

P/N 5004-5200 REV. A (Preliminary)

APRIL 2005

EQUIPMENT SERIAL NO. _____

SHIPMENT DATE _____

ANALOG STUDIO TO TRANSMITTER LINK
Model 5290 STL Transmitter
Model 5291 STL Receiver

USER'S GUIDE

Preliminary



1953 Concourse Drive
San Jose, California 95131-1708 USA
TEL: (+1) 408 943-9323
FAX: (+1) 408 943-9218
EMAIL: techsupport@TFTInc.com



MODEL 5291 STL RECEIVER

MODEL 5290 STL TRANSMITTER

The TFT 5200 Analog STL Series consists of a transmitter and receiver pair that accommodates a single RF channel. The transmitter is either composite or mono. Receivers are available in composite/mono, composite only, and monaural only versions. Both the transmitter and receiver are frequency agile across a specific band and all bands from 140 MHz to 1.7 GHz are available. The Model 5290 Transmitter covers 944-952 MHz, along with its companion composite/mono receiver, the Model 5291.

The transmitter has a 20-Watt output and is frequency agile in 6.25 kHz steps, set by front panel switches.

FEATURES:

- 20 Watts
- Frequency Agile
- Composite or mono, jumper selectable
- Wideband or narrowband
- Frequency Stability 0.0005%
- THD <0.05%
- SNR >80 dB
- Selectable Pre-/De-Emphasis
- 10 μ V sensitivity for 60 dB SNR
- 152 kHz MUX available
- Front Panel LCD
- Modulation Bargraph
- Type N RF Connectors
- FCC ID: BIO5290*(Pending)

TABLE OF CONTENTS

Paragraph	Title	Page
Section I – GENERAL INFORMATION		
1.1	INTRODUCTION.....	1-1
1.2	EQUIPMENT DESCRIPTION.....	1-1
1.3	SPECIFICATIONS.....	1-2
1.4	FCC DESIGNATOR.....	1-3
1.5	WARRANTY INFORMATION.....	1-3
1.6	CLAIMS FOR DAMAGE IN SHIPMENT.....	1-3
1.7	TECHNICAL SUPPORT.....	1-3
Section II – GETTING TO KNOW YOUR SERIES 5200 STL AND RELATED EQUIPMENT		
2.1	INTRODUCTION.....	2-1
	...	
2.2	UNPACKING & INSPECTION.....	2-1
2.3	THE 5290 STL TRANSMITTER FRONT PANEL.....	2-1
2.4	THE 5290 STL TRANSMITTER REAR PANEL.....	2-2
2.5	THE 5291 STL RECEIVER FRONT PANEL.....	2-3
2.6	THE 5291 STL RECEIVER REAR PANEL.....	2-4
2.7	RELATED EQUIPMENT.....	2-4
2.8	PRE-INSTALLATION INFORMATION.....	2-5
Section III – PRE-INSTALLATION CHECKOUT		
3.1	INTRODUCTION.....	3-1
	...	
3.2	PRIMARY POWER	3-1

Paragraph

Title

Page

APPLICATION.....

Section IV - OPERATING

4.1	INTRODUCTION.....	4-1
4.2	OVERVIEW OF OPERATION.....	4-1
4.3	SETTING TRANSMITTER PARAMETERS.....	4-1
4.4	OBSERVING TRANSMITTER OPERATING.....	4-1
4.5	SETTING RECEIVER PARAMETERS.....	4-1

Section V – INSTALLATION

5.1	INTRODUCTION.....	5-1
	...	

Section VI – THEORY OF OPERATION

6.1	GENERAL	6-1
6.2	MODEL 5290 STL TRANSMITTER BASIC DIAGRAM DESCRIPTION.....	6-1
6.3	MODEL 5291 STL RECEIVER BASIC DIAGRAM DESCRIPTION.....	6-1

Section VII – MAINTENANCE AND REPAIR

7.1	INTRODUCTION.....	7-1
	...	
7.2	TOOL AND TEST EQUIPMENT REQUIREMENTS.....	7-1
7.3	ROUTINE MAINTENANCE.....	7-1
7.3.1	Calibration.....	7-1
7.4	DIAGNOSTICS AND REPAIR.....	7-1
7.5	TFT CUSTOMER SERVICE DEPARTMENT.....	7-1

Section VIII – ENGINEERING DRAWINGS

List of Figures

Figure	Title	Page
2.3-1	Model 5290 STL Transmitter Front Panel	2-1
2.4-1	Model 5290 STL Transmitter Rear Panel	2-2
2.5-1	Model 5291 STL Receiver Front Panel	2-3
2.6-1	Model 5291 STL Receiver Rear Panel Connectors	2-4

List of Tables

Table	Title	Page
1.3-1	Transmitter and Receiver Specifications	1-2
2.3-1	Model 5290 STL Transmitter Front Panel Controls and Indicators	2-1
2.4-1	Model 5290 STL Transmitter Rear Panel Connectors	2-2
2.5-1	Model 5291 STL Receiver Front Panel Indicators and Controls	2-3
2.6-1	Model 5291 STL Receiver Rear Panel Connectors	2-4

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This Model 5200 STL User's Guide is arranged in seven sections, as follows:

Section I: General Information

A general description of the 5200 Series Transmitter, its specifications, general information on the FCC designator, warranty and damage claim procedures, and technical support information.

Section II Getting To Know Your Model 5200 Series Transmitter and Receiver and Related Equipment

Overview of the various system components of the 5200 Series Transmitter and Receiver and related equipment. Control and Indicator functions, basic component functions, and their interconnection.

Section III: Pre-Installation Checkout

Some basic test methodology on the Transmitter and Receiver and their related equipment. The user should find it useful to perform the tests in this section with all the 5200 Series Transmitter and Receiver equipment on a lab bench.

Section IV: Operating the Transmitter and Receiver

Detailed description of setup procedures of various Transmitter and Receiver system parameters, as well as enabling of optional features.

Section V: Installation

Instruction for installing and adjusting various system components of the 5200 Series Transmitter and Receiver.

Section VI: Theory of Operation

Basic description of transmitter and receiver circuits

Section VII: Maintenance and Repair

Describes routine maintenance procedures and tools and equipment requirements.

Section VIII: Engineering Drawings

1.2 EQUIPMENT DESCRIPTION

The TFT 5200 Analog STL Series consists of a transmitter and receiver pair that accommodates a single RF channel. The transmitter is either composite or mono. Receivers are available in composite/mono, composite only, and monaural only versions. Both the transmitter and receiver are frequency agile across a specific band and all bands from 140 MHz to 1.7 GHz are available. The Model 5290 Transmitter covers 944-952 MHz, along with its companion composite/mono receiver, the Model 5291.

The transmitter has a 20-Watt output and is frequency agile in 6.25 kHz steps, set by front panel switches.

1.3 SPECIFICATIONS

The Transmitter and Receiver System Specifications are listed in Table 1.3-1.

Table 1.3-1. DIGITAL TRANSMITTER AND RECEIVER SYSTEM SPECIFICATIONS

<p>SYSTEM</p> <p>Frequency.....940-960 MHz (other frequencies available)</p> <p>Step Size.....6.25 kHz</p> <p>Frequency Stability.....± 5 ppm (±0.0005)%</p> <p>Occupied Bandwidth..... ≤ 300 kHz or ≤ 500 kHz, depending upon MUX</p> <p>I/O Connector.....XLR, 600Ω</p> <p>Frequency Response.....± 0.1 dB (20 Hz to 15 kHz)</p> <p>Distortion.....< 0.03% at 1 kHz</p> <p>Stereo Separation.....> 80 dB</p> <p>Signal-to-Noise.....> 40 dB</p> <p>RF Dynamic Range.....> 40 dB</p> <p>Nonlinear Crosstalk.....< 50 dB</p> <p>MUX Channel.....152 kHz on 500 kHz version</p> <p>TRANSMITTER</p> <p>Output Power.....20 Watts (maximum)</p> <p>Output Impedance.....50 Ω</p> <p>Output Connector.....Type N (female)</p> <p>Composite Input.....3 V_{p-p} 2k Ω, unbalanced, BNC</p>	<p>Mono Input.....0 dBm, balanced, bridging</p> <p>MUX Input.....1.23 V_{p-p} 2k Ω</p> <p>RECEIVER</p> <p>RF Input Connector.....Type N, female, 50 Ω</p> <p>Sensitivity/Threshold.....-86.9 dBm for 60 dB SNR</p> <p>Composite Outputs.....3 V_{p-p} low impedance to drive 2k Ω termination, unbalanced, BNC</p> <p>Mono Output Level.....0 to +4 dBm, > 55 dB, XLR male, 600 Ω</p> <p>MECHANICAL AND ENVIRONMENTAL (Transmitter and Receiver)</p> <p>Dimensions.....19 x 3.5 x 17 (inches) 48.3 x 8.9 x 43.2 (cm)</p> <p>Weight.....20 lbs. (9 kg)</p> <p>AC Power Requirements.....120/240 VAC 50/60 Hz</p> <p>Transmitter.....150 Watts</p> <p>Receiver.....20 Watts</p> <p>Operating Temperature.....0° to +50° C.</p>
---	---

1.4 FCC DESIGNATOR and ID

Type Certification under FCC Part 74 has been submitted. The FCC emission designators are:

80KF3E (mono) for 300 kHz channels

284KF9E (composite) for 300 kHz channels

404KF9E (composite with 152 kHz MUX) for 500 kHz channels

The FCC ID is BIO5290.

1.5 WARRANTY INFORMATION

The following warranty policy and limitations are applicable to all models of the 5200 Series STL Transmitters and Receivers.

TFT, Inc. warrants each manufactured unit to meet published specifications and to be free from defects in material and workmanship. TFT will repair or replace, at its expense, for a period of one (1) year from the date of shipment of equipment, any parts which are defective from faulty material or workmanship. This Warranty does not cover equipment which has been misused and/or altered by the user. Units found to be defective during the warranty period shall be returned to TFT with transportation charges prepaid by the BUYER. It is expressly agreed that replacement and repair shall be the sole remedy of the BUYER with respect to any non-conforming equipment and parts thereof, and shall be in lieu of any other remedy available by applicable law. All returns to the factory must be authorized in advance by TFT. Upon examination by the factory, if any TFT equipment is found to be defective, the unit will be repaired and returned to the BUYER with transportation charges prepaid by TFT during the warranty period. Transportation charges for the Transmitter and Receiver units found to be defective within the first 30 days of the warranty period will be paid both ways by TFT . Transportation charges for warranty returns wherein failure is found not to be the fault of TFT or one year after the delivery of the equipment shall be paid both ways by the BUYER. This warranty does not apply to equipment which, in the opinion of the SELLER, has been altered or misused.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. TFT IS NOT LIABLE FOR ANY CONSEQUENTIAL DAMAGES.

1.6 CLAIMS FOR DAMAGE IN SHIPMENT

Your instrument should be inspected and tested by the method given in Section 2.2 of this manual as soon as it is received. If the instrument is damaged in any way or fails to operate properly due to transportation damage, file a claim with the carrier or, if insured separately, with the insurance company.

1.7 TECHNICAL SUPPORT

OUR CUSTOMER SERVICE FOR STL PRODUCTS IS AVAILABLE DIRECTLY FROM 8:00AM TO 5:00PM PACIFIC TIME MONDAY THROUGH FRIDAY. PLEASE CONTACT US IF YOU NEED ASSISTANCE. WE ALSO HAVE AN EMERGENCY TELEPHONE NUMBER FOR SERVICE DURING NON-BUSINESS HOURS. YOU MAY CONTACT OUR MAIN TELEPHONE NUMBER AND WILL BE GIVEN THE NUMBER OF OUR EMERGENCY SERVICE HOTLINE. A CUSTOMER SERVICE REPRESENTATIVE IS ON CALL 24 HOURS PER DAY, 7 DAYS PER WEEK, AND WILL CALL YOU BACK ABOUT YOUR EMERGENCY.



1953 Concourse Drive
San Jose, California 95131-1708 USA
Tel: (+1) 408 943-9323 Fax: (+1) 408 943-9218
Email: techsupport@TFTInc.com

SECTION II

GETTING TO KNOW YOUR SERIES 5200 STL AND RELATED EQUIPMENT

2.1 INTRODUCTION

This section provides an overview description of the Model 5290 STL Transmitter and Model 5291 Receiver including Front Panel controls and indicators, Rear Panel connectors, options and other related peripheral equipment.

2.2 UNPACKING & INSPECTION

Upon receiving the equipment, inspect its shipping container and contents for shipping damage. Keep all packing material until equipment performance is confirmed. If any of the equipment is damaged or fails to operate properly due to transportation damage, file a claim with the transportation company or, if insured separately, with the insurance company.

The following items should come with each TFT unit. Please notify TFT if any items are missing.

Description	Part No	Qty
Installation and Operation Guide	5004-5200	1
Power Cord	1950-7742	1
Warranty Notice	3002-0002	1
Warranty Card	3001-0420	1

2.3 THE 5290 STL Transmitter FRONT PANEL

The Model 5290 STL Transmitter Front Panel is a collection of input switches and output LEDs, and LCD screen. The Model 5290 STL Transmitter is illustrated in Figure 2.3-1 and described in Table 2.3-1. Controls and indicators are located on the Front Panel. Detailed descriptions on the usage and operation of the keys can be found in this Section.

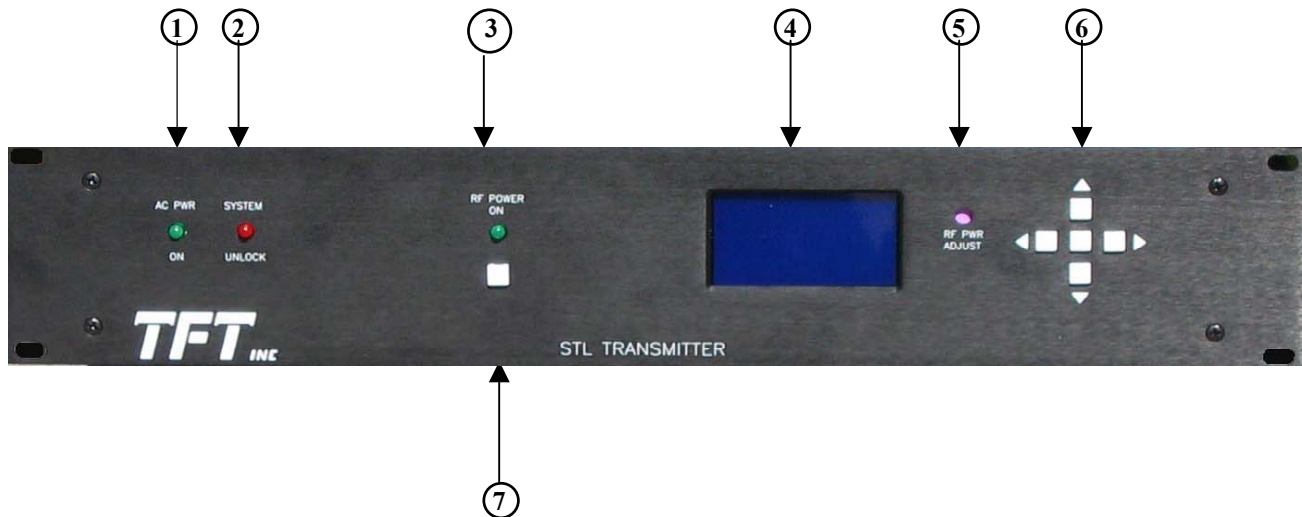


Figure 2.3-1. Model 5290 STL Transmitter Front Panel

Table 2.3-1. Model 5290 STL Transmitter Front Panel Controls and Indicators

ITEM	TITLE	FUNCTION
1	AC POWER LED	AC Power On LED Indicator
2	SYSTEM UNLOCK LED	Indicates one or more VCOs is unlocked; PA is disabled if “on”.
3	RF POWER LED	Indicates radiation of RF power from output
4	LCD	Displays transmitter parameters including frequency and power
5	RF POWER ADJUST	Adjusts power from 0.5 to 20.0 Watts (R18)
6	NAVIGATION AND ENTRY	Scrolls page display and selects items on LCD
7	RF POWER ON/STANDBY SWITCH	Turns on for RF power radiation from the unit.

2.4 THE Model 5290 STL TRANSMITTER REAR PANEL

The Model 5290 STL Transmitter Rear Panel has Input/Output connectors for related or optional equipment. Figure 2.4-1 shows the Rear Panel Configuration.

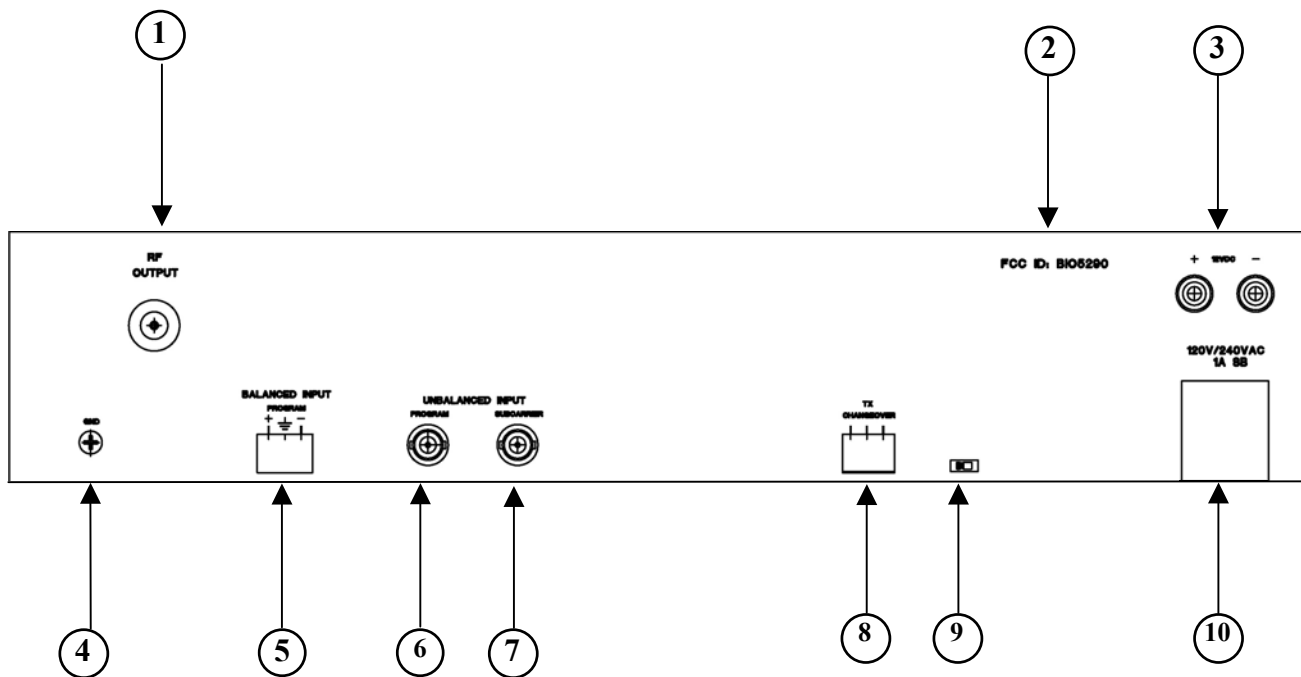


Figure 2.4-1. Model 5290 STL Transmitter Rear Panel Connectors

Table 2.4-1. Model 5290 STL Transmitter Rear Panel Connectors

ITEM	TITLE	FUNCTION
1	RF	Type N female connector, 50 Ohms
2	FCC ID	FCC Type Certification ID
3	12 Vdc Input (optional)	Terminals for optional ± 12 Vdc input
4	GND	Ground screw connection
5	AUDIO INPUT	Screw terminal connection, balanced audio input, 600 Ω
6	PROGRAM	Composite program input, unbalanced, BNC 2 V _{p-p}
7	SUBCARRIER	Subcarrier (MUX) input, unbalanced, BNC
8	TX CHANGEOVER	Connector for transmitter changeover (TFT Model 7770)
9	AUTO/MAN	Switch to set mode of operation with or without transmitter changeover
10	AC INPUT	IEC Input connector/fuse assembly

2.5 THE 5291 STL RECEIVER FRONT PANEL

The Model 5291 STL Receiver Front Panel is a collection of input switches and output LEDs, and LCD screen. The Model 5291 STL Receiver Front Panel is illustrated in Figure 2.5-1 and described in Table 2.5-1.

Controls and indicators are located on the Front Panel. Detailed descriptions on the usage and operation of the keys can be found in this Section.

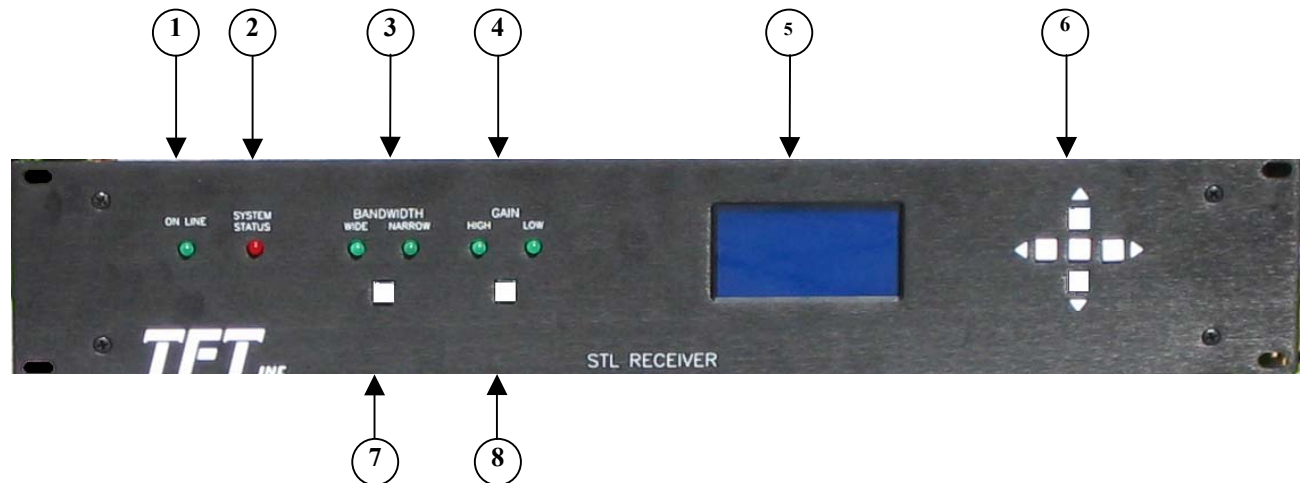


Figure 2.5-1 Model 5291 STL Receiver Front Panel

Table 2.5-1 Model 5291 STL Receiver Front Panel Indicators and Controls

ITEM	TITLE	FUNCTION
1	ON LINE	“On” indicates receiver is providing output. “Off” indicates that the stand-by receiver looped through the auto-switchover is providing output or that the receiver is turned off by remote control.
2	SYSTEM STATUS	“On” indicates that VCOs are locked
3	BANDWIDTH	“Wide” indicates 500 kHz operation; “Narrow” indicates “300 kHz operation.
4	GAIN	“High” indicates that RF input is selected for best sensitivity; “Low” indicates that gain of 1 st RF amplifier is reduced to prevent overload.
5	LCD	Multi-page display of receiver operating characteristics and parameters
6	Navigation Keys	Used to scroll LCD pages and enter parameters
7	BANDWIDTH Select	Toggles between “Wide” and “Narrow” bandwidth operation
8	GAIN Select	Toggles gain of 1 st RF amplifier between “High” and “Low”

2.6 THE STL RECEIVER REAR PANEL

The Model 5200 Series STL Receivers Rear Panels have audio and connectors for related or optional equipment. Figure 2.6-1 shows the rear panel configuration.

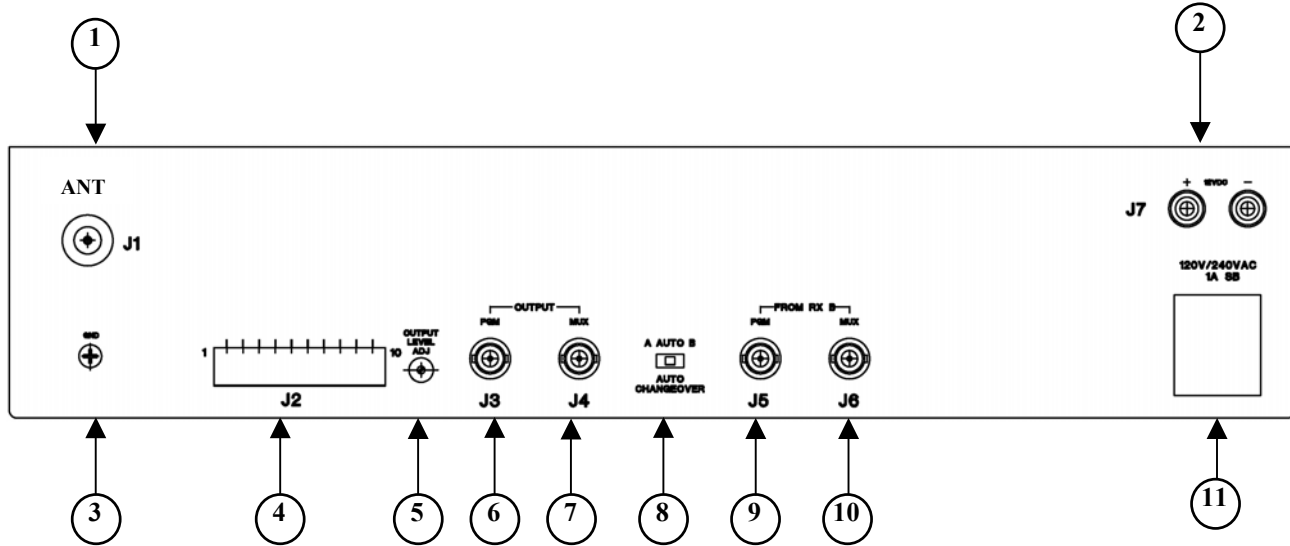


Figure 2.6-1 Model 5291 STL Receiver Rear Panel Connectors

Table 2.6-1 Model 5291 STL Receiver Rear Panel Connectors

ITEM	TITLE	FUNCTION
1	RF INPUT	Type N RF input connector, 50 Ohms
2	DC input (optional)	Optional ± 12 Vdc input power terminals
3	GND	Grounding terminal
4	J2	Terminal connections for mono balanced output and remote controls
5	OUTPUT LEVEL ADJ	Adjustment for Program Output level
6	PGM OUTPUT, J3	Program output connector, BNC, unbalanced $3 V_{p-p}$
7	MUX OUTPUT, J4	MUX output connector, BNC, unbalanced
8	AUTO CHANGEOVER	Switch to select Auto Changeover operation with another receiver or to manually select this receiver "A" or another receiver "B" to supply signals to the OUTPUT connectors
9	RX B PGM, J5	Input from stand-by receiver "B", program, BNC, unbalanced
10	RX B MUX, J6	Input from stand-by receiver "B", MUX, BNC, unbalanced
11	AC Input	IEC AC power input connector assembly

2.7 RELATED EQUIPMENT

The Series 5200 STL Transmitters and Receivers can accommodate various components to comprise a complete Studio to Transmitter Link. Some of this equipment is described in the following paragraphs.

2.7.1 MODEL 7770 AUTOMATIC TRANSMITTER CHANGEOVER UNIT

The Model 7770 Automatic Transmitter Changeover Unit is a switching device that can switch between two transmitters and furnish a single output for connection to an antenna. There is a separate data sheet available for this product.

2.8 PRE-INSTALLATION INFORMATION

Before installing your STL Transmitter and Receiver, you should be familiar with the requirements of Part 74 of the FCC rules, as amended. An adequate path survey and analysis is helpful to evaluate the environment and application of the Digital STL system. Theoretical results obtain from such a path survey and analysis should be compared to actual installed data in order to establish a benchmark for the system and to document its performance.

Assistance may be obtained from TFT Customer Service.



1953 Concourse Drive
San Jose, California 95131-1708 USA
Tel: (+1) 408 943-9323 Fax: (+1) 408943-9218
Email: techsupport@TFTInc.com

SECTION III

PRE-INSTALLATION CHECKOUT

3.1 INTRODUCTION

This section describes a functional bench test to be performed before installing and testing the 5200 Series STL Transmitter and Receiver according to the procedures given in Section V. By completing the pre-installation checkout, the user can be certain that the equipment is operating properly.

CAUTION

Do not connect the transmitter antenna output directly to the receiver antenna input. Doing so will damage the receiver input circuitry.

3.2 PRIMARY POWER APPLICATION

Before power is applied to the 5200 Series STL Transmitter, insure that an adequate load is connected to the RF Output Connector.

For back-to-back testing, place the transmitter and receiver next to each other. Terminate the transmitter output in a 50 Ohm load of 50 watts or larger rating.

To insure that the transmitter and receiver function as a system, we recommend the following checkout procedure before final installation of the system.

- a. Place the front panel RF POWER ON/STANDBY switch to the STANDBY position.
- b. Connect the AC power connectors to the correct line voltage.
- c. The units are now ready for test.

SECTION IV

OPERATING

THE 5200 SERIES ANALOG STL TRANSMITTERS and RECEIVERS

4.1 INTRODUCTION

The 5200 Series of Transmitters and Receivers are conventional composite and mono systems designed to meet today's stringent broadcasting requirements. Each transmitter or receiver is fully compatible with other TFT systems of comparable configuration. The 5200 series of transmitters is designed to fulfill requirements for composite stereo, composite stereo with MUX, and mono applications. The 5200 series of receivers is available for composite/mono, composite, and mono only configurations. Frequencies from 140 MHz to 2 GHz will be available.

4.2 OVERVIEW OF OPERATION

These instructions assume that the units have been configured by the factory and that the Pre-Installation Checkout has been completed in accordance with the instructions in Section III of this User's Guide.

4.3 SETTING TRANSMITTER PARAMETERS

See Section II for details of the transmitter front panel and rear panel connections.

Make sure that RF power is turned "off" and that the transmitter is connected to a proper load or antenna.

Pressing the center (ENTER) button to the right of the display will advance the LCD through various pages for setup.

The default page should have an indication for "FRQ". Increment the frequency desired for operation with the "UP" and "DOWN" arrow keys until the desired frequency is displayed. Once the desired frequency is displayed, press the center (ENTER) button to "load" the desired frequency into the unit.

No further adjustments are required to change frequency. No tuning adjustments are required to change frequency within the range of frequencies at which the unit operates. It will tune the entire band automatically.

The screw adjustment to the right of the LCD will increment the output power to the desired level between 0.5 Watt and 20 Watts.

The unit is now ready for operation. The RF power "On" switch may be pressed.

4.4 OBSERVING TRANSMITTER OPERATION

The center (ENTER) button to the right of the display to advance through display pages to observe various operating parameters, including frequency, power output, reflected power, VCO status, etc.

4.5 SETTING RECEIVER PARAMETERS

The receiver operating frequency is set in a fashion similar to that of the transmitter (See Section 4.3 above.).

Pressing the center (ENTER) button to the right of the display will advance the LCD through various pages for setup.

The default page should have an indication for "FRQ". Increment the frequency desired for operation with the "UP" and "DOWN" arrow keys until the desired frequency is displayed. Once the desired frequency is displayed, press the center (ENTER) button to "load" the desired frequency into the unit.

No further adjustments are required to change frequency. No tuning adjustments are required to change frequency within the range of frequencies at which the unit operates. It will tune the entire band automatically.

After the unit is installed, all operating parameters should be recorded in order to establish a baseline for future maintenance and operation. RSSI (Received Signal Strength Indication) should be noted, along with all VCO and voltage readings. This will assist trouble shooting in the future by having comparison readings.

SECTION V INSTALLATION

5.1 INTRODUCTION

This section describes the installation of the Model 5200 Analog STL Transmitter and Receiver Series and their related options and equipment after they have been unpacked and tested according to methods described in Section IV.

Electrical ground for the Model 5200 Transmitters and Receivers is established through the AC power cord. Additionally, there is a grounding stud on the rear of each unit. If a more substantial technical ground is available, it may be connected to the chassis box directly at the grounding screw, using a short piece of braid. Proper grounding, good engineering practice, and safety depend on the knowledge and care of the installing engineer.

All units are designed to mount in a 19" rack or cabinet using (4) 12-24 pan head machine screws.

Mounting requirements: Size: 3.5"H x 19"W x 12"D (8.9 cm x 47.5 cm x 30.5 cm) Maximum. Weight: Approximately 20 pounds (9 kg.)

Power requirements: Input power: 117/240 VAC @ 50/60 Hz, 100 Watts maximum, 3 Prong Power Cord - UL style SVT

Environmental requirements: 0°C to 50°C (32°F to 122°F).

General Hazards:

- a. Elevated Operating Ambient Temperature - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum rated ambient temperature.
- b. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- c. Mechanical Loading - Mounting of the equipment in a rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- d. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuit might have on over-current protection and supply wiring.
- e. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., power strip use).

SECTION VI

THEORY OF OPERATION

6.1 GENERAL

This section describes the theory of operation for the Model 5200 Series STL Transmitter and Receivers.

The Model 5200 STL Transmitter accepts either balanced or unbalanced composite or monaural audio on the rear panel. The composite input level should be $3V_{p-p}$ for ± 50 kHz deviation. The program input is adjusted by R22 on the Main Board. Similarly, there is an unbalanced input for a MUX channel, the level of which should be $1.2V_{p-p}$ for ± 12 kHz deviation. The MUX deviation is adjusted by R29 on the Main Board.

J10 sets the transmitter for "Flat" composite or monaural operation. J11 sets the transmitter pre-emphasis to 75 μ sec; J12 sets the pre-emphasis to 50 μ sec. Only one of these three jumpers should be made at any time.

If the optional SCA generator is utilized, then J19 should be connected between pins 2 and 3; if an external SCA generator is utilized, the J19 should be connected between pins 1 and 2.

The summed output of the program and SCA networks is routed to a 70 MHz VCO Modulator, which consists of U14 and U13. Linearity of the modulation is adjusted by R64.

The 70 MHz modulated VCO output (-18 dBm) is mixed in U27 with a local oscillator (+3 dBm), which operates 70 MHz below the output frequency. This on-frequency, modulated signal (-24 dBm) is filtered by FL2, then amplified by U28, which adds approximately 30 dB of gain. The output of U28 (+3 dBm) is again filtered then amplified by U29, a 15 dB gain amplifier, for a final output from the main board of approximately +15 dBm.

The local oscillator consists of a dual Phase-Lock-Loop, which consists of a TCXO that operates at 20 MHz and U20 (VCO1), VCO2 and U21. The frequency is referenced to the 20 MHz TCXO and actually set by U19 and U24, which are controlled by logic programmed by U1.

The modulated, on-frequency RF output of the main board is routed to the input of the power amplifier, where the signal is furthered amplified and filtered by U1 and strip-line filters on the Power Amplifier Board.

U10, U11, U6A, U8A on the Main Board control lock-out and remote control functions. Metering samples for PGM, MUX, FWD PWR, REV PWR, VCO1 bias, VCO2 bias, and VCO3 bias are furnished to U1 and subsequently scaled and displayed by the front panel LCD.

6.2 MODEL 5200 STL TRANSMITTER BASIC DIAGRAM DESCRIPTION

The 5290 Transmitter consists of a Main Board, a Display Board, a Power Amplifier, and a power supply. The Main Board contains input processing and metering, the local oscillator, mixer, and RF output circuits. The Display Board receives display information from the Main Board for display on the front panel LCD. The Power Amplifier amplifies the modulated, on-frequency RF output from the Main Board to the proper RF output level on the rear panel.

6.3 MODEL 5291 STL RECEIVER BASIC DIAGRAM DESCRIPTION

(To be supplied)

SECTION VII

MAINTENANCE AND REPAIR

7.1 INTRODUCTION

The 5200 Series STL Transmitter and Receiver have no moving parts or components that require routine replacement. They require only minor audio adjustment.

7.2 TOOL AND TEST EQUIPMENT REQUIREMENTS

The following tools and equipment are required for analog STL system maintenance:

- Hand Tools
- Digital Voltmeter
- Oscilloscope
- Audio generator
- Audio analyzer/noise/distortion
- RF Spectrum Analyzer, 10 GHz
- RF Signal Generator, 2 GHz
- RF Load, 50 Ω , 25 Watts
- Stereo generator/coder
- Stereo demodulator/modulation monitor

7.3 ROUTINE MAINTENANCE

The Series 5200 STL Transmitter and Receiver should require no routine maintenance. As equipment and systems external to the Transmitter and Receiver change, minor audio level adjustments may be necessary.

7.3.1 CALIBRATION

The Series 5200 STL Transmitter and Receiver do not require routine calibration.

7.4 DIAGNOSTICS AND REPAIR

Before attempting repair, the tools and test equipment listed in Section 7.2 should be on hand. Only limited diagnostics and repairs can be accomplished without a complete set of equipment listed. The most practical repair philosophy is by the factory. It is recommended that a stand-by unit be on hand, together with an alternative plan for operation while factory repairs are being made. Spares kits are available from the factory. Rental and emergency units are available from the factory during repairs.

Some general (and very important) observations on repair:

1. The STL equipment uses static sensitive components. ESD (Electrostatic Discharge) precautions must therefore be observed during repairs. This is extremely important.
2. The Theory of Operation Section (Section VI) is helpful in understanding how the equipment functions and will help you with diagnostics, as it covers the jobs performed by each major component and subsystem.

7.5 TFT CUSTOMER SERVICE DEPARTMENT

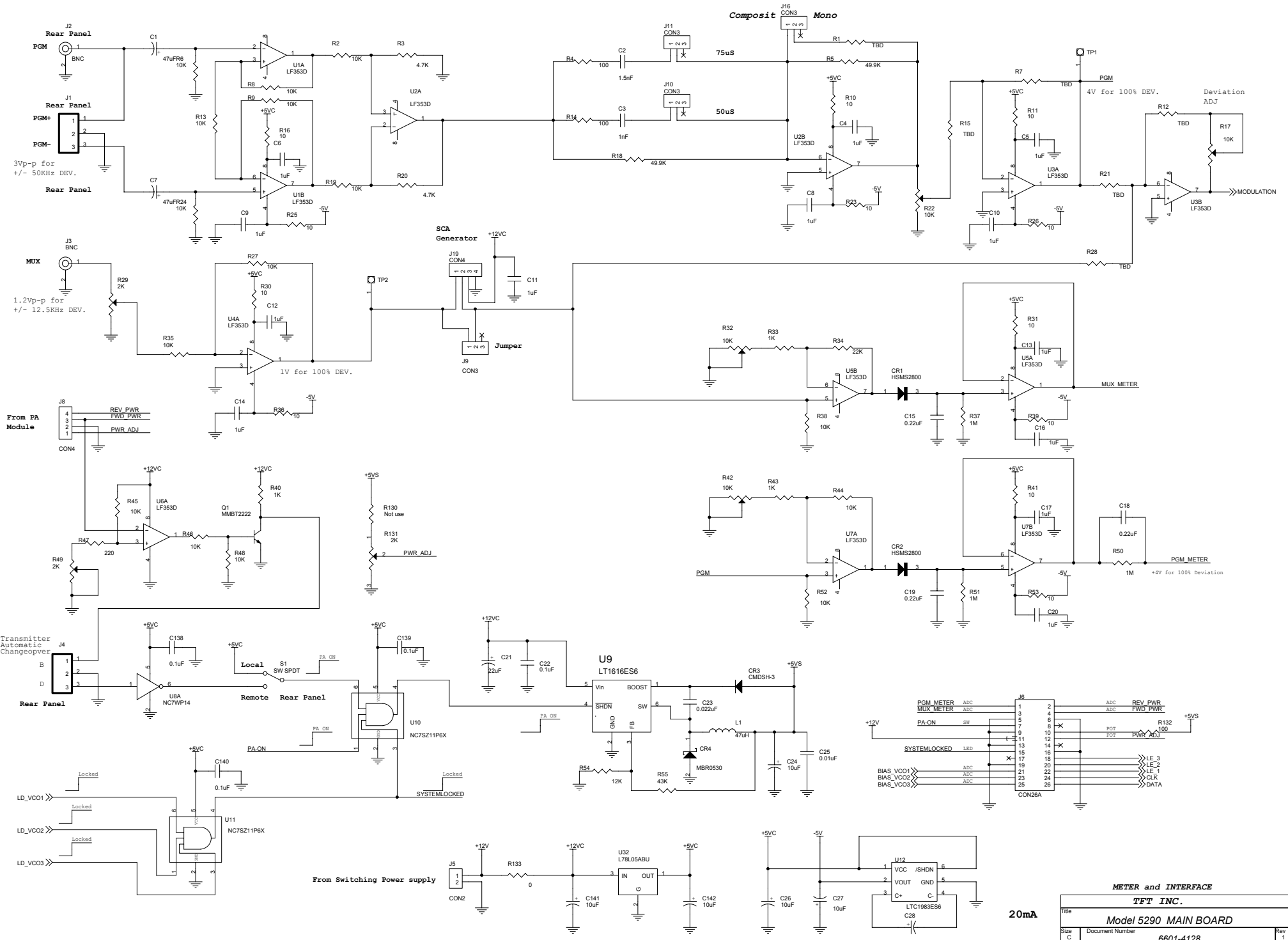
TFT emergency service is available 24 hours a day. Please call us if you need assistance with any TFT products.

TFT, Inc.
1953 Concourse Drive
San Jose, California 95131-1708 USA
Telephone: (+1) 408 943-9323, Fax: (+1) 408 943-9218
Email: techsupport@TFTInc.com

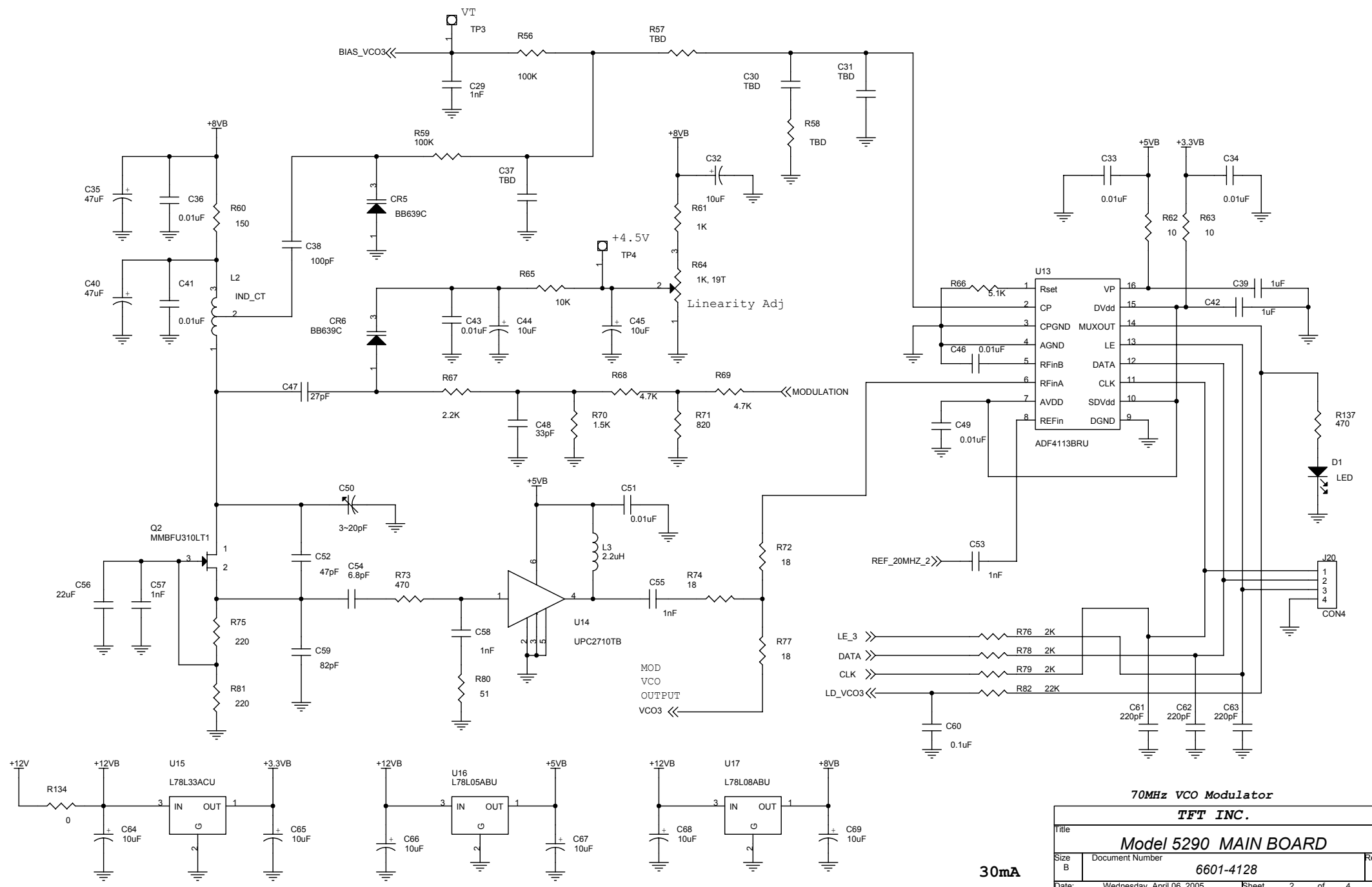
**SECTION VIII
ENGINEERING DRAWINGS**

Model 5290 Transmitter

Title	Dwg. No.	Rev
Main Board: Meter and Interface	6601-4128 (1 of 4)	1
Main Board: 70 MHz VCO Modulator	6601-4128 (2 of 4)	1
Main Board: Up Converter, Filter Amp	6601-4128 (3 of 4)	1
Main Board: Dual PLL Up Converter, LO	6601-4128 (4 of 4)	1
Power Amplifier	6601-4129	1
Display Board (for 5290 & 5291)	6601-4132	1



METER and INTERFACE			
TFT INC.			
Model 5290 MAIN BOARD			
Title	6601-4128		
Size	Document Number		Rev 1
Date	Wednesday, April 06, 2005	Sheet	1 of 4

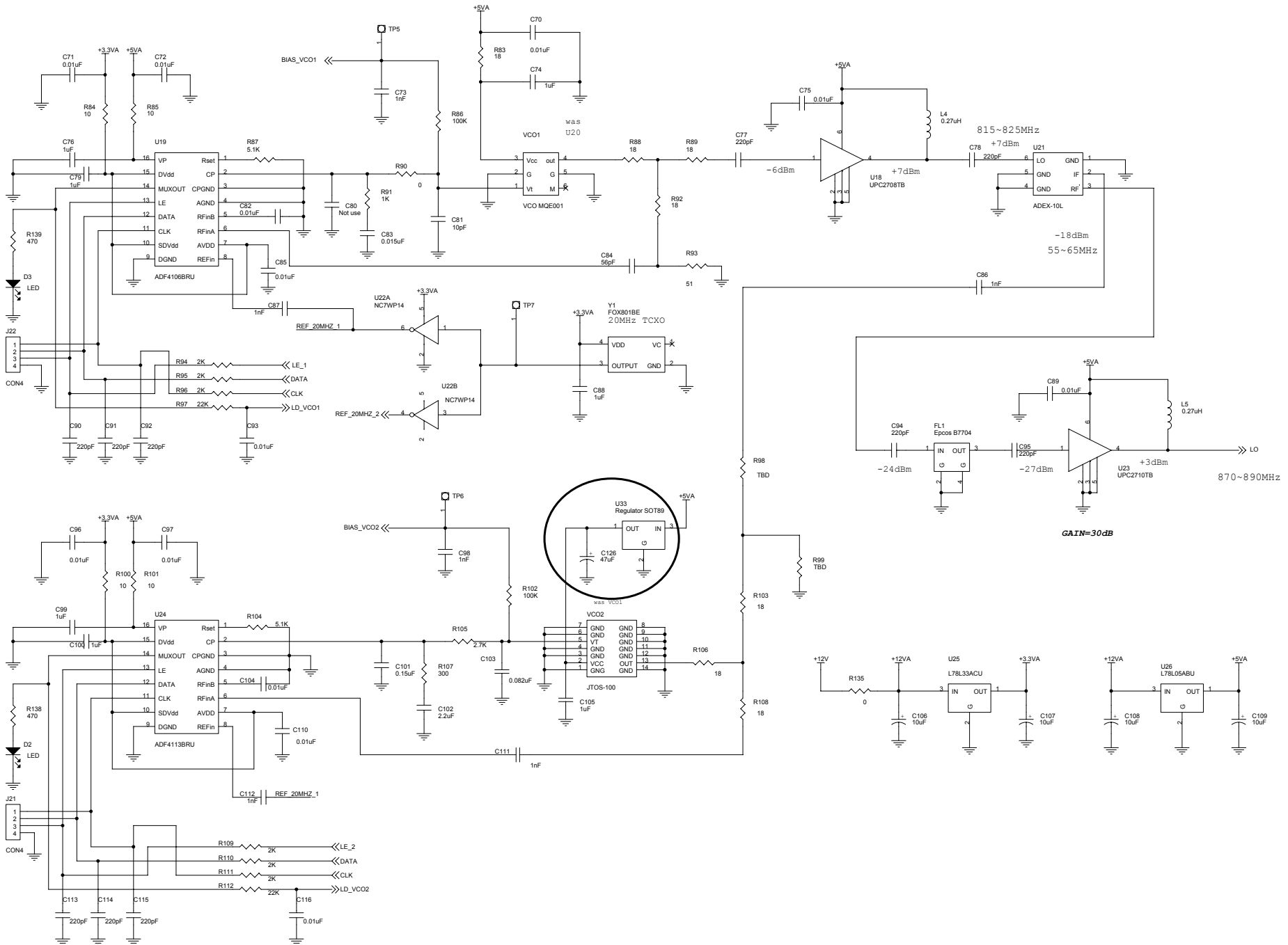


70MHz VCO Modulator

TFT INC.

Title			Model 5290 MAIN BOARD		
Size B	Document Number		6601-4128		Rev 1
Date:	Wednesday, April 06, 2005		Sheet	2	of 4

30mA

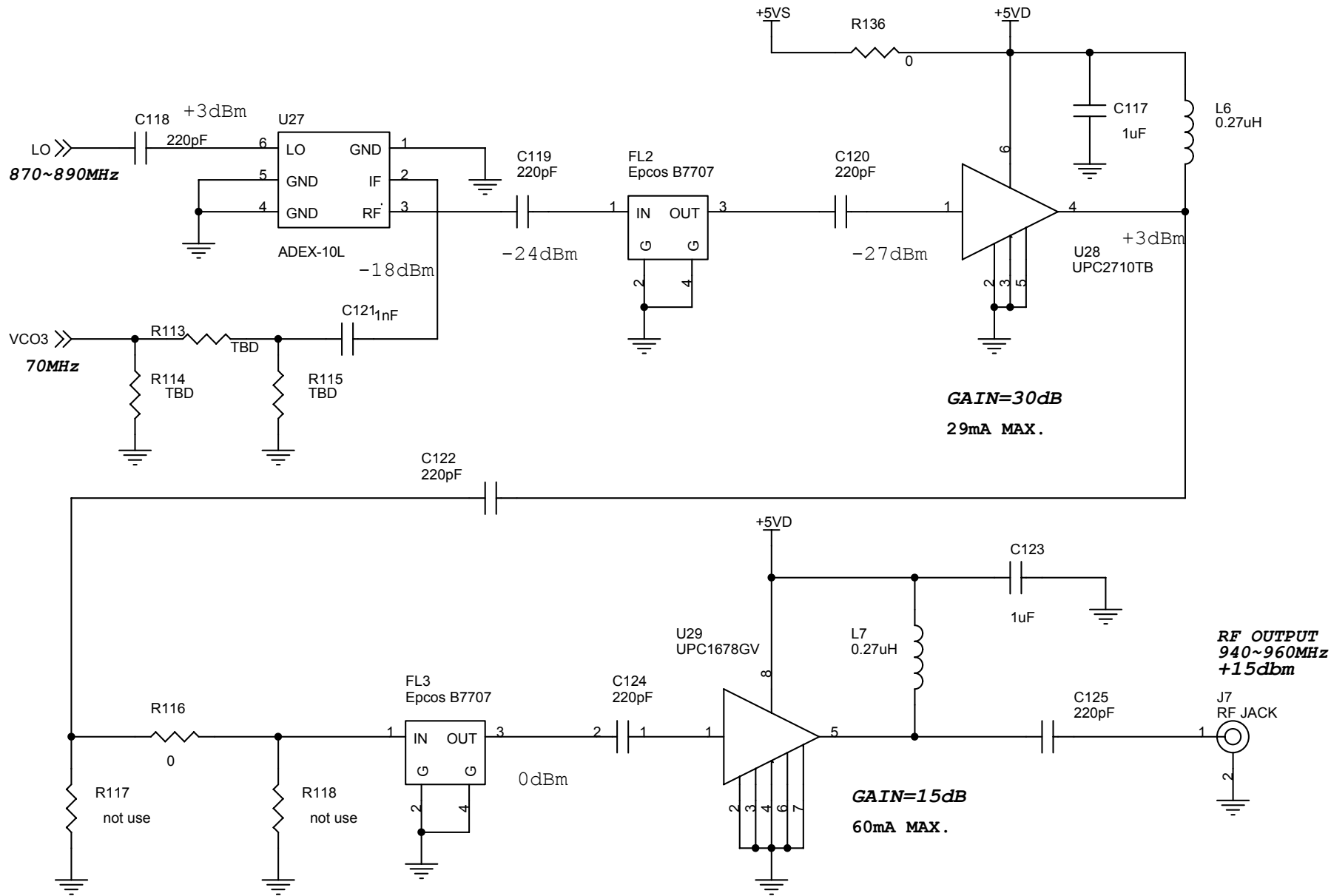


DUAL PLL UP CONVERTOR LO

TFT INC.

Title			Model 5290 MAIN BOARD		
Size			Document Number		
C			6601-4128		
Date			Wednesday, April 06, 2005		
Sheet			3 of 4		
Rev			1		

50mA



GAIN=30dB
29mA MAX.

GAIN=15dB
60mA MAX.

RF OUTPUT
940~960MHz
+15dbm

90mA

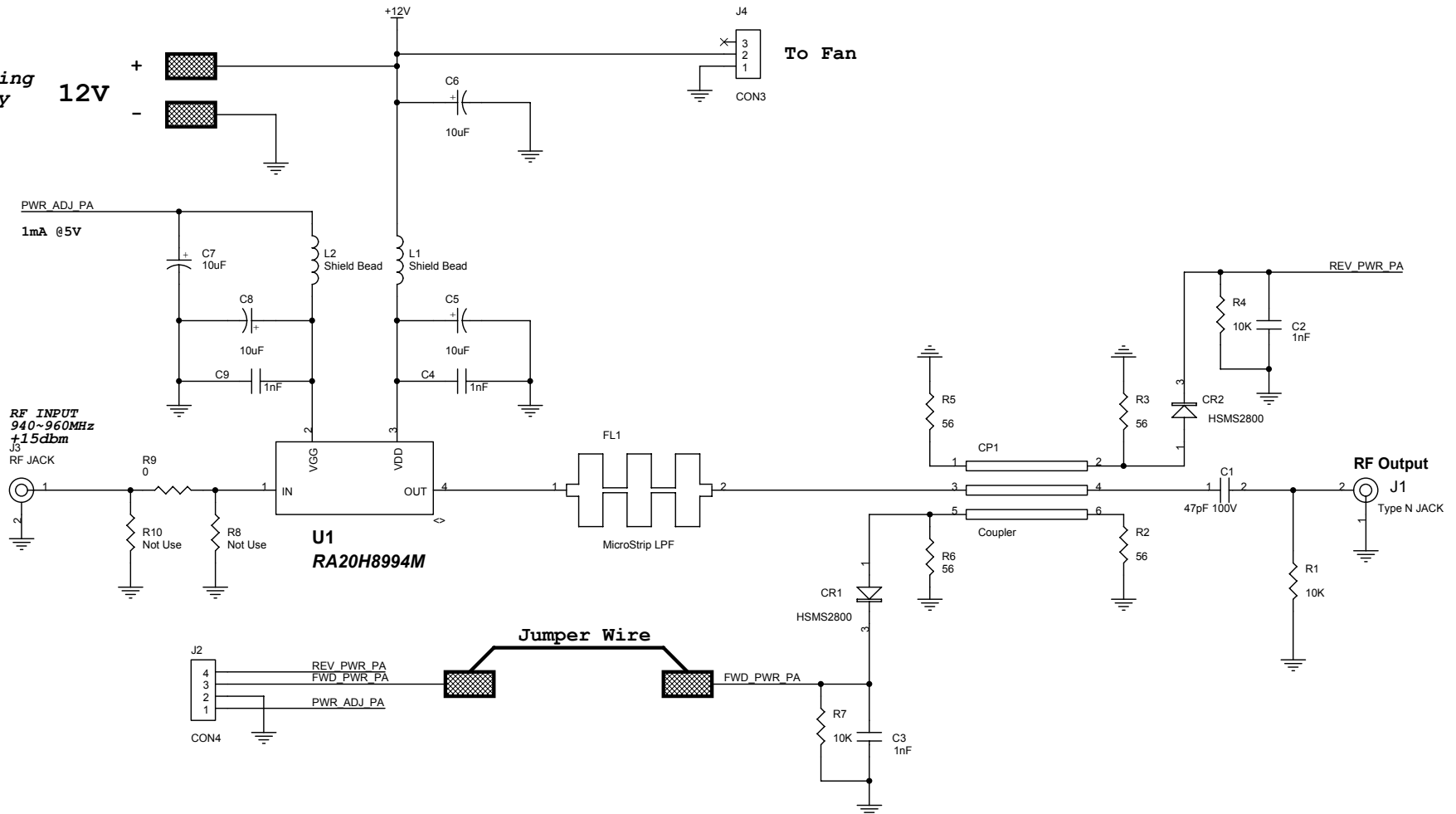
Up Converter, Filter Amp

TFT INC.

Title		
Model 5290 MAIN BOARD		
Size	Document Number	Rev
A	6601-4128	1
Date:	Thursday, April 07, 2005	Sheet 4 of 4

From Switching
Power Supply

12V



TFT INC.		
Title		
Model 5290 Power Amplifier		
Size B	Document Number 6601-4129	Rev 1
Date: Wednesday, April 06, 2005		
Sheet 1 of 1		

