DC426B DEMO BOARD QUICK START GUIDE

Description:

The DC426B demo circuit board is intended to demonstrate the capabilities of the LT®5511 high signal level upconverting mixer IC for 1900MHz infrastructure applications.

The LT5511 mixer IC is designed to meet the high linearity requirements of cable TV infrastructure downstream transmitters and wireless infrastructure transmit systems. The IC includes a differential LO buffer amplifier driving a double-balanced mixer. The LO, RF and IF ports can be easily matched to a broad range of frequencies for different applications. The high performance capability of the LO buffer allows the use of a single-ended source, thus eliminating the need for an LO balun.

The LT5511 mixer delivers +17dBm typical input 3rd order intercept at 950MHz, and +15.5dBm IIP3 at 1900MHz, with IF input signal levels of –5dBm. The input 1dB compression point is typically +6dBm.

The DC426B demo board is optimized to upconvert a 50MHz IF input to 1900MHz RF output with the LO injected from the high-side at 1950MHz.

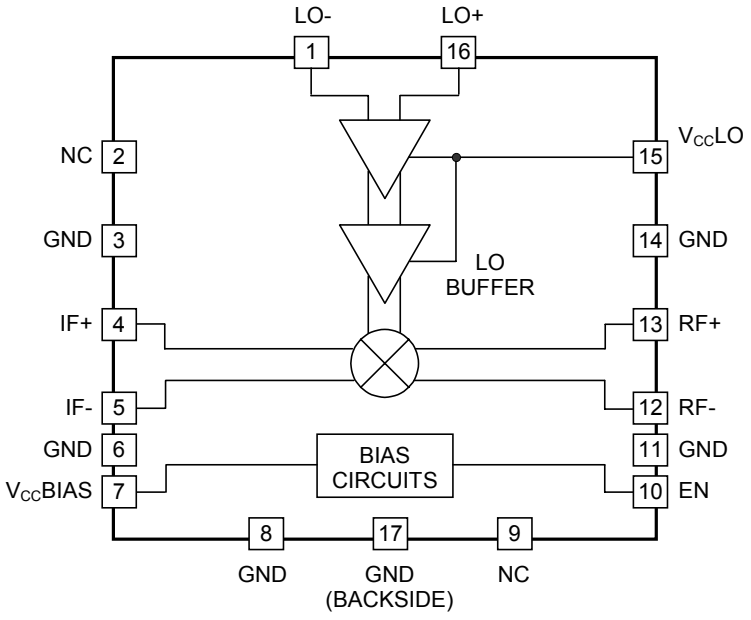


Figure 1. LT5511 IC Block Diagram

LT5511 Upconverting Mixer Single-Tone Measurements for 1900MHz Band.

1. Connect all test equipment as shown in Figure 2.
2. Set the Power Supply output voltage to 5V, and set the current limit to 100mA.
3. Set the dipswitch SW1 (Enable) to 1. Mixer is in ENABLE mode.
4. Set the Signal Generator #1 to provide a 1950MHz, -10dBm, CW signal to the demo board LOin port.
5. Set the Signal Generator #2 to provide a 50MHz, -5dBm, CW signal to the demo board IFin port.
6. Set the Spectrum Analyzer's center frequency to 1900MHz. Perform mixer conversion gain, and 1dB compression measurements.
7. Set the Spectrum Analyzer's center frequency to 1950MHz. Perform mixer LO to RF suppression measurement.
8. Set the Spectrum Analyzer's center frequency to 1850MHz and 2050MHz. Perform input 2^{nd} order distortion measurement. (IIP2 = 2 * P1 – P2 – Gc, where P1 is the power level of the desired output at 1900MHz, P2 is the largest 2^{nd} order product at either 1850MHz or 2050MHz, and Gc is conversion gain. P1 and P2 are in units of dBm, and Gc is in dB.)

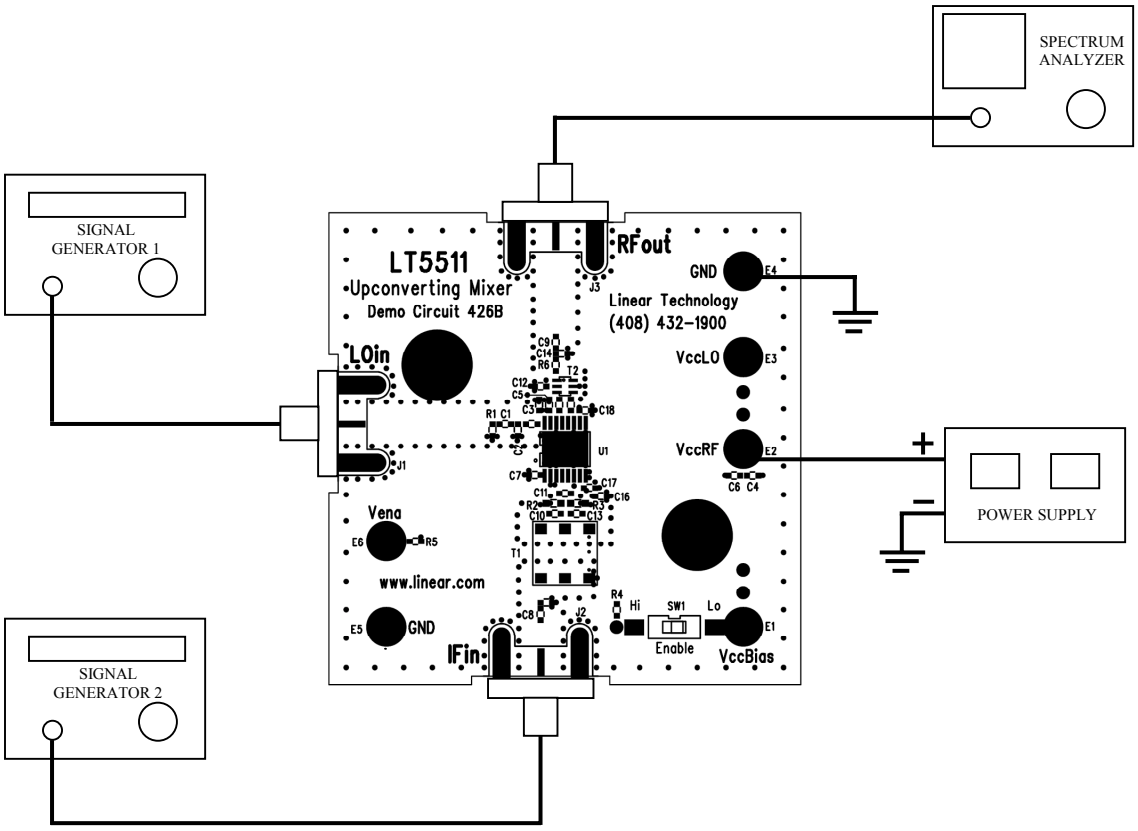


Figure 2. Test Set-Up for Mixer Single-Tone Measurements

LT5511 Upconverting Mixer Two-Tone Measurements for 1900MHz Band.

1. Connect all test equipment as shown in Figure 3.
   Note: 1). A high quality combiner that provides 50-ohm termination on all ports and has good port-to-port isolation should be used.
   2). The two 3dB attenuators on the inputs of the combiner are used to further improve source isolation.
2. Set the Power Supply output voltage to 5V, and set the current limit to 100mA.
3. Set the dipswitch SW1 (Enable) to 1. Mixer is in ENABLE mode.
4. Set the Signal Generator #1 to provide a 1950MHz, -10dBm, CW signal to the demo board LOin port.
5. Set the Signal Generator #2 and #3 to provide two -5dBm CW signals to the demo board IFin port—one at 50MHz, and the other at 51MHz.
6. Set the Spectrum Analyzer's center frequency to 1899.5MHz. Perform input 3rd order distortion measurement. (IIP3 = P1 + (P1 – P3) / 2 – Gc, where P1 is the lowest power level of the two desired output tones at either 1899MHz or 1900MHz, P3 is the largest 3rd order product at either 1898MHz or 1901MHz, and Gc is conversion gain. P1 and P3 are in units of dBm, and Gc is in dB.)

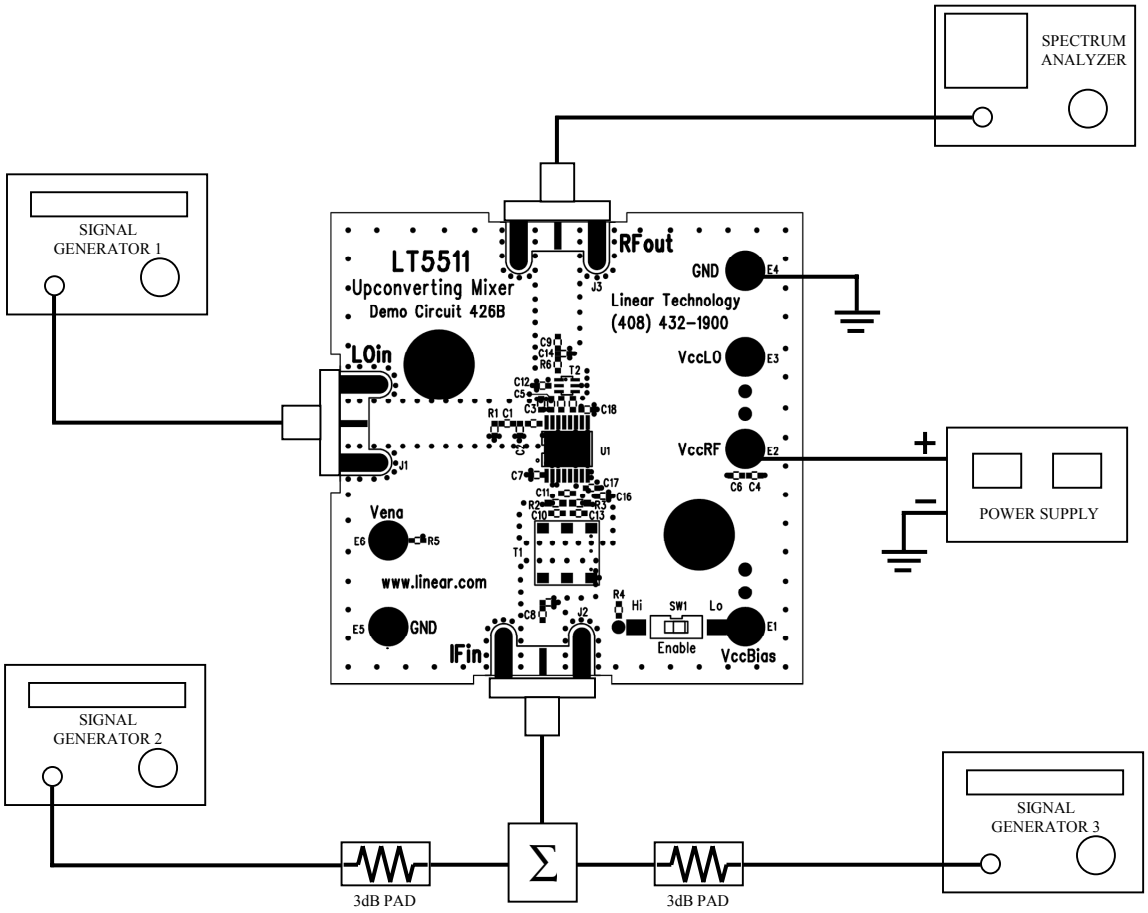
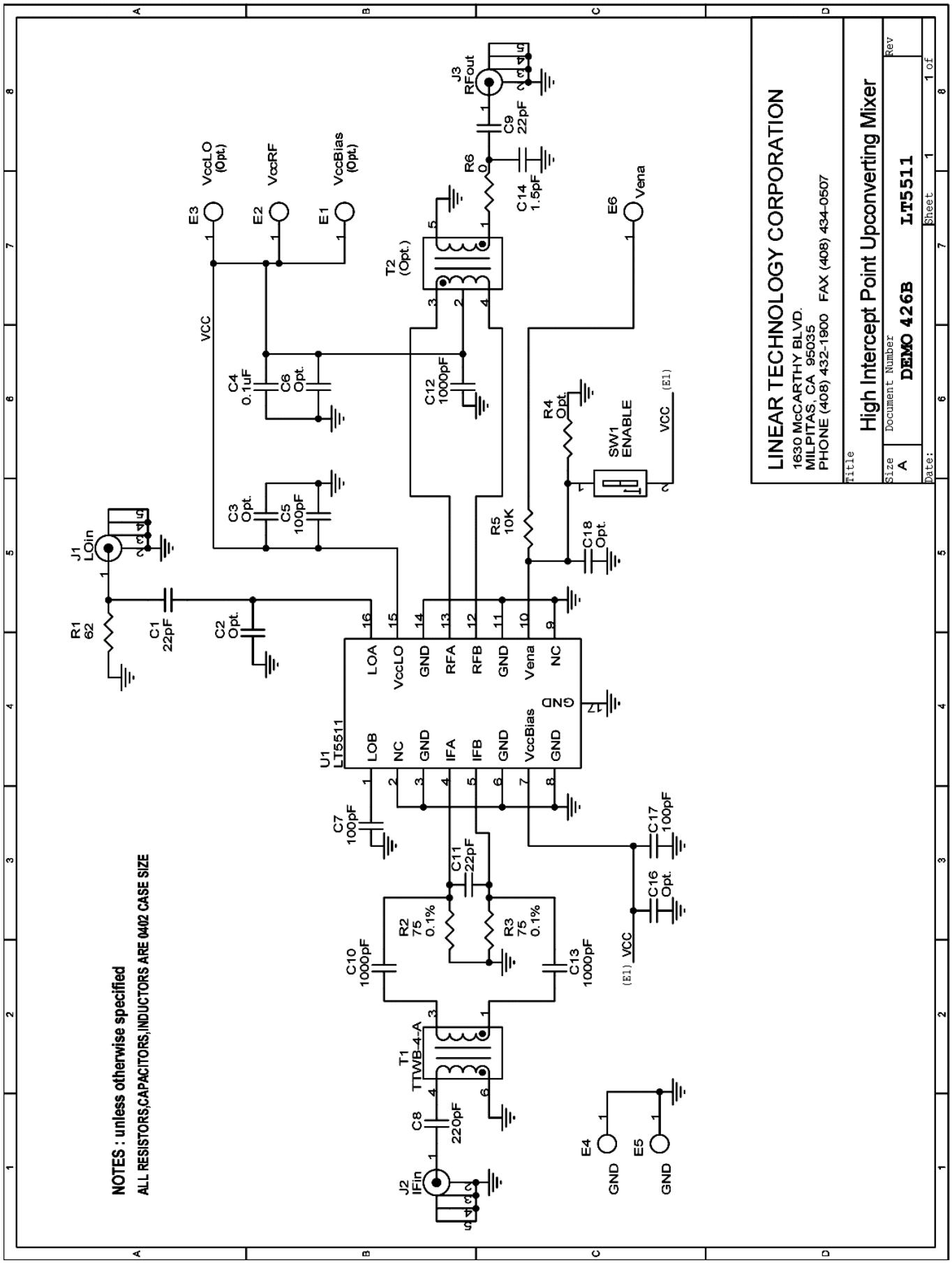


Figure 3. Test Set-Up for Mixer Two-Tone Measurements


LINEAR TECHNOLOGY CORPORATION
1630 McCARTHY BLVD.
MILPITAS, CA 95035
PHONE (408) 432-1900 FAX (408) 434-0507
Title
High Intercept Point Upconverting Mixer
Size A
Document Number DEMO 426B LT5511
Rev
Date:
Sheet 1 of
NOTES : unless otherwise specified
ALL RESISTORS,CAPACITORS,INDUCTORS ARE 0402 CASE SIZE
U1 LT5511
LOB NC GND IFA IFB GND VccBias GND
LOA VccLO GND RFA RFB GND Vena NC GND
T1 TTWB-4-A
T2 (Opt.)
J1 LOin
J2 IFin
J3 RFout
E1 VccBias (Opt.)
E2 VccRF
E3 VccLO (Opt.)
E4 GND
E5 GND
E6 Vena
SW1 ENABLE
R1 62
R2 75 0.1%
R3 75 0.1%
R4 Opt.
R5 10K
R6 0
C1 22pF
C2 Opt.
C3 Opt.
C4 0.1uF
C5 100pF
C6 Opt.
C7 100pF
C8 220pF
C9 22pF
C10 1000pF
C11 22pF
C12 1000pF
C13 1000pF
C14 1.5pF
C16 Opt.
C17 100pF
C18 Opt.
VCC
(E1) VCC
(E1) VCC

Linear Technology Corporation

LT5511EFE

Bill Of Material
Demo Bd. #426B
QTY- 100
10/29/02

Item	*Qty*	*Reference*	*Part Description*	*Manufacture / Part #*
1	1	C14	CAP., CHIP NPO 1.5pF 50V	MURATA GRM36COG1R5B050AQ 0402
2	3	C1,C9,C11	CAP., CHIP NPO 22pF 50V	MURATA GRM36COG220J050AQ 0402
3	3	C5,C7,C17	CAP., CHIP NPO 100pF 25V	AVX, 04023A101JAT 0402
4	1	C8	CAP., CHIP NPO 220pF 25V	AVX, 04023A221JAT 0402
5	3	C10,C12,C13	CAP., CHIP X7R 1000pF 50V	AVX, 04025C102JAT 0402
6	1	C4	CAP., CHIP Y5V 0.1uF 16V	AVX, 0402YG104ZAT1A 0402
7	0	C2,C3,C6,C16,C18	Option	
8	4	E2,E4,E5,E6	TURRET, PAD	MILL-MAX 2501-2 PAD .092"
9	0	E1,E3	Option	
10	3	J1,J2,J3	CONN. SMA 50-OHM EDGE-LAUNCH	E.F. JOHNSON 142-0701-851
11	1	R1	RES., CHIP 62 5%	AAC CR05-620JM 0402
12	2	R2,R3	RES., CHIP 75 0.1%	IRC PFC-W0603R-03-75R0-B 0603
13	0	R4	Option	
14	1	R6	RES., CHIP 0	AAC CJ05-000M 0402
15	1	R5	RES., CHIP 10K 5%	AAC CR05-103JM 0402
16	1	T1	TRASFORMER, WIDEBAND RF	COILCRAFT, TTWB-4-A
17	0	T2	OPTION	
18	1	SW1	SWITCH, SMT 1-POS. SPST	APEM DM01
19	1	U1	IC., LINEAR TECHNOLOGY	LINEAR TECH. LT5511EFE 16-TSSOP

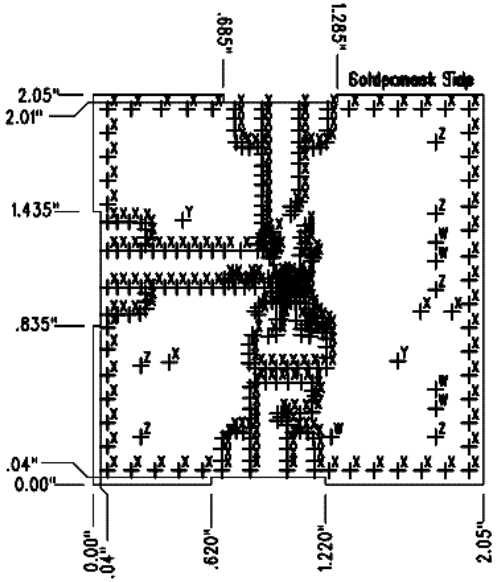
APPROVED VENDOR LIST

VENDOR	PHONE NUMBER	PART TYPE	WEBSITE ADDRESS
AAC (was TAD)	(800) 508-1521	CHIP RESISTORS	
AAC (was TAD)	(714) 255-9186		
AAVID	(714) 556-2665	HEAT SINKS	
ALLEN BRADLEY	(800) 592-4888	CARBON RESISTORS	
AMP	(717) 564-0100	PC MOUNT BNC	
APEM	(718) 246-1007	SMD TOGGLE/PB SWITCH	
API DELEVAN	(716) 652-3600	INDUCTORS	
AVX	(843) 946-0362	CHIP CAPS	
AVX	(843) 946-0524	CHIP RESISTORS	
AVX	(207) 282-5111	TANTALUM CAPS	
AVX	(843) 946-0323	HIGH VOLTAGE CAPS	
BERG	(800) 237-2374	CONNECTORS	
BH ELECTRONICS	(952) 894-9590	INDUCTORS	
BI TECHNOLOGIES	(714) 447-2656	TRANSFORMERS	
BI TECHNOLOGIES	(714) 447-2345	RES./RES. NETWORKS	
BOURNS	(801) 750-7253	POTENTIOMETERS, SIPS	
CADDOCK ELECTRONICS	(541) 496-0700	HIPO. RES., SIPS, DIPS	
CENTRAL SEMI	(631) 435-1110	SMALL SIGNAL DISCRETES	
CHICAGO MINIAT. LAMP	(201) 489-8989	LEDS	
COILCRAFT	(847) 639-6400	INDUCTORS	
COMM CON	(626) 301-4200	HEADERS, SHUNTS	
CONNEX	(805) 378-6464	BNC CONNECTORS	
COOPER ELECT. TECH.	(561) 752-5000	INDUCTORS	
CORNELL DUBILIER	(508) 996-8561	CAPACITORS	
CTS	(219) 293-7511	RESISTOR ARRAYS	
CUI-STACK	(503) 643-4899	POWER CONNECTORS	
DALE (see Vishay)	(605) 665-1627	INDUCTORS	
DALE (see Vishay)	(605) 665-9301	SENSE RESISTORS	
DATA DISPLAY PRODUCT	(800) 421-6815	LEDS	
DIODES INC.	(805) 446-4800	DIODES	
ELECTRONIC CONCEPTS	(908) 542-7880	400V FILM CAPACITORS	
EPSON	(310) 787-6300	CRYSTALS	
FAIRCHILD	(207) 775-4502	LOGIC	
FAIRCHILD	(408) 822-2126	MOSFETS	
FAIRCHILD	(888) 522-5372	CRG (CUST. RESPONSE)	
FCI	(717) 767-8005	HOT PLUG CONNECTORS	
FUKUSHIMA	(818) 765-8300	MPC RESISTORS	
FUJI	(201) 712-0555	SCHOTTKY DIODES	
GENERAL SEMICONDUCTOR	(516) 847-3000	DIODES	
GOWANDA	(716) 532-2234	INDUCTORS	
GRAYHILL	(708) 354-1040	DIP SWITCHES	
HARRIS	(800) 442-7747	LOGIC	
HEWLETT PACKARD	(800) 235-0312	IR LED	

HITACHI	(408) 433-1990	RF POWER AMPS
IDT	(408) 727-6116	LOGIC IC
IR	(310) 322-3331	MOSFETS
IRC	(361) 992-7900	SENSE RESISTORS
ITW PAKTRON	(708) 667-3444	CAPACITORS
JOHNSON COMPONENTS	(650) 948-6533	RF CONNECTORS
JOHNSON COMPONENTS	(760) 434-5961	RF CONNECTORS
KEMET	(408) 986-0424	TANTALUM CAPS
KEMET	(864) 963-6300	CRG (CUST. RESPONSE)
KETEMA	(714) 630-0081	SURGE SUPPRESSORS
KEYSTONE	(718) 956-8900	JACKS, TURRETS
LITEON	(408) 241-4588	LEDS, DIODES
LTC	(408) 432-1900	HIGH PERF. I.C.S
MAGNETICS	(800) 245-3984	TOROID CORES ETC.
MARCON	(847) 696-2000	HIGH C/V CAPACITORS
METHODE	(800) 323-6864	ZIF SOCKETS
MF ELECTRONICS	(914) 576-6570	CRYSTAL OSCILLATORS
MICROCHIP	(602) 786-7200	MICROCONTROLLER IC
MICRO PLASTICS	(870) 453-8861	NYLON STANDOFFS
MICRO-SEMI	(617) 926-0404	DIODES
MIDCOM	(605) 886-4385	INDUCTORS
MIDCOM	(800) 643-2661	INDUCTORS
MILL-MAX	(516) 922-6000	TURRETS
MINICIRCUITS	(718) 934-4500	RF TRANSFORMERS
MOTOROLA	(800) 441-2447	LOGIC, REGS
MURATA ELECTRONICS	(770) 436-1300	CAPS., INDUCTORS,
MURATA ELECTRONICS	(800) 831-9172	CRG (CUST. RESPONSE)
MURATA ELECTRONICS	(770) 433-5789	RF DEVICES
NEC/TOKIN	(510) 324-4110	INDUCTORS/HI C/V CAPS
NICHIA	(408) 573-0933	WHITE LEDS
NICHICON	(847) 843-7500	ELECTROLYTIC CAPACITOR
ON SEMICONDUCTOR	(602) 244-6600	DISCRETE DIODES ETC.
ON SHORE	(602) 921-3000	TERMINATORS
PANASONIC	(714) 373-7334	INDUCTORS, POLY CAPS
PANASONIC	(201) 348-5217	LEDS
PANASONIC	(201) 373-7334	SWITCHES
PERICOM	(408) 435-0800	LOGIC IC
PHILIPS	(914) 246-2811	INDUCTORS
PHILIPS	(914) 247-2036	PLANAR INDUCTORS
PHILIPS	(508) 851-2200	DISCRETES, I.C.s
PULSE	(619) 674-8100	INDUCTORS
QT OPTOELECTRONICS	(408) 720-1440	RF SWITCH
RAYCHEM	(800) 227-4856	FUSES
RG ALLEN	(818) 765-8300	METAL OXIDE RESISTORS
RF MICRO DEVICES	(336) 664-1233	RF2138 / RF2140
SAMTEC	(800) 726-8329	WIRE JUMPERS
SANYO	(619) 661-6835	OSCON CAPS

SCHOTT	(507) 532-3201	INDUCTORS, XFORMERS
SCHURTER	(707) 778-6311	FUSES AND HOLDERS
SIGNATRON	(909) 464-1883	DB9 CONNECTORS
SIEMENS	(108) 257-7910	OPTO
SILICONIX	(800) 554-5565	MOSFETS
SILICONIX	(408) 988-8000	MOSFETS
SPRAGUE	(207) 324-4140	CAPACITORS
SULLINS	(760) 744-0125	HEADERS, SHUNTS
SUMIDA	(847) 956-0667	INDUCTORS
SUMIDA	(408) 982-9660	INDUCTORS
TAIYO YUDEN	(408) 573-4150	CHIP CAPS / RES.
TAIYO YUDEN	(800) 348-2496	CRG (CUST. RESPONSE)
TEKTRONIX	(800) 835-9433	SCOPE PROBE SOCKETS
TEMIC	(408) 970-5700	IR PHOTO DIODE
THERMALLOY	(972) 243-4321	HEAT SINKS
THIN FILM TECHNOLOGY	(507) 625-8445	THIN FILM CHIP RESISTORS
TOCOS	(847) 884-6664	SMD POTENTIOMETERS
TOKIN (NEC)	(510) 324-4110	CAPS., INDUCTORS,
TOKO	(847) 699-3430	RF PRODUCTS
TOSHIBA	(714) 455-2000	SINGLE GATE LOGIC
TOSHIBA	(949) 455-2000	LOGIC
UNITED CHEMICON	(847) 696-2000	ELECTROLYTIC CAPACITOR
VISHAY	(605) 665-9301	ZENER/SM. SIGNAL DIODES
VISHAY	(605) 665-9301	INDUCTORS, SENSE Rs
VITRAMON	(203) 268-6261	CERAMIC CHIP CAPACITOR
WIMA	(914) 347-2474	PAPER/FILM CAPACITORS
ZETEX	(631) 366-5068	SMALL SIGNAL DISCRETES
ZIERICK	(800) 882-8020	STAKED PINS

REVISIONS			
REV	DESCRIPTION	APPR	DATE



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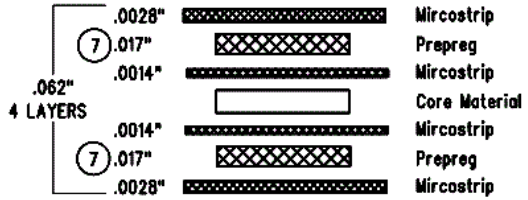
10	269	X	PLTD
120	2	Y	PLTD
95	6	Z	PLTD



NOTES: UNLESS OTHERWISE SPECIFIED

1. FAB PER IPC-A-600
2. MATERIAL: EPOXY FIBERGLASS, NEMA GRADE FR-4
   FINISHED THICKNESS TO BE .062 +/- .005 INCH
   WITH 2 OZ. COPPER ON TWO OUTER LAYERS AND
   1 OZ. COPPER ON TWO INTERNAL LAYERS.
   FLAMABILITY RATING: 94 V-0 MINIMUM .
3. SIZE: CUT TO DIMENSIONS AND TOLERANCES SHOWN.
   0.00 ARE PRIMARY DATUMS.
4. DRILLLING: DRILL HOLES PER SCHEDULE. PLATE THROUGH
   HOLES WITH COPPER, .001 INCH THICK MIN. ALL
   HOLE SIZES ARE SPECIFIED AFTER PLATING.
   HOLE LOCATION TOLERANCES ARE +/-.003
   INCH IN RELATION TO CENTER
5. FINISH: SMOBC USING WET MASK, OR LPI BOTH SIDES, GREEN
   PREFERRABLE. SILKSCREEN COMPONENT SIDE WITH
   WHITE NON-CONDUCTIVE INK.
6. CONTROLLED 50 OHM IMPEDANCE (AT 2.5 GHz FREQ.) FOR
   LAYER 1-2 AND LAYER 4-3.

(7) SUBJECT TO CHANGE BY MANUFACTURER, DEPENDING ON DIELECTRIC CONSTANT DEVIATIONS. PLEASE CONSULT LTC.

8. DO NOT ALTER ARTWORK e.g. TO ADD LOGO OR DATE CODE.
9. WHEN PANELIZED THIS BOARD. PLEASE MERGE TEST BOARD TOGETHER. THE TEST BOARD NEED TO BE BUILT IN THE SAME PANEL. MIN. BUILD ONE TEST BOARD EACH PANEL.

FAB DRAWING

APPROVALS		
	INIT	DATE
DRAWN		
CHECK		
DESIGN		
ENGR		
SCALE = NONE		

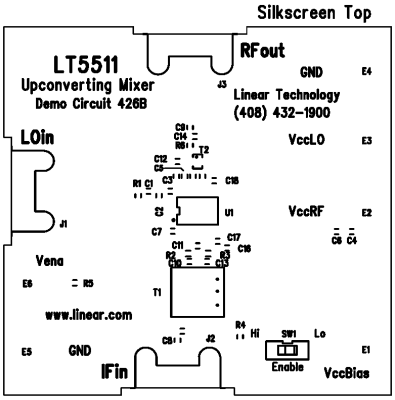
LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
PH: (408)432-1900

TITLE: LT5511
HIGH INTERCEPT POINT UPCONVERTING MIXER

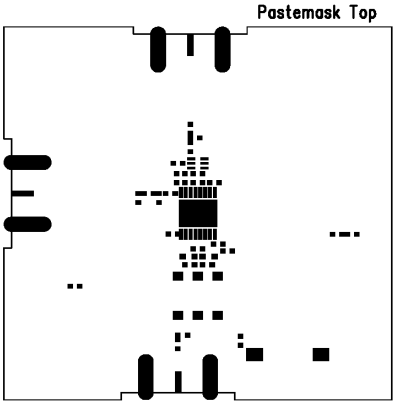
SIZE	DEMO	REV.
A	426B	

SHT 1 of 1

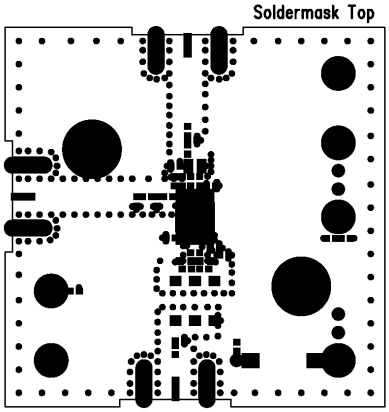
Silkscreen Top



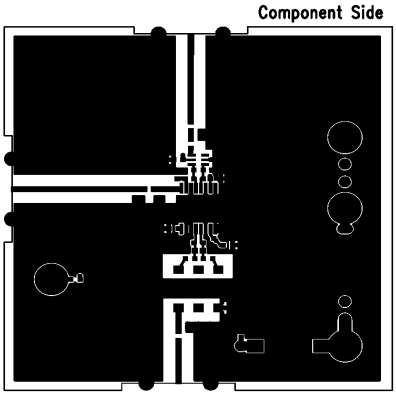
Pastemask Top



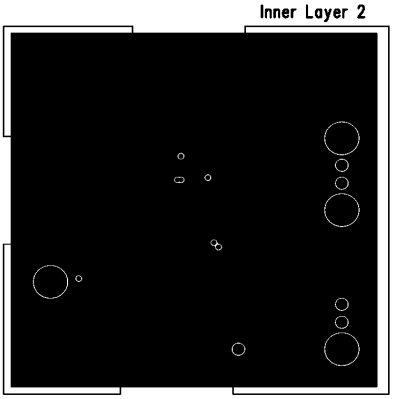
Soldermask Top



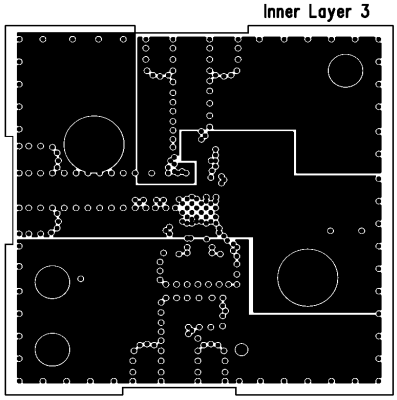
Component Side



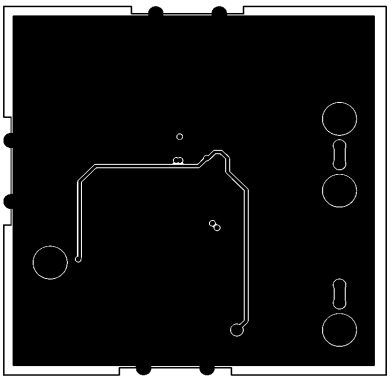
Inner Layer 2



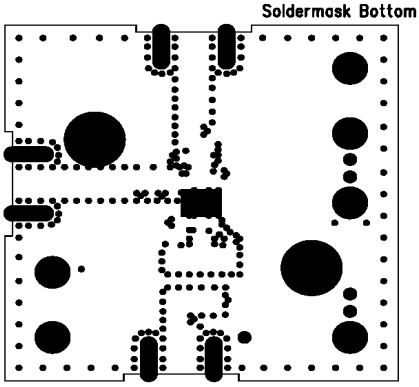
Inner Layer 3



Solder Side



Soldermask Bottom



Silkscreen Bottom