



## DC503A DEMO BOARD QUICK START GUIDE

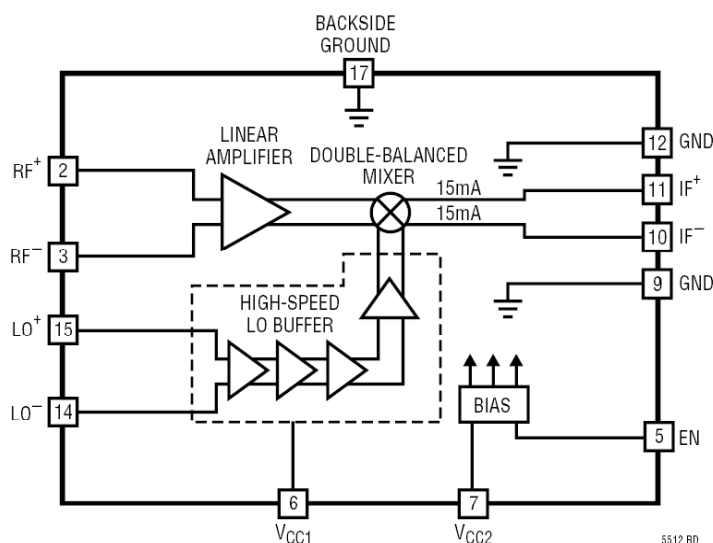
### *Description:*

The DC503A demo circuit board is intended to demonstrate the capabilities of the LT5512 downconverting mixer IC for cable infrastructure applications.

The LT<sup>®</sup>5512 (Figure 1) is a broadband high signal level mixer IC optimized for high linearity downconverter applications including cable and wireless infrastructure. The IC includes a differential LO buffer driving a double-balanced mixer. An integrated RF amplifier improves LO-RF isolation and eliminates the need for precision external bias resistors.

The LT5512 is a high-linearity alternative to passive diode mixers. Unlike passive mixers, which have conversion loss and require high LO drive level, the LT5512 delivers conversion gain and requires significantly lower LO drive levels.

The DC503A demo board downconverts 1230MHz RF input to 270-870MHz IF output. The LO is injected from the high-side between 1500MHz and 2100MHz.



**Figure 1. LT5512 IC Block Diagram**

## LT5512 Downconverting Mixer Single-Tone Measurements for 1230 MHz CATV 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. Connect TP1 (EN) to the 5V power supply. Mixer is in ENABLE mode.
4. Set the Signal Generator #1 to provide an 1800MHz, -10dBm, CW signal to the demo board LOin port.
5. Set the Signal Generator #2 to provide a 1230MHz, -10dBm, CW signal to the demo board RFIn port.
6. Set the Spectrum Analyzer's center frequency to 570MHz. Perform mixer conversion gain, and 1dB compression measurements.
7. Set the Spectrum Analyzer's center frequency to 1800MHz. Perform mixer LO to IF leakage measurement.

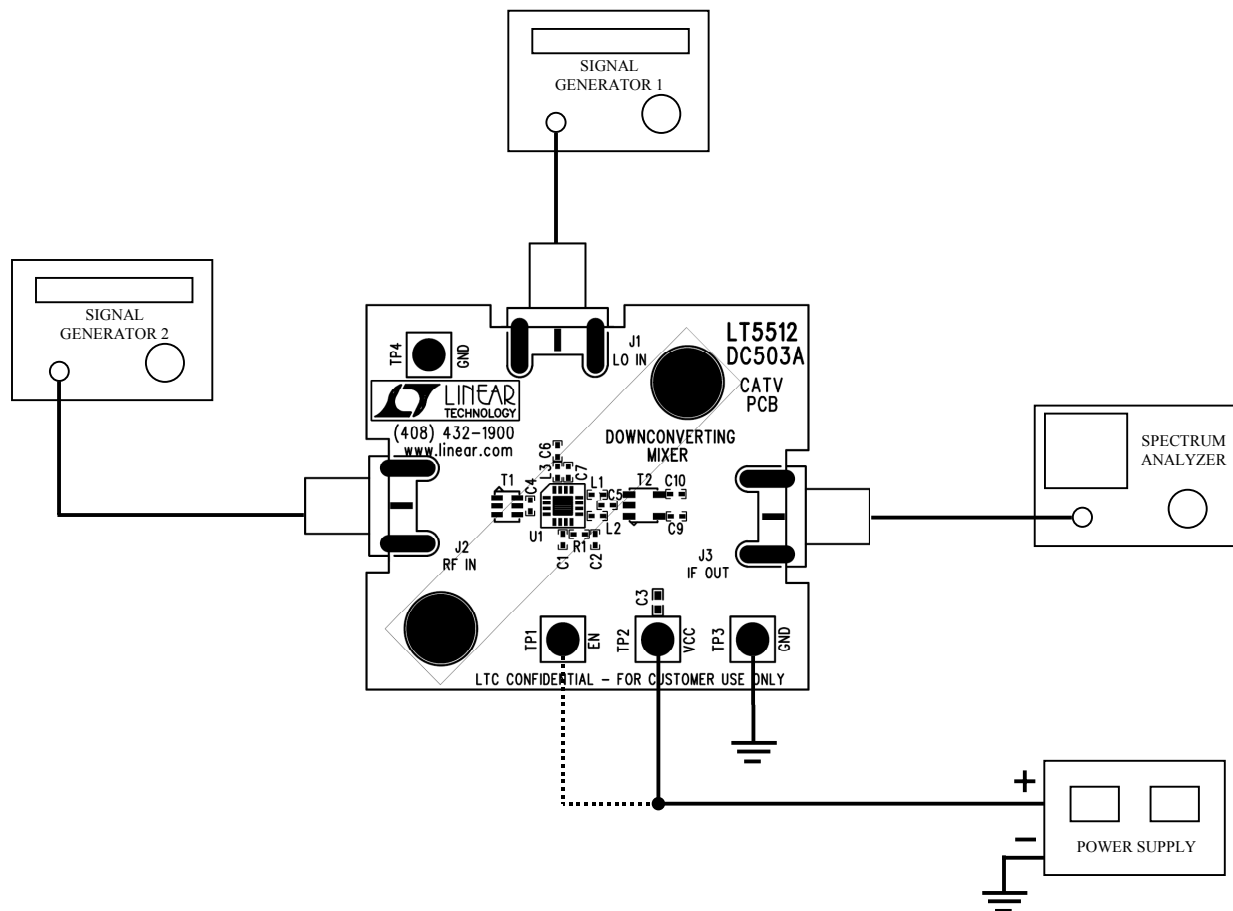


Figure 2. Test Set-Up for Mixer Single-Tone Measurements.

## LT5512 Downconverting Mixer Two-Tone Measurements for 1230MHz CATV 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. Connect TP1 (EN) to the 5V power supply. Mixer is in ENABLE mode.
4. Set the Signal Generator #1 to provide a 1800MHz, -10dBm, CW signal to the demo board LOin port.
5. Set the Signal Generator #2 and #3 to provide two -10dBm CW signals to the demo board RFin port—one at 1229.9MHz, and the other at 1230.1MHz.
6. Set the Spectrum Analyzer's center frequency to 570MHz. Perform input 3<sup>rd</sup> order distortion measurement. (IIP3 =  $P_1 + (P_1 - P_3) / 2 - G_c$ , where  $P_1$  is the lowest power level of the two desired output tones at either 569.9MHz or 570.1MHz,  $P_3$  is the largest 3<sup>rd</sup> order product at either 569.7MHz or 570.3MHz, and  $G_c$  is conversion gain.  $P_1$  and  $P_3$  are in units of dBm, and  $G_c$  is in dB.)

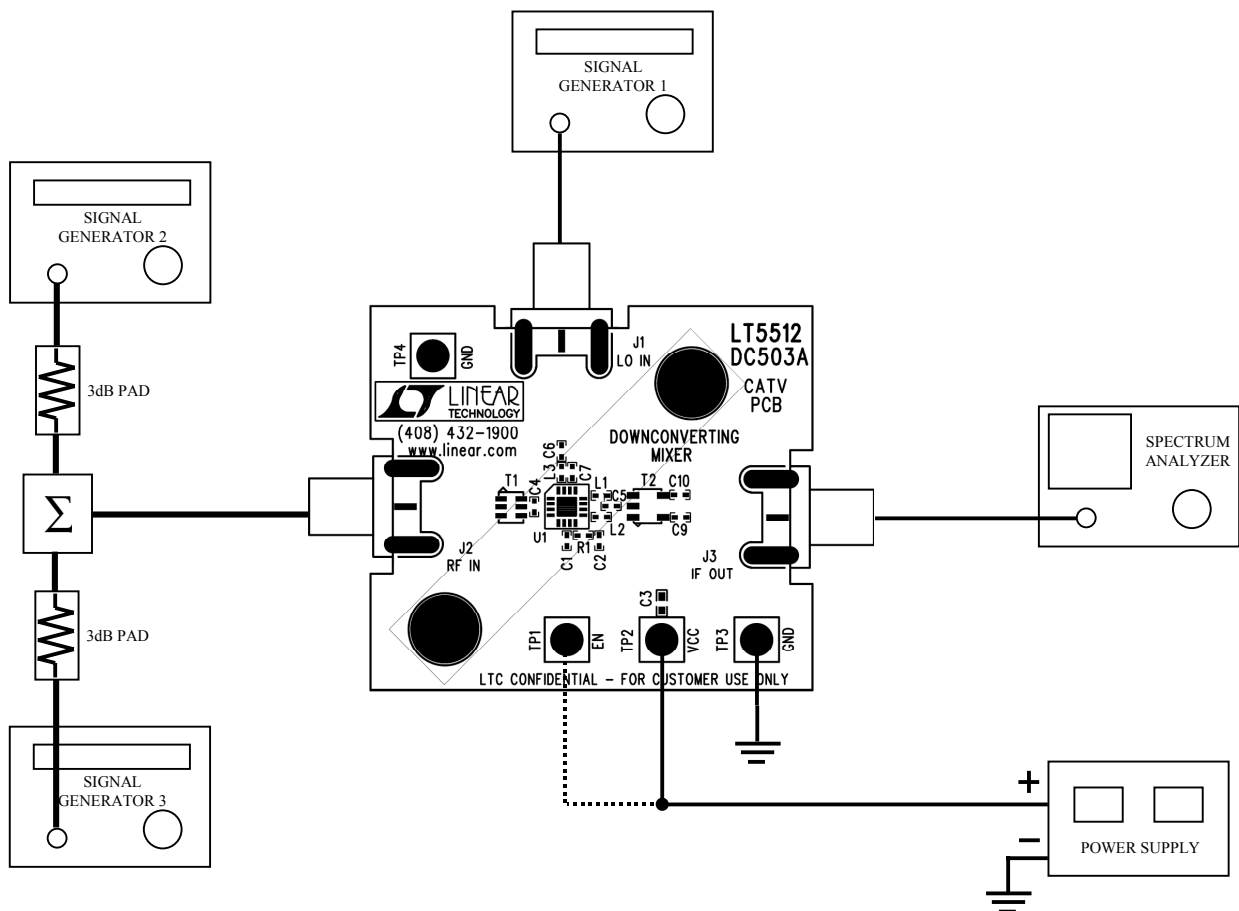
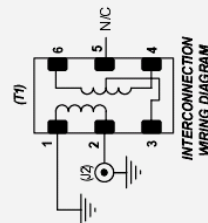


Figure 3. Test Set-Up for Mixer Two-Tone Measurements.

| ECO | REV | DESCRIPTION                 | DATE     | APPROVED |
|-----|-----|-----------------------------|----------|----------|
|     | 1   | INITIATE                    | 01/23/02 |          |
|     | 2   | REVISED; DEMO BOARD RELEASE | 5/7/02   |          |

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| Item | Qty | Reference Designator | Part Description                      | Manufacture / Part No.    |
|------|-----|----------------------|---------------------------------------|---------------------------|
| 1    | 6   | C1,C5,C6,C7,C9,C10   | CAP, COG, 100pF, 50V, 5%, 0402        | MURATA GRP1555C1H101JD01  |
| 2    | 1   | C2                   | CAP, X7R, .01uF, 16V, 10%, 0402       | MURATA GRP155R71C103KA01  |
| 3    | 1   | C3                   | CAP, Y5V, 1uF, 10V, [+80%,-20%], 0603 | TAIYO YUDEN LMK107F105ZA  |
| 4    | 1   | C4                   | CAP, COG, 2.7pF, 50V, +/- .25pF, 0402 | MURATA GRP1555C1H2R7CZ01  |
| 5    | 1   | R1                   | RES, CHIP, 10 OHM, 1%, 0402           | AAC CR05-10R0FM           |
| 6    | 2   | L1,L2                | IND, 12nH, 5%, 0402                   | TOKO LL1005-FH12NJ        |
| 7    | 1   | L3                   | IND, 6.8nH, 10%, 0402                 | TOKO LL1005-FH8N2K        |
| 8    | 1   | T1                   | XFMR, 1:1, HYBRID, 1275MHz +/-139MHz  | MURATA LDB311G2705C-428   |
| 9    | 1   | T2                   | XFMR, 4:1, RF WIDEBAND, 500-2500MHz   | M/A-COM ETC1.6-4-2-3      |
| 10   | 1   | U1                   | IC, LT5512EUF, 4X4mm QFN              | LINEAR LTC5512EUF         |
| 11   | 3   | J1,J2,J3             | CONN, SMA, 50-OHM EDGE-LAUNCH         | E.F. JOHNSON 142-0701-851 |
| 13   | 3   | TP1,TP2,TP3          | TESTPOINT, TURRET, .090               | MILL-MAX 2501-2           |
| 12   | 1   |                      | PCB, DC503A                           | DEMO BOARD DC503A         |

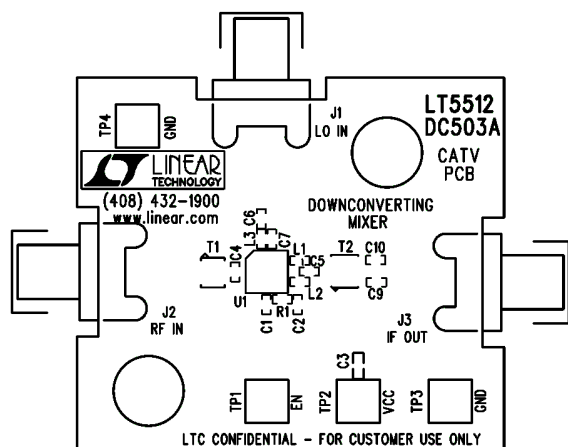
| VENDOR                | APPROVED VENDOR LIST |                        | WEBSITE ADDRESS |
|-----------------------|----------------------|------------------------|-----------------|
|                       | PHONE NUMBER         | PART TYPE              |                 |
| AAC (was TAD)         | (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      |

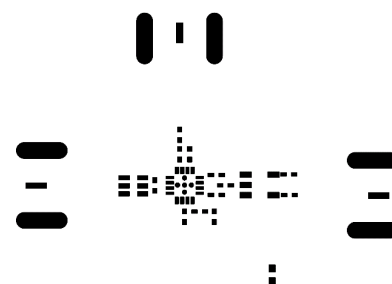
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| SIGNATRON            | (909) 464-1883 | DB9 CONNECTORS           |
| SIEMENS              | (108) 257-7910 | OPTO                     |
| SILICONIX            | (800) 554-5565 | MOSFETS                  |
| SILICONIX            | (408) 988-8000 | 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              |



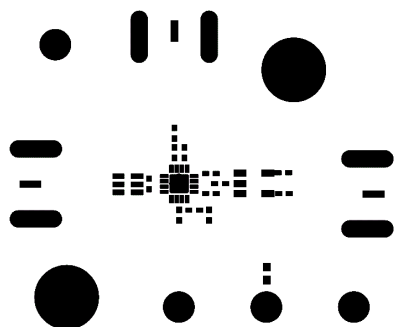




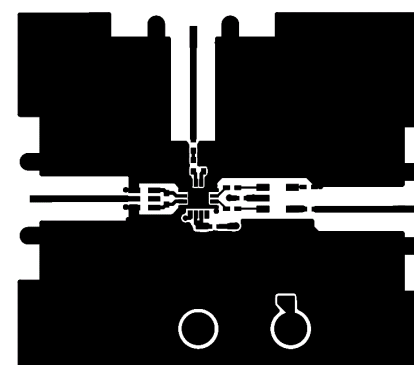
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| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| SILKSCREEN TOP                        |            |       |



|                                       |            |       |
|---------------------------------------|------------|-------|
| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| PASTE MASK TOP                        |            |       |

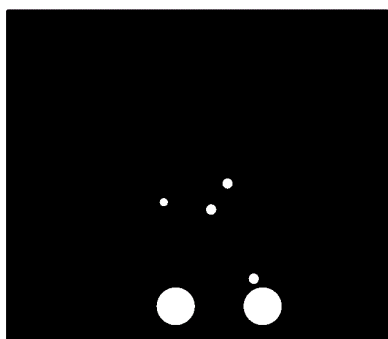


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|---------------------------------------|------------|-------|
| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| SOLDER MASK TOP                       |            |       |



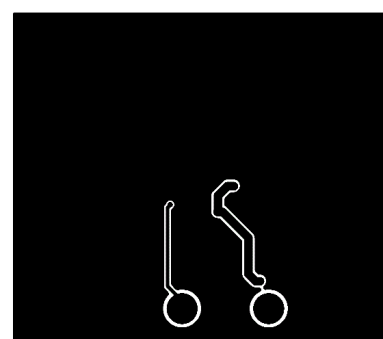
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| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| L1-COMPONENT SIDE                     |            |       |

DO NOT MODIFY INNER LAYER COPPER BACKOFF OUTLINE.

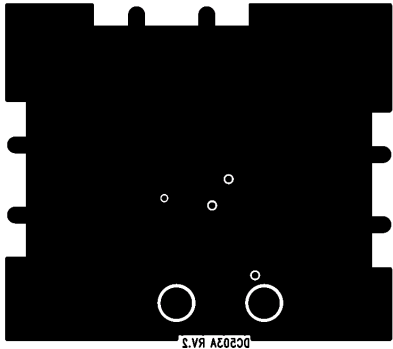


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| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| L2-GND PLANE 1                        |            |       |

DO NOT MODIFY INNER LAYER COPPER BACKOFF OUTLINE.

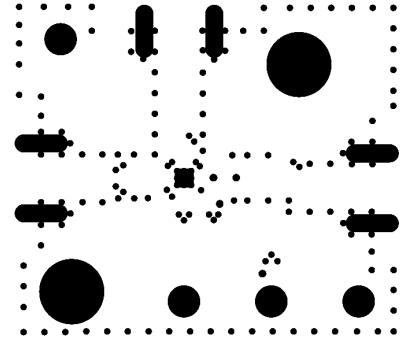


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| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| L3-GND PLANE 2                        |            |       |



DC503A REV 2

|                                       |            |       |
|---------------------------------------|------------|-------|
| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| FRONT SIDE                            |            |       |



|                                       |            |       |
|---------------------------------------|------------|-------|
| COMPANY LINEAR TECHNOLOGY CORPORATION |            |       |
| TITLE A/W, LT5512 CATV PCB            | NO. DC503A | REV 2 |
| SOLDER MASK BTM                       |            |       |