enable BNC that is used to shut down the LT1675 to near 0mW.

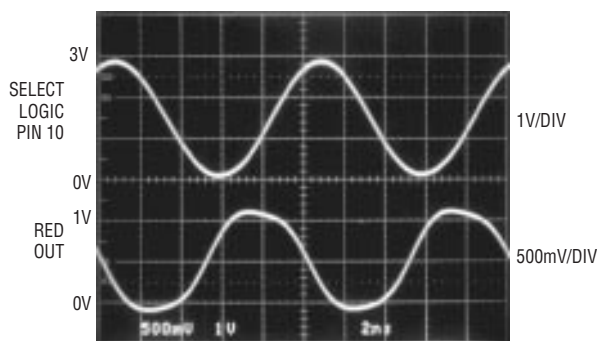
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PERFORMANCE SUMMARY

PARAMETER	CONDITIONS	TYPICAL VALUE	UNIT
Channel-to-Channel Select Time			
Delay Time	Measured from Time SELECT Pin Crosses Logic Threshold	5	ns
Switching Time	Time for V _{OUT} to Switch from 0V to 1V	2.5	ns
Small-Signal –3dB Bandwidth	Less than 1dB Peaking	250	MHz
Gain Flatness	Less than 0.1dB	70	MHz
Slew Rate	V _{OUT} = 5V _{P-P}	1100	V/μs
Channel Select Output Transient	Measured Between Back Termination and Load	50	mV _{P-P}
Output Current	V _{IN} = ±1V, V _{OUT} = 0V	70	mA

TYPICAL PERFORMANCE CHARACTERISTICS AND BOARD PHOTO

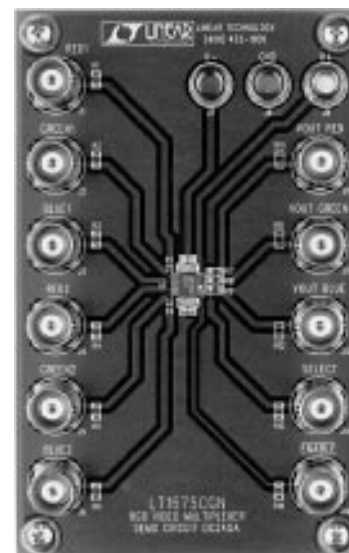
Select Pin Switches Inputs at 100MHz



RED 1 = 0V, RED 2 = 1V, R_L = 100Ω
 MEASURED BETWEEN 50Ω BACK TERMINATION AND
 50Ω LOAD

1674 TA02

Component Side (Board Photo)



DC240 BP

PACKAGE AND SCHEMATIC DIAGRAMS

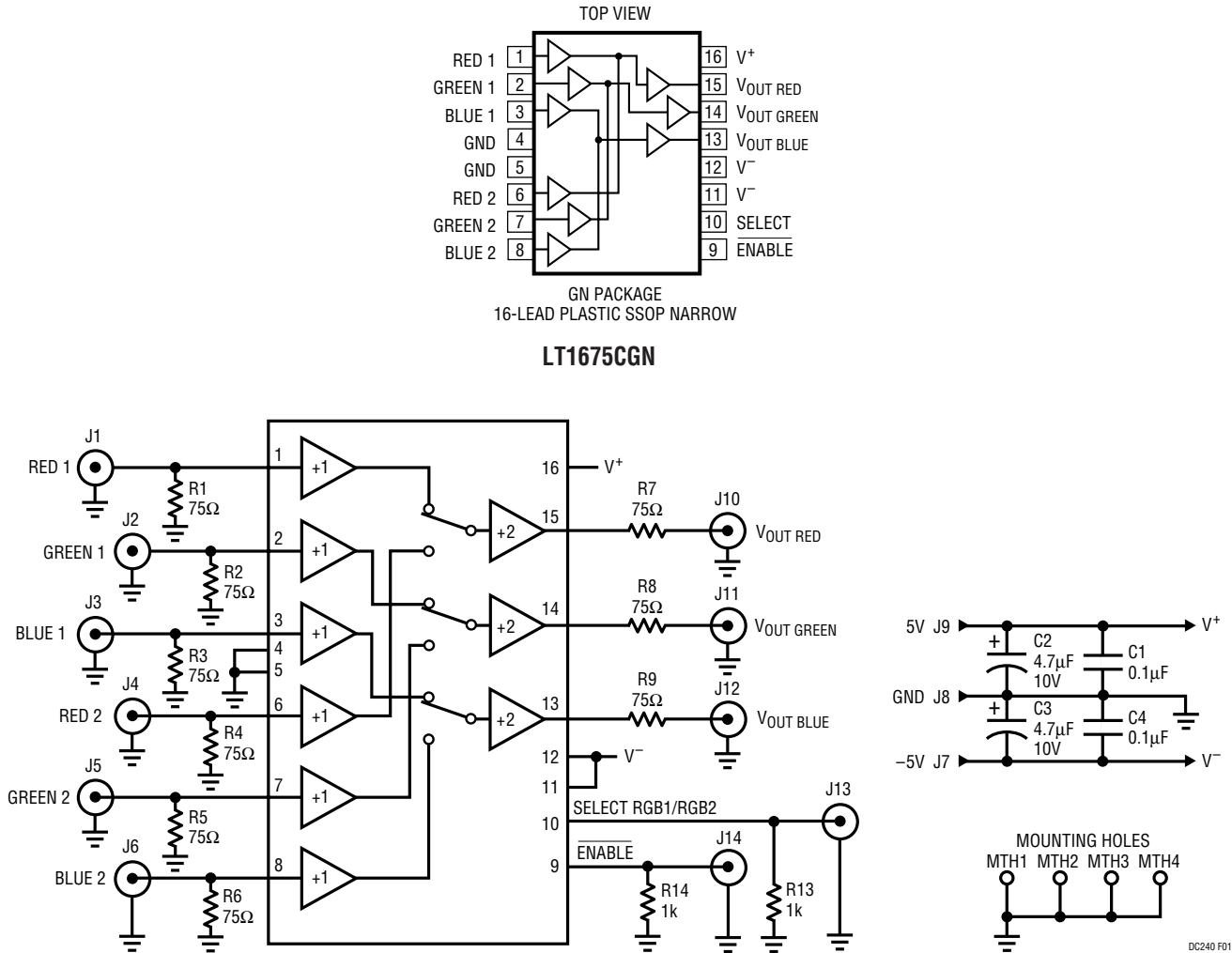


Figure 1. High Speed RGB MUX

PARTS LIST

REFERENCE DESIGNATOR	QUANTITY	PART NUMBER	DESCRIPTION	VENDOR	TELEPHONE
C1, C4	2	08053C103MAT1A	0.1μF 25V 20% X7R Capacitor	AVX	(843) 946-0362
C2, C3	2	TAJA475M010R	4.7μF 10V 20% Tantalum Capacitor	AVX	(207) 282-5111
J1 to J6, J10 to J14	11	112404	50Ω PCB-Vertical BND Connector	Connex	(805) 378-6464
J7 to J9	3	575-4	Standard Banana Jack Connector	Keystone	(718) 956-8900
R1 to R9	9	CR10-750JM	75Ω 1/10W 5% Chip Resistor	TAD	(714) 255-9123
R13, R14	1	CR10-102JM	1kΩ 1/10W 5% Chip Resistor	TAD	(800) 508-1521
U1	1	LT1675CGN	SSOP-16 RGB MUX IC	LTC	(408) 432-1900
	4	1902C	#4-40 1/2" Nylon Hex Standoff	Keystone	(718) 956-8900
	4		#4-40 1/4" Screw	(Any)	

OPERATION

6dB of Gain

DC240 showcases the excellent performance of the LT1675. This MUX has its internal gain set at +2V/V or 6dB, because it is designed to drive a double-terminated 50Ω or 75Ω cable that has an inherent 6dB loss. To aid in evaluation, three resistors, R10, R11 and R12, can be added to DC240 to simulate the 75Ω cable load. Without these resistors, the outputs of DC240 drive 75Ω cables directly.

Power Supplies

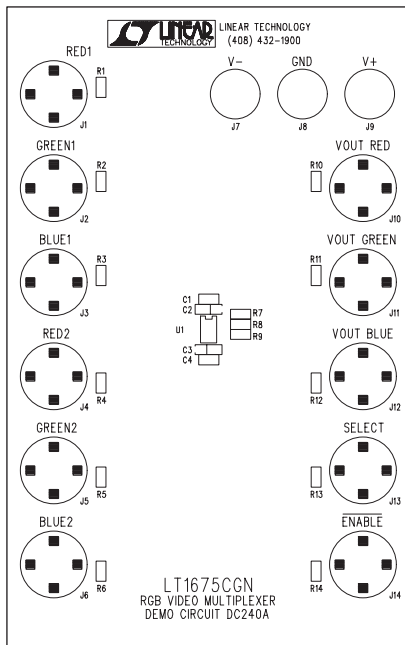
The LT1675 will function with supply voltages below ±2V (4V total); however, to ensure a full 1V_{P-P} video signal (2V_{P-P} at the output pins), the power supply voltage should be between ±4V and ±6V. The LT1675 is designed to operate on ±5V; at no time should the supplies exceed ±6V. DC240 has a 1k resistor between Pin 9 and ground, ensuring the LT1675 is active when power is applied. When the multiplexer is disabled with Pin 9 at V⁺, R14

draws 5mA of current from a ±5V supply. This does not represent the shutdown current of the LT1675, which is typically 1μA. R14 has been added only to aid in evaluation. Similarly, R13 on Pin 10 has been added to force the LT1675 to always select the RGB2 channels, and this resistor is also not necessary.

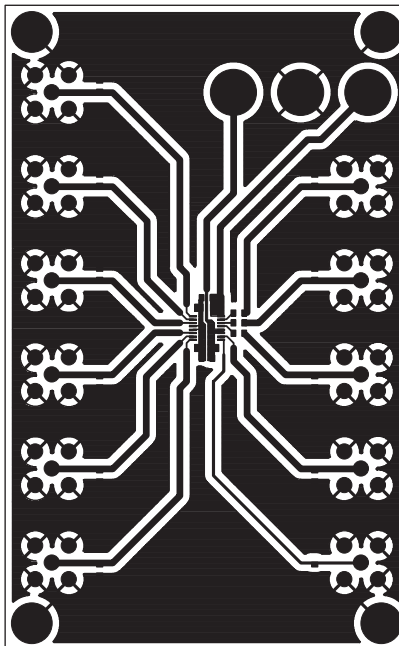
Expanding Inputs

In video-routing applications, where the ultimate speed is not mandatory, as it is in pixel switching, it is possible to expand the number of MUX inputs by shorting the LT1675 outputs together and switching with the $\overline{\text{ENABLE}}$ pins. The internal gain-set resistors have a nominal value of 750Ω and cause a 1500Ω shunt across the 75Ω cable termination. The effect of this loading is to cause a small gain error. For ten LT1675s (20 Red, 20 Green and 20 Blue) the gain error is only -1.7dB per channel.

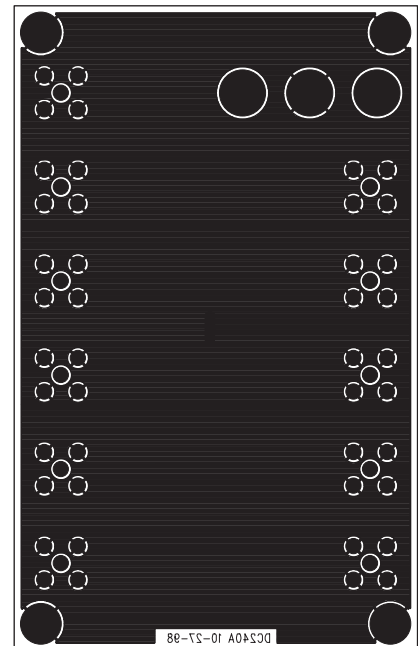
PCB LAYOUT AND FILM



Silkscreen Top

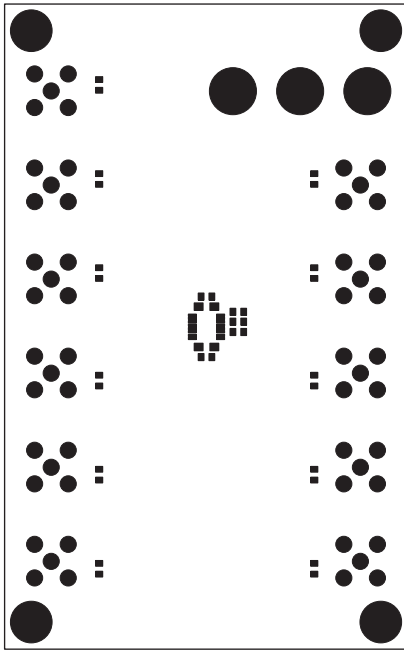


Copper Layer Top

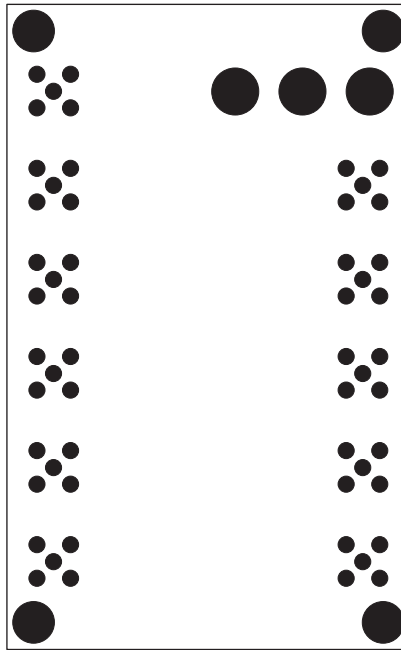


Copper Layer Bottom

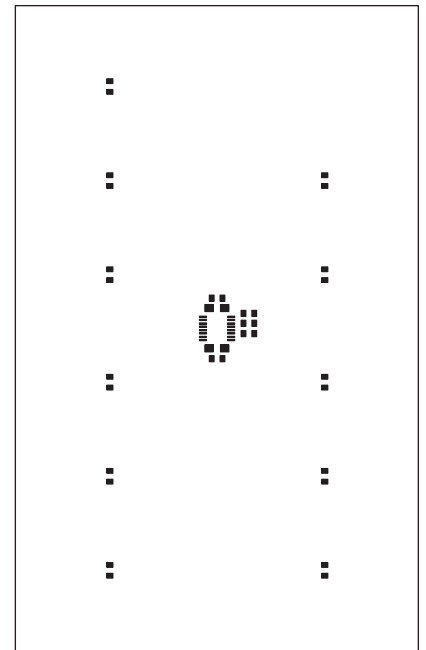
PCB LAYOUT AND FILM



Soldermask Top

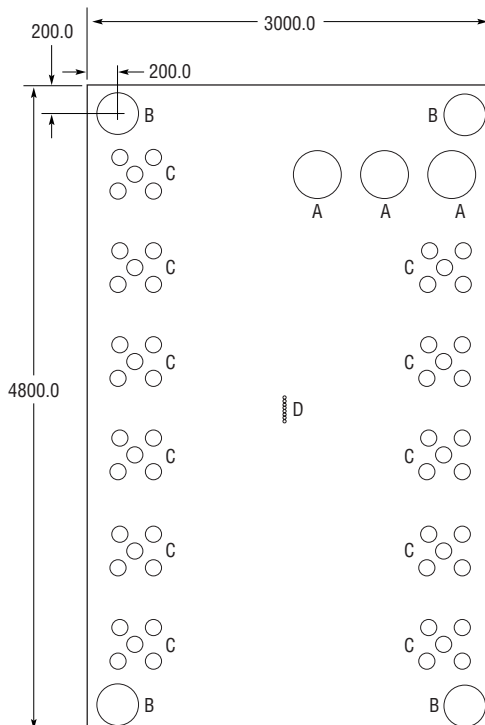


Soldermask Bottom



Pastemask Top

PC FAB DRAWING



SYMBOL	DIAMETER	NUMBER OF HOLES	PLATED
A	209	3	YES
B	120	4	YES
C	52	55	YES
D	15	8	YES

NOTES:

1. ALL DIMENSIONS ARE IN MILS ± 3
2. FINISHED MATERIAL IS FR4, 0.062 THICK, 2 OZ Cu, 2 LAYERS. PLATED HOLE WALL THICKNESS IS 0.001 MINIMUM
3. PROCESS/PLATING: SMOBC
4. SOLDERMASK BOTH SIDES USING GLOSSY GREEN LPI
5. SILKSCREEN WHITE NONCONDUCTIVE INK COMPONENT SIDE