Instructions

Tektronix

QuickStart8
DPO Demonstration Board for TDS7104 and TDS7054 Oscilloscopes

071-0715-00

www.tektronix.com

Tektronix, Inc., 14200 SW Karl Braun Drive, Beaverton, OR 97077

WARRANTY

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In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the respective warranty period and make suitable arrangements for the performance of service. Tektronix will provide such service at Customer's site without charge during the warranty period, if the service is performed within the normal on-site service area. Tektronix will provide on-site service outside the normal on-site service area only upon prior agreement and subject to payment of all travel expenses by Customer. When or where on-site service is not available, Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it. To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the General Safety Summary in other system manuals for warnings and cautions related to operating the system.

To Avoid Fire or Personal Injury

Ground the Product. This product is indirectly grounded through the grounding conductor of the mainframe power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in an Explosive Atmosphere.

Do Not Operate in Wet/Damp Conditions.

Keep Product Surfaces Clean and Dry.

Safety Terms and Symbols

Terms in This Manual. These terms may appear in this manual:

CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. These symbols may appear on the product:

CAUTION
Refer to Manual

Protective Ground
(Earth) Terminal

Preface

This instruction manual contains specific information about the QuickStart8 board for use with the TDS7104 and TDS7054 Oscilloscopes.

- *Getting Started* covers how to set up and configure the Quick-Start8 board and an overview of the output signals; plus any required materials you may need to use the board.
- *Basic Operations* provides a quick reference testpoint table and a detailed description of the output signals.
- The *Appendix* includes circuit diagrams for reference only, and instructions on how to maintain and ship the QuickStart8 board.

Contacting Tektronix

Phone	1-800-833-9200*
Address	Tektronix, Inc. Department or name (if known) 14200 SW Karl Braun Drive P.O. Box 500 Beaverton, OR 97077 USA
Web site	www.tektronix.com
Sales support	1-800-833-9200, select option 1*
Service support	1-800-833-9200, select option 2*
Technical support	Email: support@tektronix.com 1-800-833-9200, select option 3* 1-503-627-2400 6:00 a.m. – 5:00 p.m. Pacific time

*** This phone number is toll free in North America. After office hours, please leave a voice mail message.**
Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.

Getting Started

Getting Started

The QuickStart8 board produces signals specifically designed to demonstrate the timing and voltage measurement capabilities of Tektronix test and measurement oscilloscopes.

The board is especially useful for demonstration and training purposes, since its uses output signals that incorporate imperfections found in a testing environment.

This section includes the following information:

- Required materials
- Instructions for setting up and configuring the board
- Overview of the output signals

Required Materials

The QuickStart8 board comes with the following standard accessory:

- Instruction manual

You will need to supply the following items:

- A Tektronix general-purpose oscilloscope
- Choose one: P6139A 10X Passive probe, TCP 202 Current probe, or Differential probe (P6246 or P6247)
- 50 Ω BNC cable with a BNC/SMA adapter

Prerequisites

The examples in this manual are based on the following prerequisites and assumptions:

- You are familiar with the basics of taking timing and voltage measurements
- That the oscilloscope and any accessories are properly set up (for example, it is assumed that any oscilloscope probe that you intend to use is properly calibrated)

Setting Up Your QuickStart8 Board

CAUTION. *Static discharge can damage the board. To prevent static damage, handle components only in a static-free environment.*

Always wear a grounding wrist strap, heel strap, or similar device while handling the board.

1. To discharge any static electricity, touch the ground connector located on the board. Then, before you remove the board from the protective bag, touch the bag to discharge stored static electricity.
2. Remove the QuickStart8 board from the bag and place the board parts-side up on any flat surface.
3. Turn the board so that the rubber feet are placed on the work surface.
4. Set the power switch, S2780, to off (see Figure 2–1 on page 2–4).

Configuring Your QuickStart8 Board

Configure the QuickStart8 board using the VCO Mode Select switch, S2810. See Figure 2–1 on page 2–4 for the switch location. The configuration you choose will determine the appearance of the output signals at test pins J2410, J2520 and J1.

VCO MODE SELECT. Switch S2810 consists of four DIP switches, labeled 1 through 4. DIP switches 1 and 2 are not used. DIP switches 3 and 4 of S2810 allow selection of several modes of operation. Table 1–1 lists the VCO switch configurations and outputs.

Table 1–1: VCO MODE SELECT (S2810)

VCO Mode Switch				PLL VCO OUTPUT
1	2	3	4	
X	X	C	C	Output varies between F_L and F_H every 800 ms
X	X	C	O	Output varies between F_L and F_H every 3 seconds
X	X	O	C	F_L*
X	X	O	O	F_H*

* **F_L is approximately 68 MHz, and F_H is approximately 85 MHz.**

Applying and Removing Power

Power Source. The QuickStart8 board can be powered directly from the TDS 7000 Series oscilloscope using the USB (Universal Serial Bus) port or from an optional transformer.

CAUTION. *Connecting the QuickStart8 board incorrectly can damage your keyboard (see Figure 1–1)*

To power on the board using the USB port:

1. Connect the USB cable into the USB IN port on the board (see Figure 1–1 and 2–1).
2. Plug the USB cable into the USB connector on back of the TDS 7000 Series instrument.
3. Plug the keyboard cable into the USB OUT port on the board (see Figure 1–1 and 2–1).

To power on the board using an optional wall transformer:

CAUTION. *To prevent damage to the oscilloscope when using a wall transformer, do not use the USB connector to attach between the QuickStart8 board and oscilloscope.*

1. Connect the power cord to the power jack on the board (see Figure 2–1).
2. Plug the wall transformer into a wall socket.

NOTE*. Use a wall transformer that is 9 volts or between 6 – 12 volts at 5 watts. The outside diameter of the power-jack connector is 5.5 mm.*

To remove power follow these steps:

1. Set the power switch (see Figure 2–1) to off.
2. Disconnect the power cord or the USB IN cable.

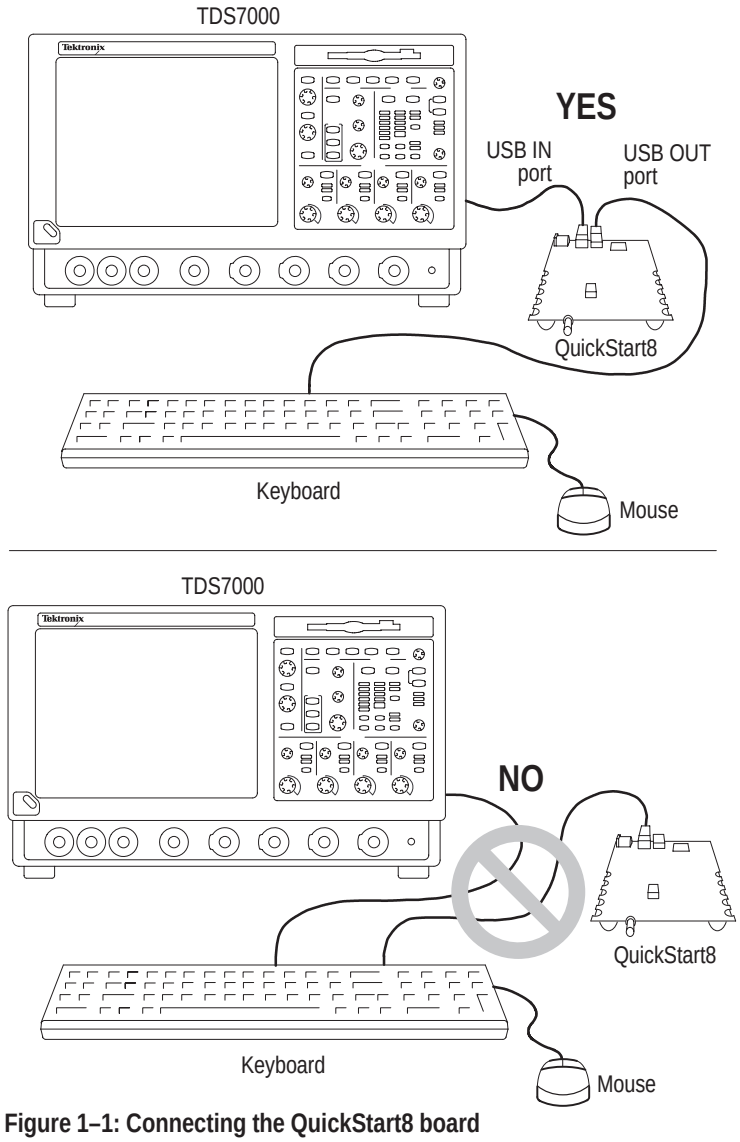


Figure 1–1: Connecting the QuickStart8 board

Overview of Signals

The following is an overview of the signals you can use on the QuickStart8 board to demonstrate a variety of timing and voltage measurements.

Signals

The following signals are available on the QuickStart8 board:

- Switching Power Supply Signals (J2880); switched voltage and current (see page 2–5)
- Quadrature amplitude modulated baseband signals (see page 2–6)
- Fast rise voltage step, J600 (see page 2–8)
- Dual random anomalies signals (see page 2–9)
- Voltage controlled oscillator outputs (see page 2–11)
- Phase locked loop control signal, J2410 (see page 2–11)
- QAM modulated RF outputs, J1 (see page 2–13)
- Pseudo-random digital signals with clock, J13 (see page 2–14)
- Universal serial bus (USB) signal outputs, J2 (see page 2–15)
- Simulated ground bounce signal, J14 (see page 2–16)

Operating Basics

Using the QuickStart8 board

This section includes a quick reference for testpoints (see Table 2–1) and a detailed description of oscilloscope signals beginning on page 2–5.

Test Points

Most of the testpoints are arranged along the edge of the board. Table 2–1 lists the oscilloscope signals and a numerical reference in the left-hand column for testpoint locations on Figure 2–1.

Table 2–1: Oscilloscope signals

See Figure 2–1	Test point	Description	Function
1	J1	MODULATED RF OUT (see page)	Demonstrates QAM modulated RF
2	J13	Pseudo-random Digital Signals (see page 2–14)	Demonstrates general digital triggering and display
3	J14	Ground Bounce Signal (see page 2–8)	Demonstrates Intermittent behavior capture
4	J600	FAST RISE STEP VOLTAGE (see page 2–8) SMA connection	Demonstrates step response and time delay measurements
5	J2410	PLL VCO OUTPUT (see page 2–11)	Selects VCO mode
6	J2520	VCO TUNING VOLTAGE (see page 2–11	Demonstrates voltage that programs the VCO frequency
7	J2880	V SWITCH: Switching power supply voltage signal (see page 2–5)	Demonstrates general oscilloscope measurements

Table 2–1: Oscilloscope signals (Cont.)

See Figure 2–1	Test point	Description	Function
8	—	I SWITCH current loop: Switching power supply current signal (see page 2–5)	Demonstrates general oscilloscope measurements
9	TP6	RAND ANOM I: A dual random anomaly signals (see page 2–9)	Demonstrates FastAcq
10	TP11	CHEAT II: Signal that coincides with the anomaly signal (see page 2–9)	Demonstrates FastAcq
11	TP13 /TP14	QAM I and Q: Baseband quadrature amplitude modulated signals (see page 2–6)	Demonstrates: • X-Y • XYZ • FastAcq
12	TP16	RAND ANOM II: A dual random anomaly signal (see page 2–9)	Demonstrates FastAcq
13	TP19	CHEAT I: Signal that coincides with the anomaly signal (see page 2–9)	Demonstrates FastAcq
14	TP21	QAM CLK: Signal that coincides with the anomaly signal (see page 2–6)	Demonstrates: • FastAcq • X-Y • XYZ

The following Table 2–2 lists the USB DATA testpoint and switches on the QuickStart8 board. See Figure 2–1 for testpoint and switch locations.

Table 2–2: USB Data and switch functions

Switches	Function	Switch position	Mode
J2	USB DATA: Makes available signals from the host computer	USB cable must be used to power the board	—
S2780	Controls power to the board	On/Off	—
S2810	VCO MODE SELECT	1 OPEN/SHUT 2 OPEN/SHUT 3 OPEN/SHUT 4 OPEN/SHUT	Not used Not used (See Table 1–1 on page 1–3)
S2830	RESET ANOM: Causes random changes to the output frequency, amplitude, and anomaly frequency	—	Reset random ANOM

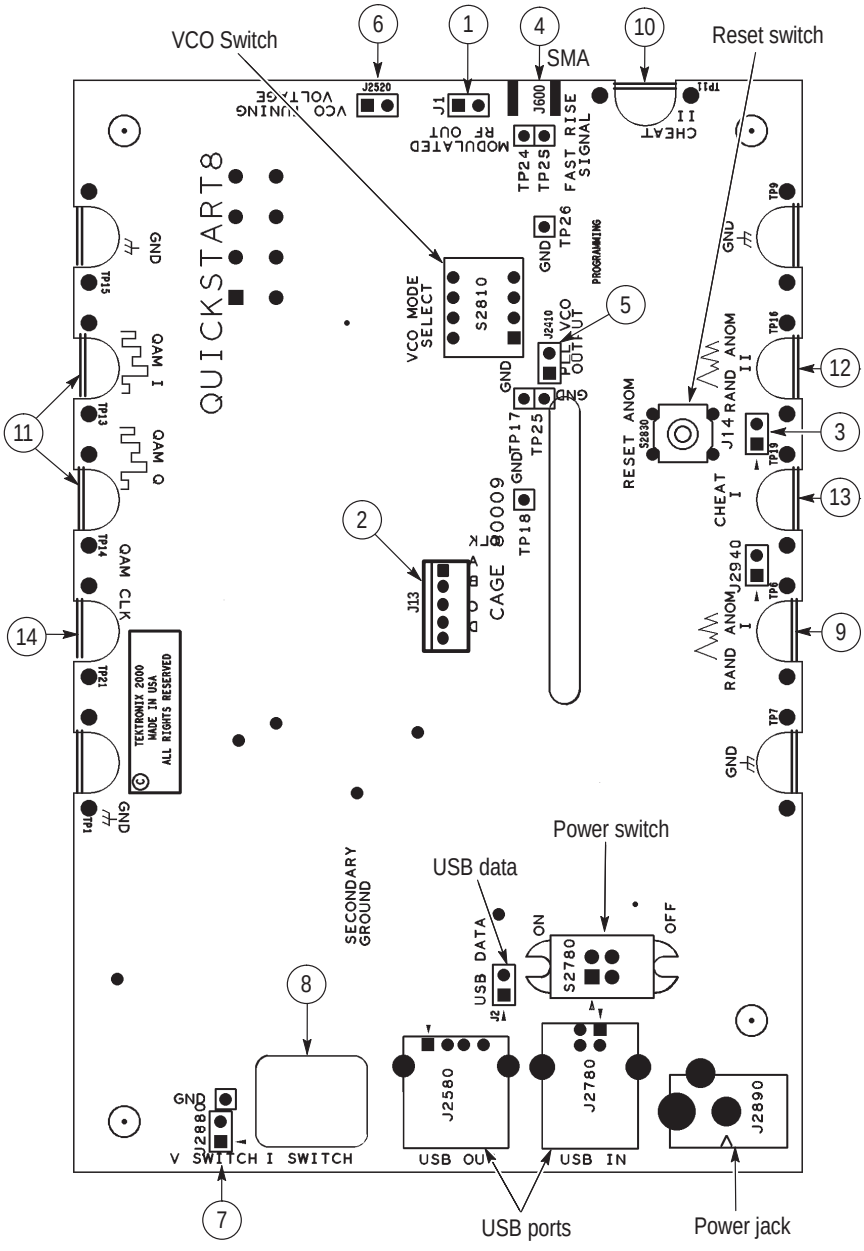


Figure 2–1: Signal locations on the QuickStart8 board

Detailed Signal Descriptions

This section covers output signals on Quickstart 8 board that demonstrate the features of the TDS7000 series of oscilloscopes.

Switching Power Supply Signals: V SWITCH, I SWITCH

The V SWITCH (J2880) and I SWITCH signals are derived from the switching power supply on the board. This power supply switches at about 260 kHz. These signals were included to demonstrate the current, voltage and power measurement capabilities on the oscilloscope (see Figure 2–2).

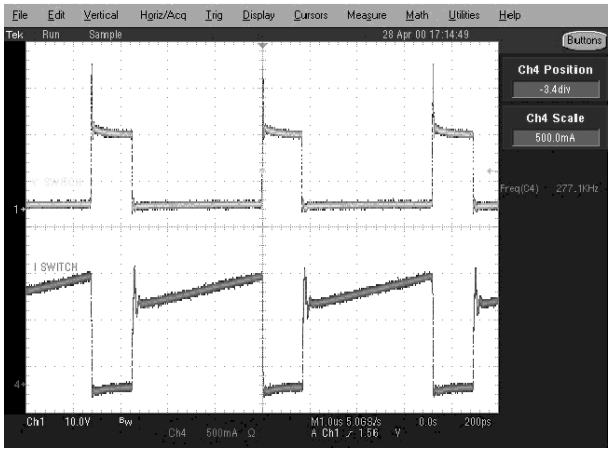


Figure 2–2: V switch, I switch

Quadrature Amplitude Modulation Baseband Signals

QAM I, QAM Q, and QAM CLK. These signals emulate a baseband quadrature amplitude modulated digital signal. The clock rate of the signal is about 1 MHz. This signal is designed to demonstrate a number of features including FastAcq, XY and XYZ as shown in Figures 2–3 through 2–6.

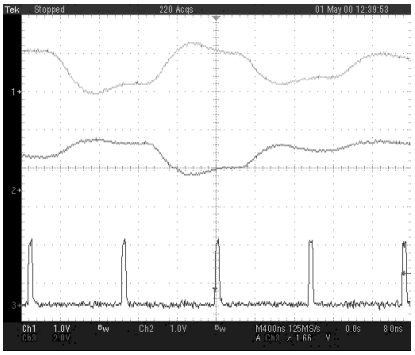


Figure 2–3: QAM I, QAM Q, and QAM CLK signals

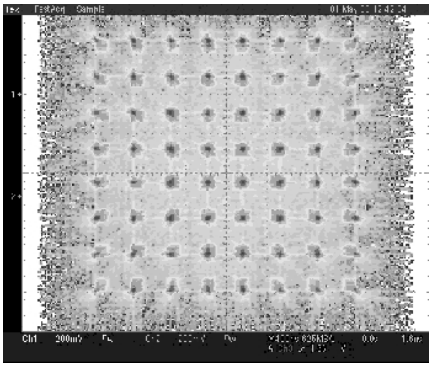


Figure 2–4: XY display

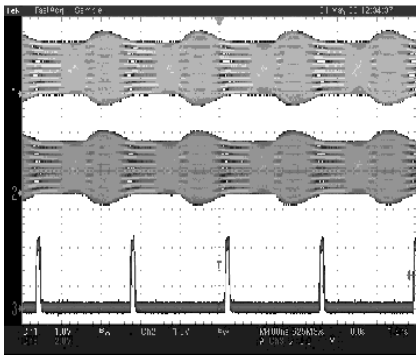


Figure 2–5: Y-T FastAcq display

XYZ Mode

Using the XYZ mode in place of the XY mode, permits the instrument to sample signals at precise times when the incoming signal is expected to be at the correct logic level. The Z parameter comes from connecting an additional probe from Channel 3 to the QAM CLK signal. The resulting QAM pattern will have data points at precise locations without the noise shown in the XY QAM pattern.

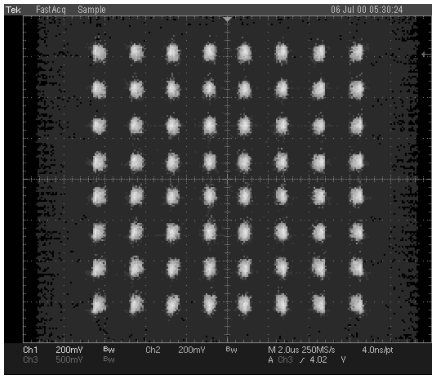


Figure 2–6: XYZ FastAcq display

A 250 mV Fast Rise Signal (Tr < 200 ps)

FAST RISE SIGNAL. This signal (J600) has an edge that is faster than the rise time of most oscilloscope, but Tektronix oscilloscope can measure this signal. There is a long (relative to rise time) 50 Ω run on the circuit board that is exposed and plated to allow for probing. This is intended to demonstrate the ability of a probe and oscilloscope system to display small time differences or skew. This signal can also be used as a deskew signal source (see Figure 2–7).

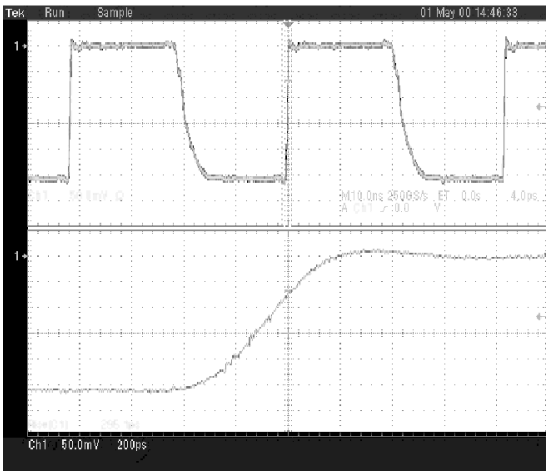


Figure 2–7: Fast Rise Signal

Dual Random Anomalies Signals

RAND ANOM I, CHEAT I, RAND ANOM II, CHEAT II. The Random Anomalies signals are square waves that have occasional glitches, short pulses and other signal changes inserted at random intervals. Two channels are provided for demonstrating two channel anomaly detection (see Figures 2–8 and 2–9).

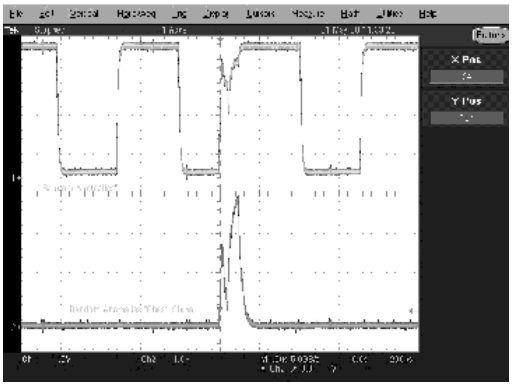


Figure 2–8: Random Anomaly with cheat signal

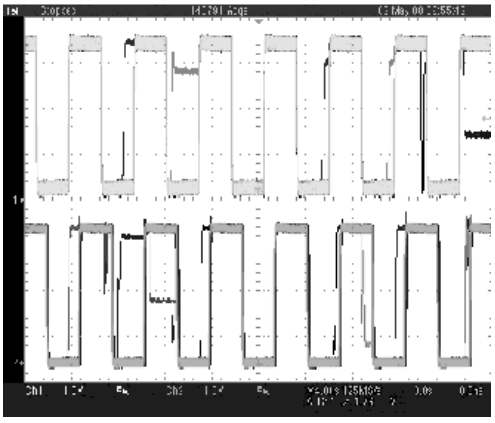


Figure 2–9: Dual Channel Random Anomalies

RESET ANOM

RESET ANOM. This switch (S2830) changes the signal output frequency and amplitude in a random fashion. The number of glitches per second is also varied by the RESET ANOM switch. The amplitude will be a value between 2.7 and 3.2 volts and the frequency will vary between 180 kHz and 320 kHz. The dual random anomaly outputs can be synchronized or unsynchronized by continuing to depress the RESET ANOM switch.

Phase Locked VCO Output Signals

PLL VCO OUTPUT. This voltage controlled oscillator output signal (J2410) provides a 2.5 volt (peak to peak) signal that is either 85 MHz or 68 MHz. For example, the peak-to-peak voltage is approximately 3.1 V when oscilloscope channel has 1MΩ of resistance or 1.8 V peak-to-peak when the oscilloscope channel has a resistance of 50 Ω.

VCO TUNING VOLTAGE. This voltage signal drives the VCO. Phase locked loop parameters determine how fast the VCO frequency will change to a new programmed value.

The PLL VCO and VCO TUNING (J2520) signals are useful for demonstrating the effect of different resolutions when comparing a high frequency envelope of a signal to a slowly varying control signal. This is demonstrated in Figures 2–10 and 2–11.

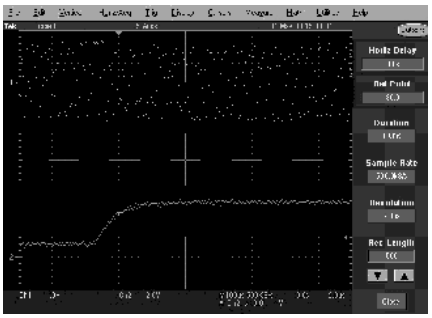


Figure 2–10: Low resolution display

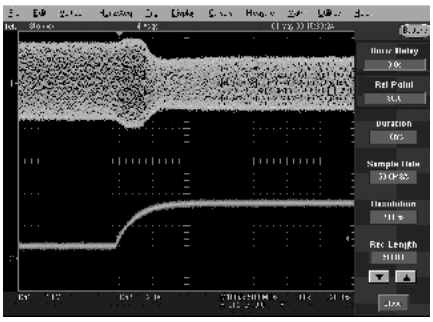


Figure 2–11: High resolution display

VCO MODE SELECT. This signal modifies the VCO output according to Table 1–1 on page 1–3. Switches 3 and 4 of S2810 (a DIP switch) allow selection of several modes of operation.

RF Modulation

You can obtain a modulated RF signal by connecting a probe to J1 located near the SMA connector (see page 2–8). The waveform has an amplitude that modulates between 40 and 80 mV when viewing the individual waveforms while the frequency modulation can be seen with a more compressed time scale.

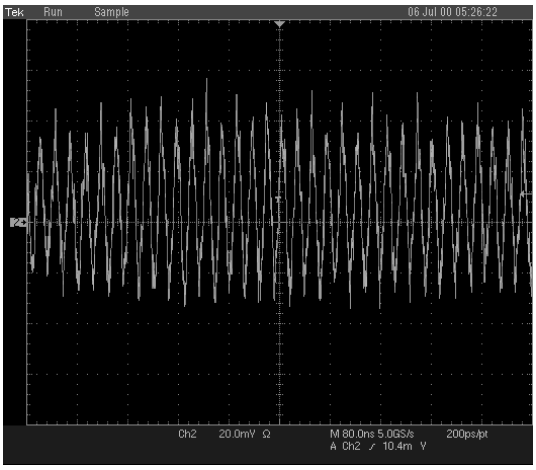


Figure 2–12: Modulated RF display

Pseudo Random Anomalies Signals

A five pin connector is included in the center of the board (J13) that generates four random digital signals and a clock. These signals are useful for demonstrating boolean trigger, state trigger, and other kinds of triggers (see Figure 2–13).

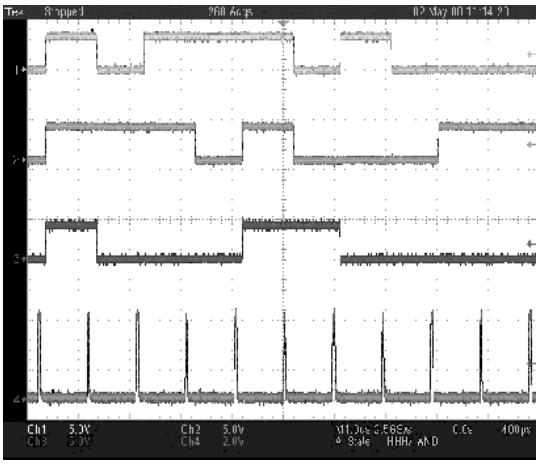


Figure 2–13: Pseudo-Random digital signals

Universal Serial Bus

USB DATA. USB signals from the host computer are available from J2 (see Figure 2–14). This testpoint will generate signals only when the USB cable is used to power the board. It is also necessary to connect a device such as a mouse to the USB output connector on the QuickStart8 board.

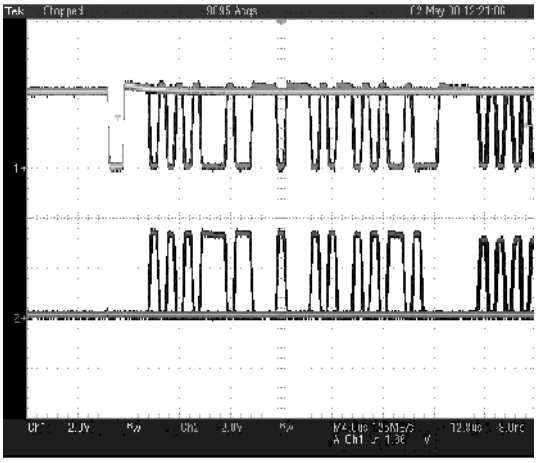


Figure 2–14: USB signals

Simulated Ground Bounce Signal

An unexpected positive transition on channel 1 (J14, pin 1) is generated whenever the signal on channel two (J14, pin 2) transitions from positive to negative. This positive transition occurs at intervals of 0.1 seconds to several seconds (see Figure 2–15).

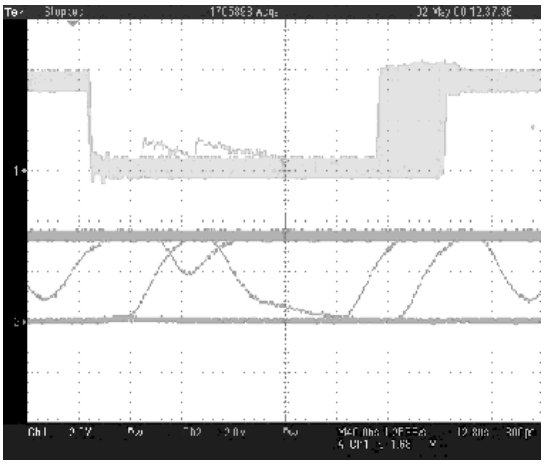


Figure 2–15: Simulated Ground Bounce signal

Appendices

Appendix A: Diagrams

This section contains the schematic diagrams for the QuickStart8 board.

Symbols

Graphic symbols and class designation letters are based on ANSI Standard Y32.2-1975. Abbreviations are based on ANSI Y1.1-1972.

Logic symbology is based on ANSI/IEEE Standard 91-1984 in terms of positive logic. Logic symbols depict the logic function performed and can differ from the manufacturer's data.

The pound (*) after a signal name indicates that the signal performs its intended function when in the low state.

Other standards used in the preparation of diagrams by Tektronix, Inc., include the following:

- Tektronix Standard 062-2476 *Symbols and Practices for Schematic Drafting*
- ANSI Y14.159-1971 *Interconnection Diagrams*
- ANSI Y32.16-1975 *Reference Designations for Electronic Equipment*
- MIL-HDBK-63038-1A *Military Standard Technical Manual Writing Handbook*

Component Values

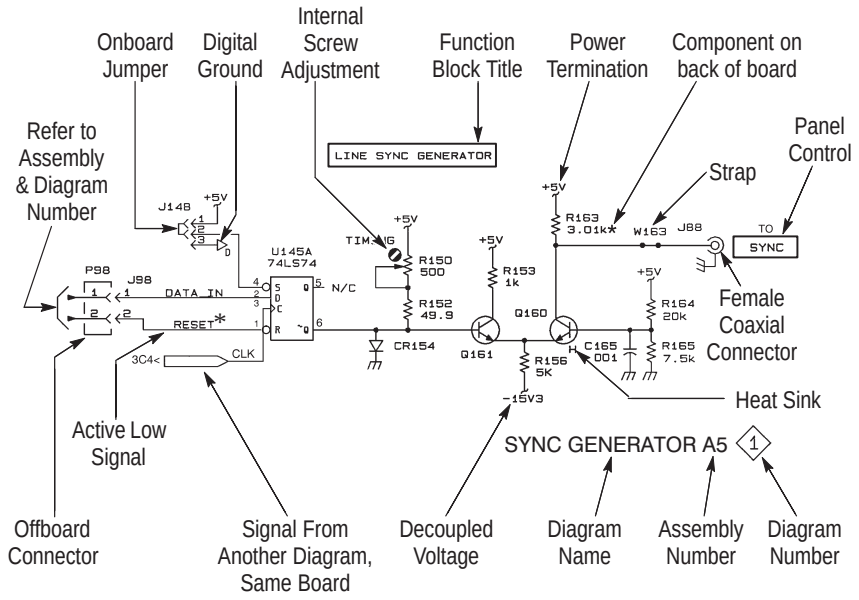
Electrical components shown on the diagrams are in the following units unless noted otherwise:

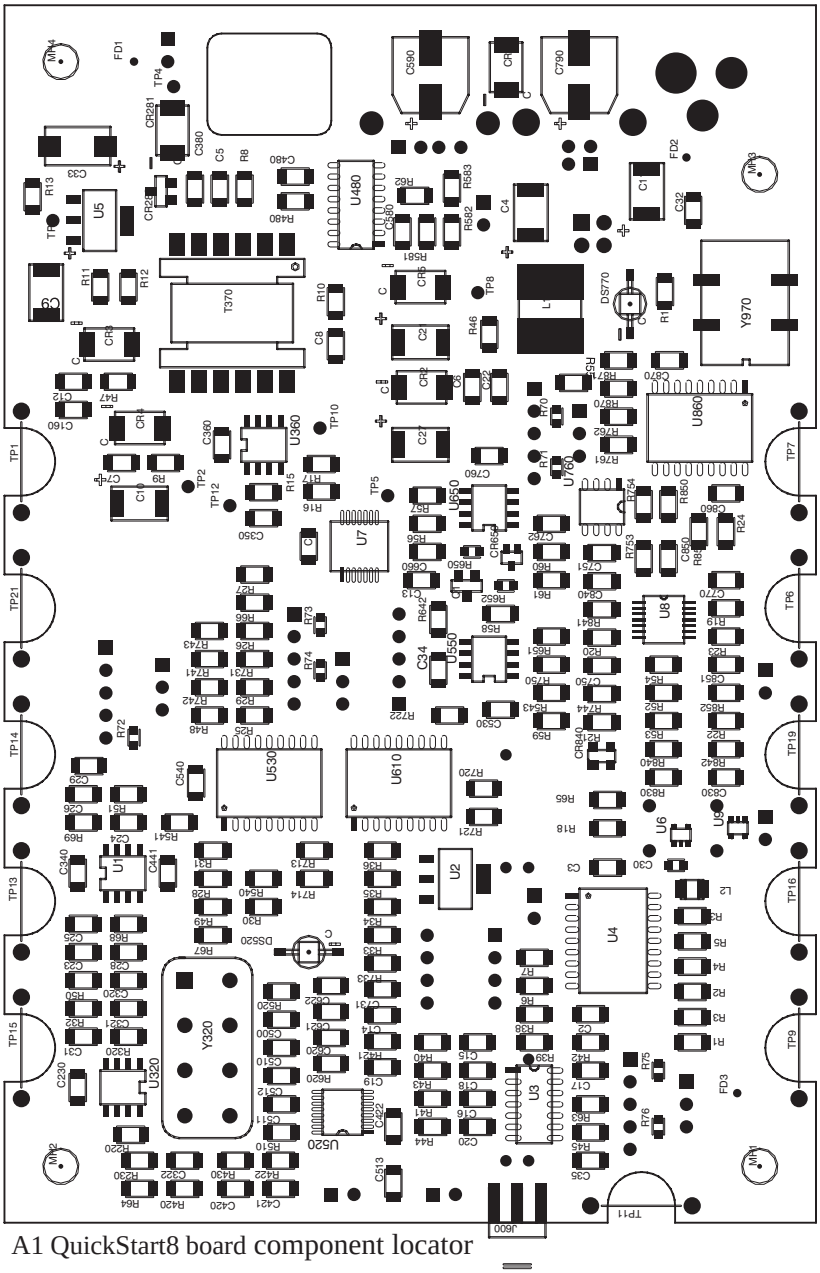
Capacitors: Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).

Resistors: Values are in ohms (Ω).

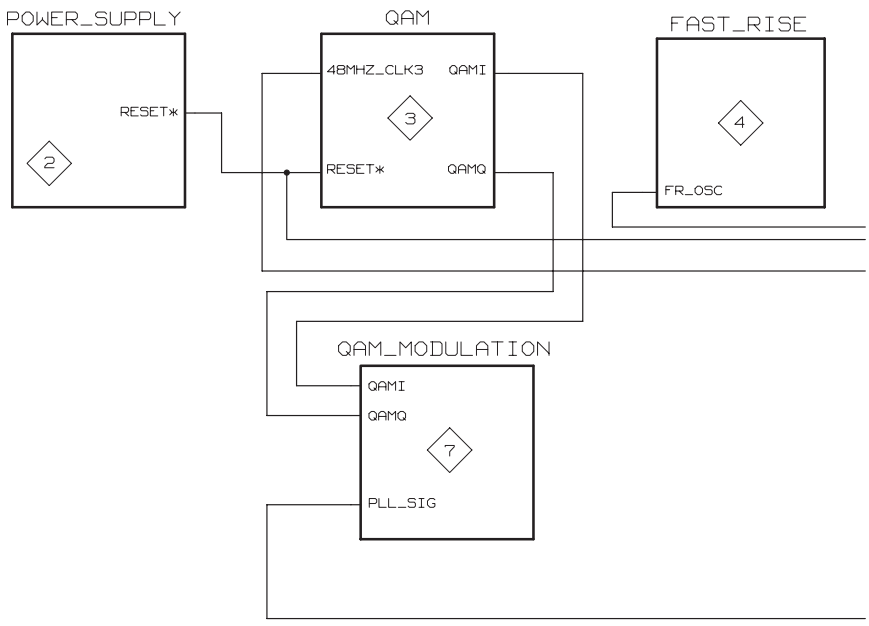
Graphic Items and Special Symbols Used in This Manual

Each assembly in the instrument is assigned an assembly number (for example, A5). The assembly number appears in the title on the diagram and the circuit board illustration.





A1 QuickStart8 board component locator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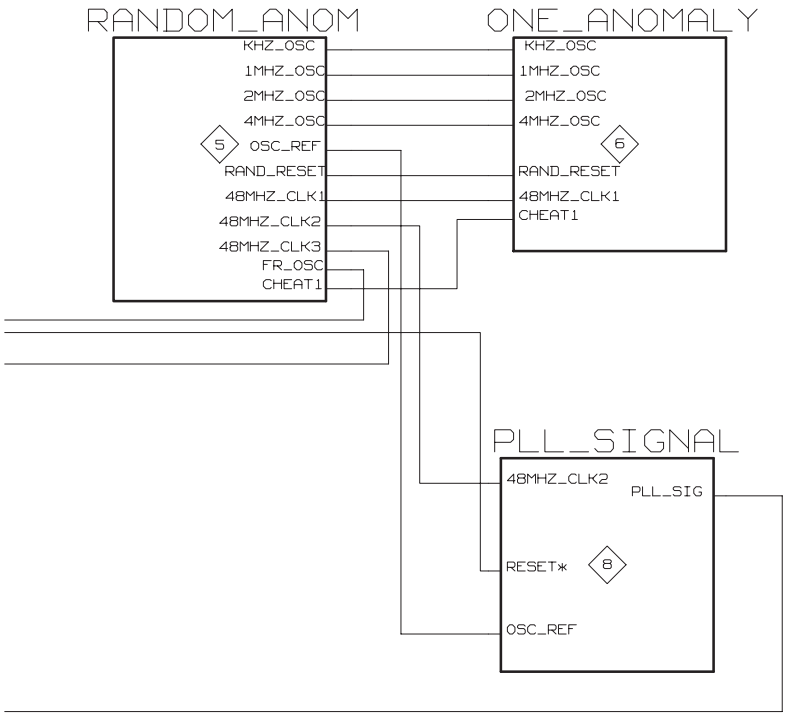
RESET*
2
QAM
48MHZ_CLK3
QAMI
3
RESET*
QAMQ
FAST_RISE
4
FR_OSC
QAM_MODULATION
QAMI
QAMQ
7
PLL_SIG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KHZ_OSC
1MHZ_OSC
2MHZ_OSC
4MHZ_OSC
5
OSC_REF
RAND_RESET
48MHZ_CLK1
48MHZ_CLK2
48MHZ_CLK3
FR_OSC
CHEAT1
ONE_ANOMALY
KHZ_OSC
1MHZ_OSC
2MHZ_OSC
4MHZ_OSC
6
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CHEAT1
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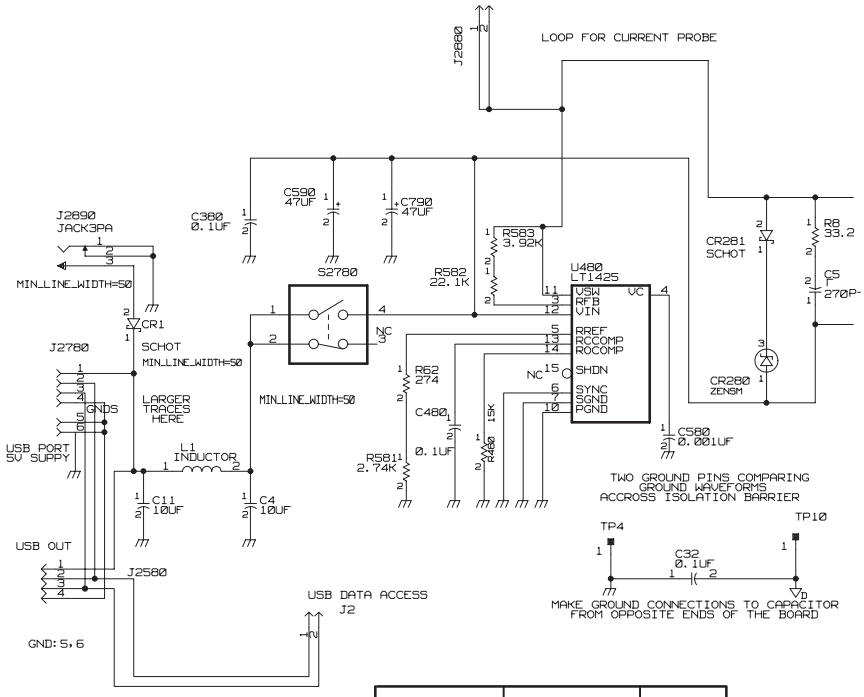
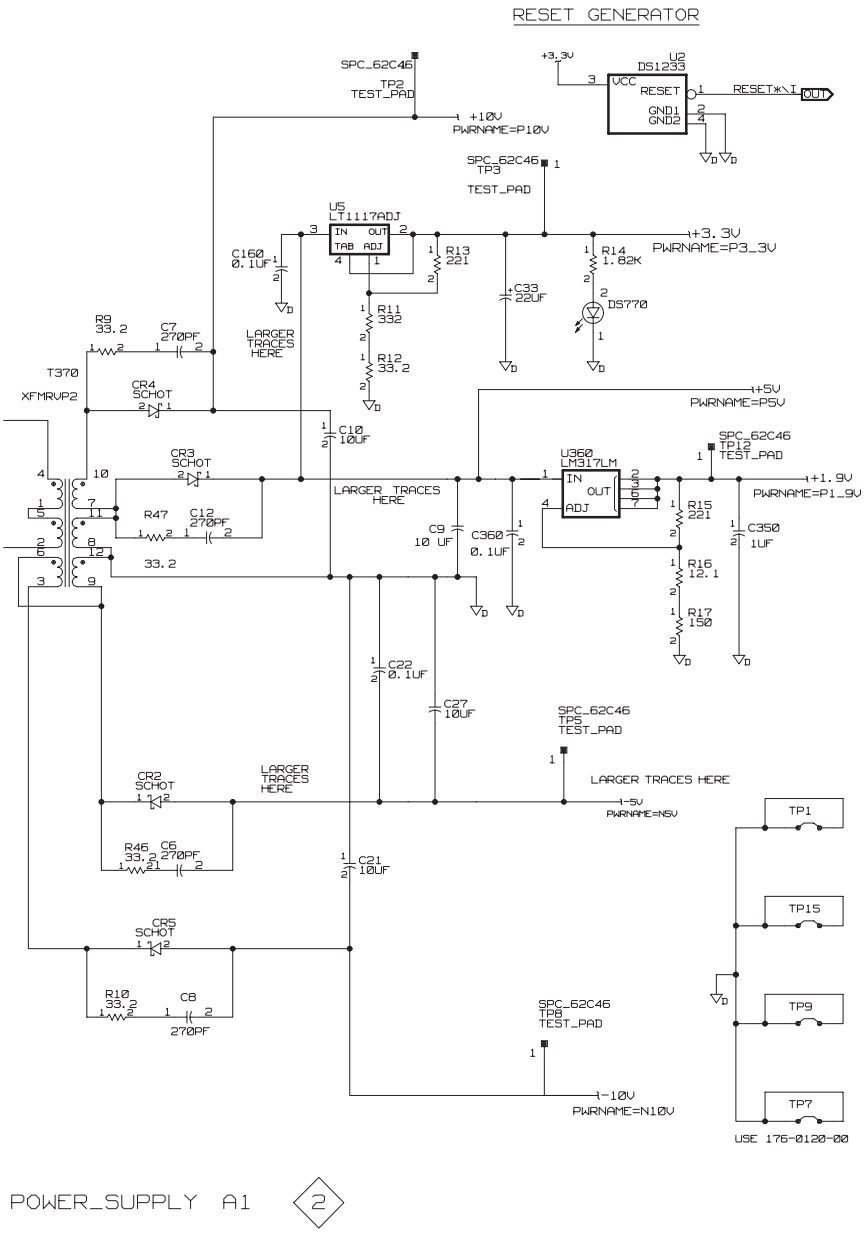
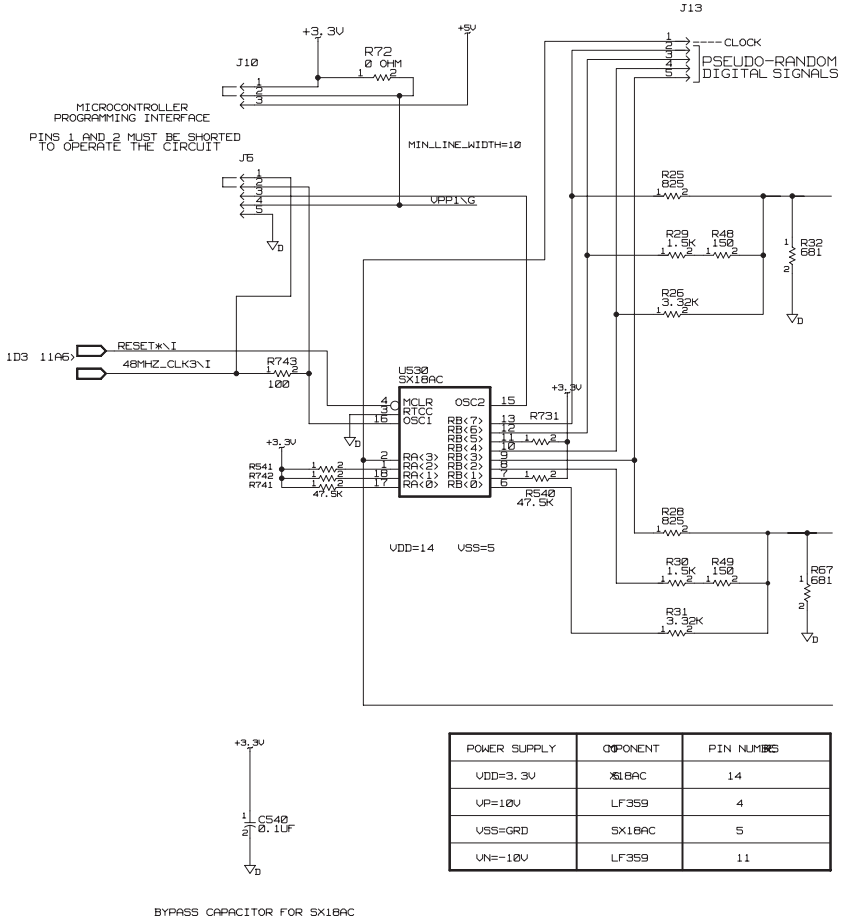
48MHZ_CLK2
PLL_SIG
RESET*
8
OSC_REF



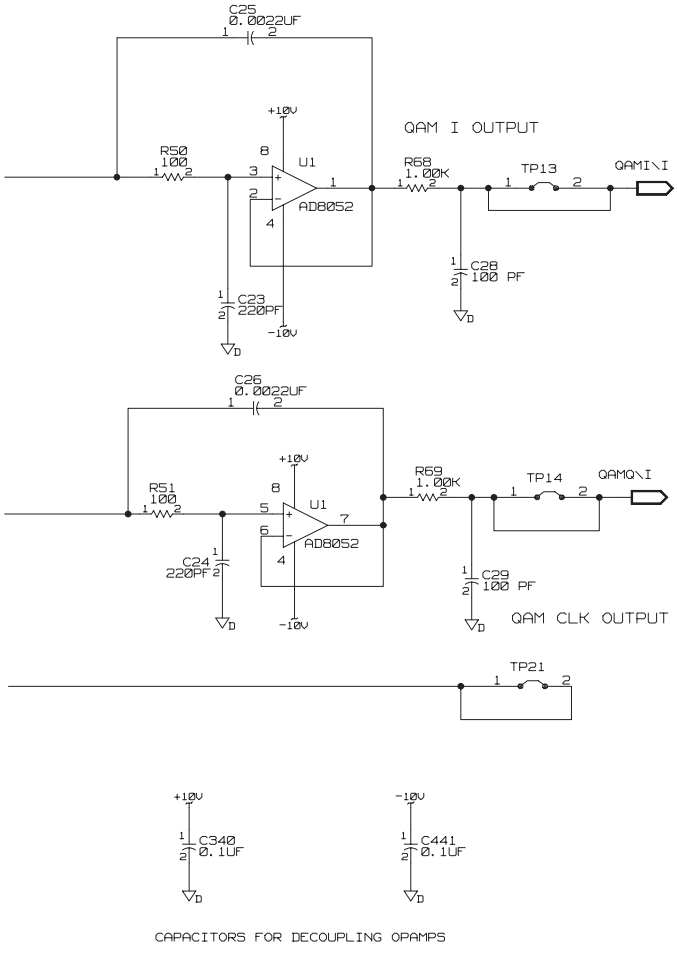
POWER SUPPLY	COMPONENT	PINS
GND=CHASSIS	USB KEYBOARD CONNECTOR	5, 6
GND=CHASSIS	LT1425	1, 8, 9, 16
GND=DGND	7805_SMD	2

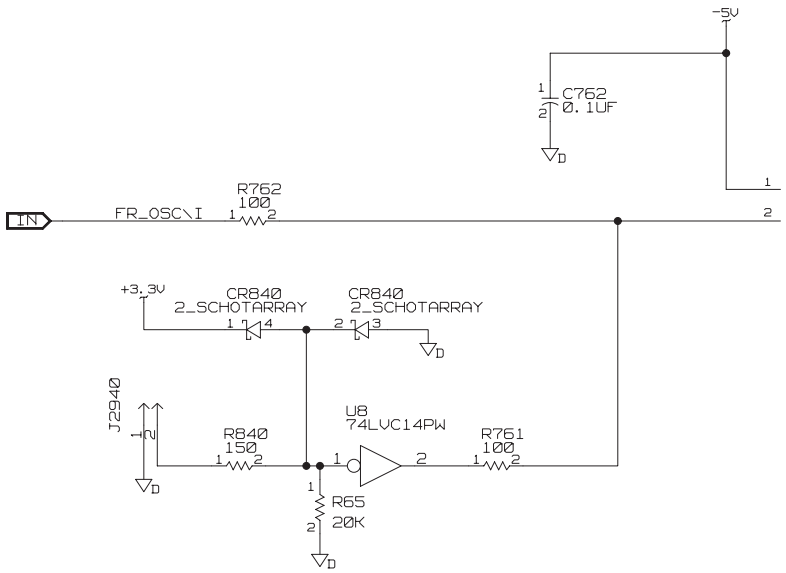
POWER_SUPPLY A1 2

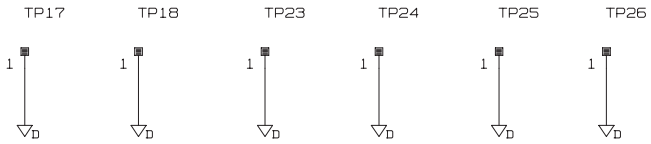

RESET GENERATOR
SPC_62C46
TP2
TEST_PAD
+10V
PWRNAME=P10V
+3.3V
U2
DS1233
VCC
RESET
RESET*\I
OUT
GND1
GND2
SPC_62C46
TP3
TEST_PAD
U5
LT1117ADJ
IN
OUT
TAB
ADJ
C160
0.1UF
R13
221
+C33
22UF
R14
1.82K
+3.3V
PWRNAME=P3_3V
DS770
R11
332
R12
33.2
R9
33.2
C7
270PF
LARGER
TRACES
HERE
T370
XFMRVP2
CR4
SCHOT
C10
10UF
+5V
PWRNAME=P5V
SPC_62C46
TP12
TEST_PAD
CR3
SCHOT
U360
LM317LM
IN
OUT
ADJ
+1.9V
PWRNAME=P1_9V
LARGER TRACES
HERE
R47
C12
270PF
33.2
C9
10 UF
C360
0.1UF
R15
221
C350
1UF
R16
12.1
R17
150
C22
0.1UF
C27
10UF
SPC_62C46
TP5
TEST_PAD
LARGER TRACES HERE
CR2
SCHOT
LARGER
TRACES
HERE
-5V
PWRNAME=N5V
R46
33.2
C5
270PF
C21
10UF
CR5
SCHOT
R10
33.2
C8
270PF
SPC_62C46
TP8
TEST_PAD
-10V
PWRNAME=N10V
TP1
TP15
TP9
TP7
USE 175-0120-00
POWER_SUPPLY A1
2



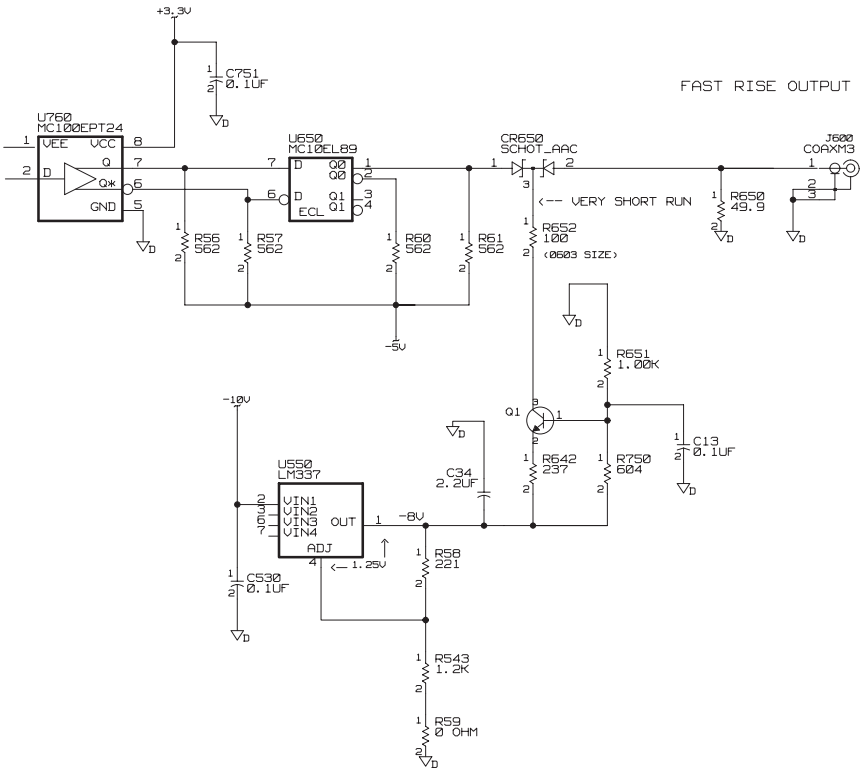
POWER SUPPLY	COMPONENT	PIN NUMBERS
VDD=3.3V	SX18AC	14
VP=10V	LF359	4
VSS=GRD	SX18AC	5
VN=-10V	LF359	11


C25
0.0022UF
+10V
QAM I OUTPUT
R50
100
U1
AD8052
R68
1.00K
TP13
QAMI\I
C28
100 PF
C23
220PF
-10V
C26
0.0022UF
+10V
R51
100
U1
AD8052
R69
1.00K
TP14
QAMQ\I
C24
220PF
C29
100 PF
QAM CLK OUTPUT
-10V
TP21
+10V
C340
0.1UF
-10V
C441
0.1UF
CAPACITORS FOR DECOUPLING OPAMPS
QAM A1
3



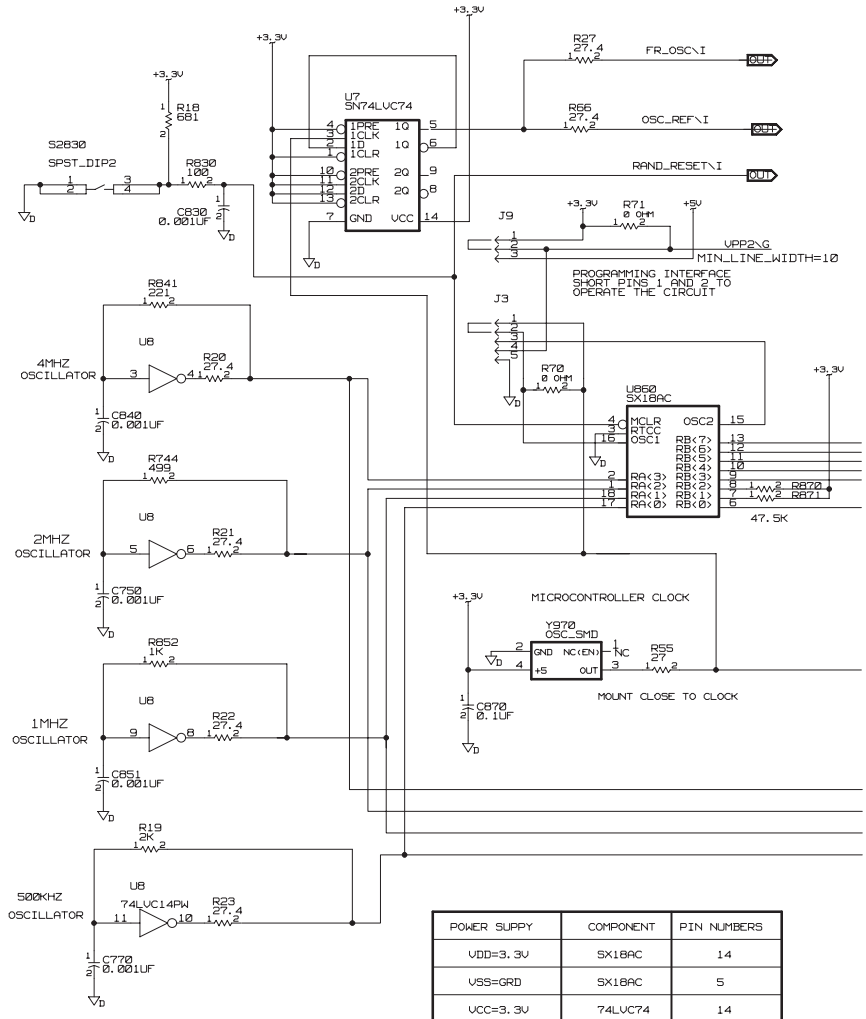


FAST_RISE A1 4



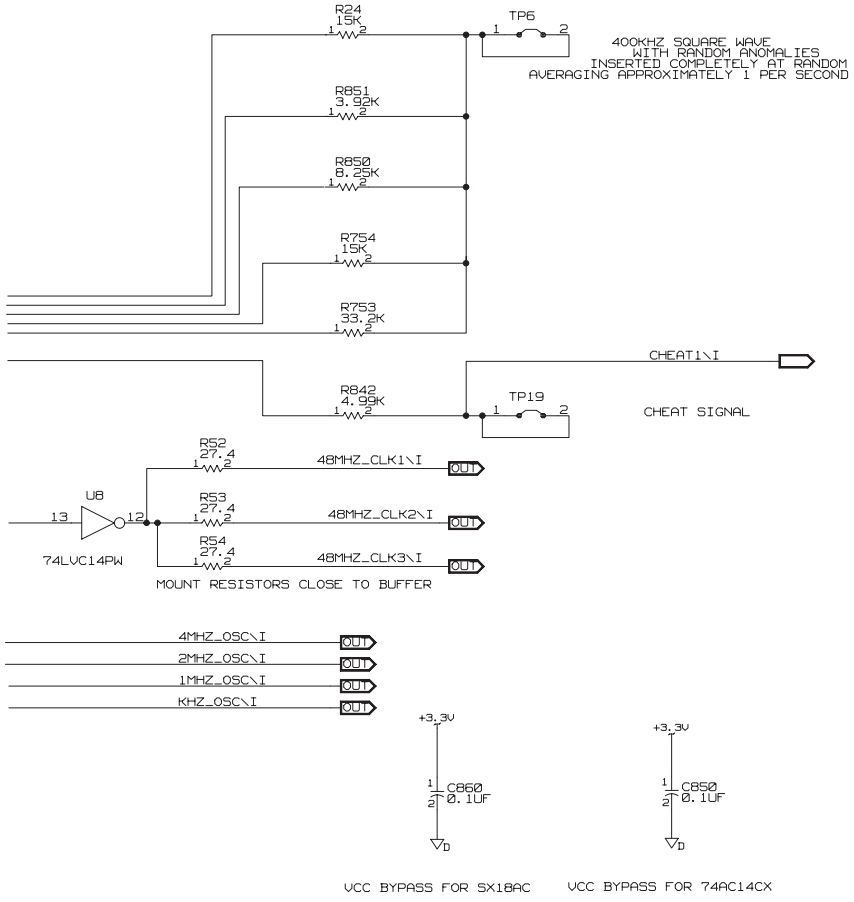
POWER SUPPLY	COMPONENT	PIN NUMBER
VCC= 6V	MC100EPT24	8
VCC= 1.9V	MC10EL89	8
VCC=5V	74LVC74	14
VEE= N3.3V	MC10EL89	5
VEE=GND	74LVC74	7
VEE= N6V	MC100EPT24	1

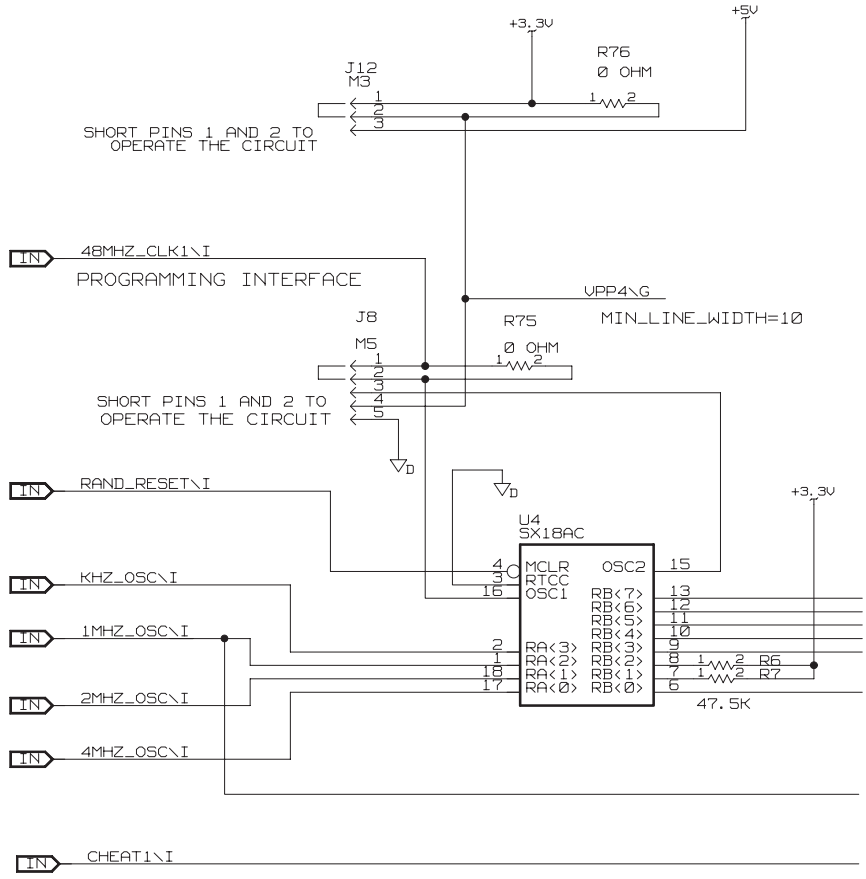
FAST_RISE A1 4



POWER SUPPY	COMPONENT	PIN NUMBERS
VDD=3.3V	SX18AC	14
VSS=GRD	SX18AC	5
VCC=3.3V	74LVC74	14
VEE=GRD	74LVC74	7

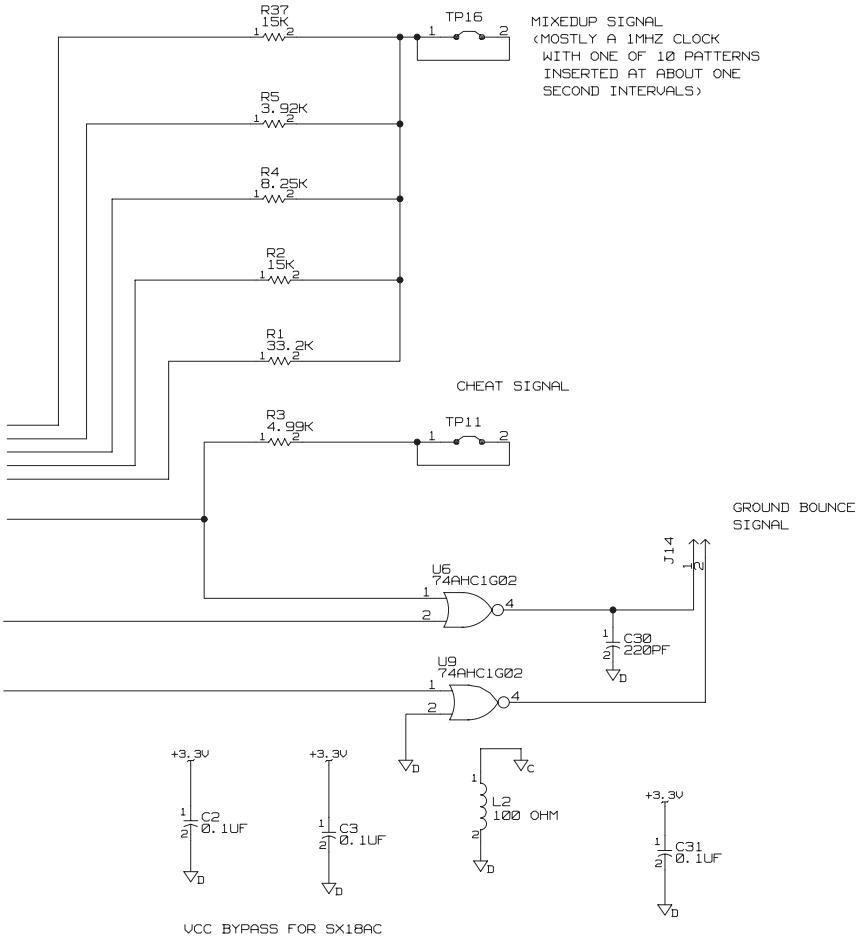
RANDOM_ANOMALIES A1 5

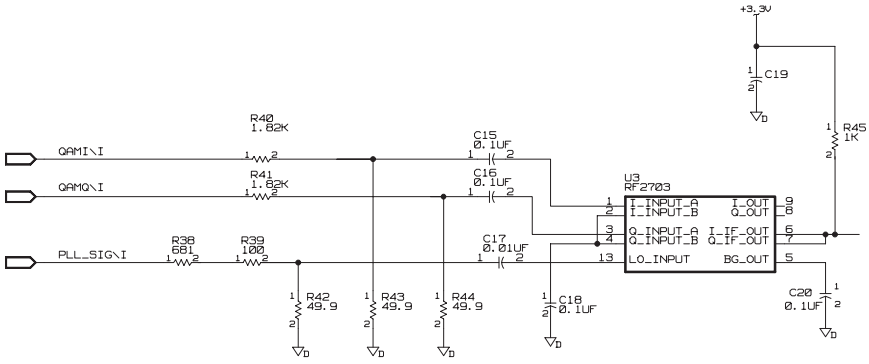

R24
15K
TP6
400KHZ SQUARE WAVE
WITH RANDOM ANOMALIES
INSERTED COMPLETELY AT RANDOM
AVERAGING APPROXIMATELY 1 PER SECOND
R851
3.92K
R850
8.25K
R754
15K
R753
33.2K
CHEAT1\I
R842
4.99K
TP19
CHEAT SIGNAL
R52
27.4
48MHZ_CLK1\I
OUT
U8
13
12
R53
27.4
48MHZ_CLK2\I
OUT
74LVC14PW
R54
27.4
48MHZ_CLK3\I
OUT
MOUNT RESISTORS CLOSE TO BUFFER
4MHZ_OSC\I
2MHZ_OSC\I
1MHZ_OSC\I
KHZ_OSC\I
OUT
+3.3V
C860
0.1UF
+3.3V
C850
0.1UF
VCC BYPASS FOR SX18AC
VCC BYPASS FOR 74AC14CX
RANDOM_ANOMALIES A1
5



POWER SUPPY	COMPONENT	PIN NUMBERS
VDD=3.3	SX18AC	14
VSS=GND	SX18AC	5
VDD=3.3	74AHC1G02	5
GND=COMMON	74AHC1G02	3

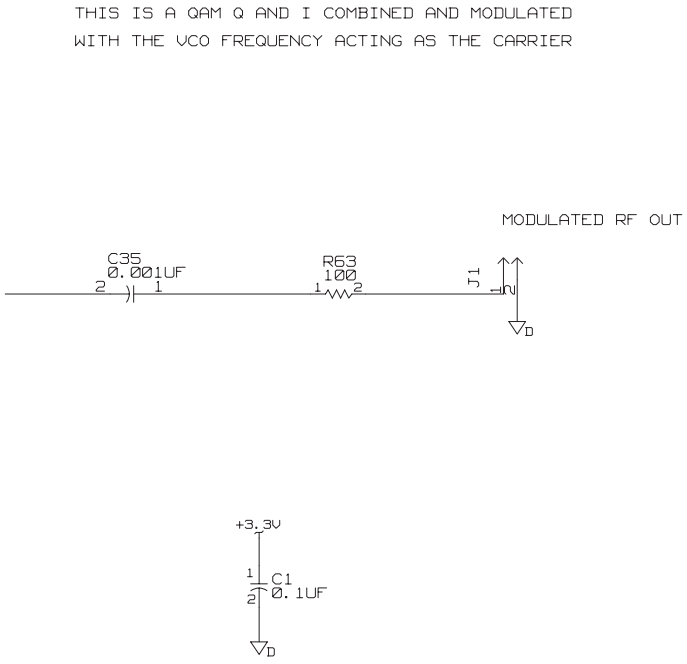
RANDOM_ANOMALIES A1 6

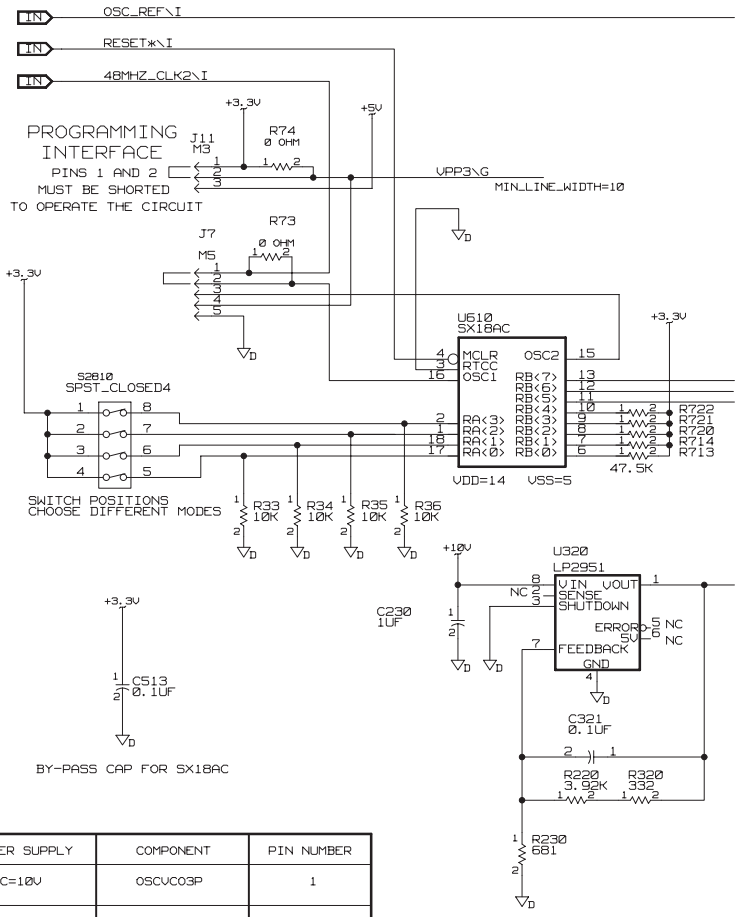

R37
15K
TP16
MIXEDUP SIGNAL
(MOSTLY A 1MHZ CLOCK
WITH ONE OF 10 PATTERNS
INSERTED AT ABOUT ONE
SECOND INTERVALS)
R5
3.92K
R4
8.25K
R2
15K
R1
33.2K
CHEAT SIGNAL
R3
4.99K
TP11
GROUND BOUNCE
SIGNAL
J14
U6
74AHC1G02
C30
220PF
U9
74AHC1G02
+3.3V
C2
0.1UF
+3.3V
C3
0.1UF
L2
100 OHM
+3.3V
C31
0.1UF
VCC BYPASS FOR SX18AC
RANDOM_ANOMALIES A1
6



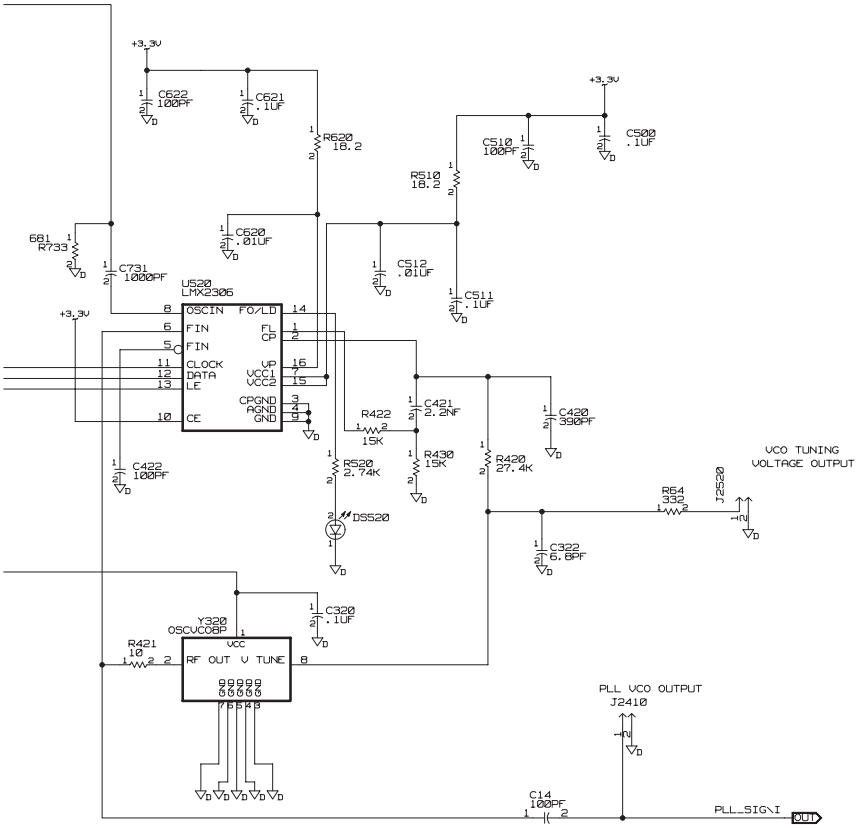
POWER SUPPLY	COMPONENT	PINS
GND=DGND	RF2703	10, 11, 12
VCC=3.3V	RF2703	14

QAM_MOD A1 7


THIS IS A QAM Q AND I COMBINED AND MODULATED
WITH THE VCO FREQUENCY ACTING AS THE CARRIER
MODULATED RF OUT
C35
0.001UF
R63
100
J1
D
+3.3V
C1
0.1UF
D
QAM_MOD A1
7



POWER SUPPLY	COMPONENT	PIN NUMBER
VCC=10V	OSCVC03P	1
VDD=3.3V	SX18AC	14
VDCP5=3.3V	R3171125MHZ	4
VCC=3.3V	LMX2306	7, 15
VP=3.3	LMX2306	16
VSS=DGRD	SX18AC	5
VEE=DGRD	R3171125MHZ	2
GRN=DGND	OSCVC03P	3, 4, 5, 6, 7


+3.3V
C622
100PF
C621
.1UF
R620
18.2
C510
100PF
C500
.1UF
R510
18.2
681
R733
C731
1000PF
C620
.01UF
C512
.01UF
C511
.1UF
U520
LMX2306
OSCIN
FIN
FIN
CLOCK
DATA
LE
CE
FO/LD
FL
CP
VP
VCC1
VCC2
CPGND
AGND
GND
R422
15K
C421
2.2NF
C420
390PF
C422
100PF
R520
2.74K
R430
15K
R420
27.4K
VCO TUNING
VOLTAGE OUTPUT
J5200
R64
330
DS520
C322
6.8PF
C320
.1UF
Y320
OSCVCO8P
R421
10
VCC
RF OUT
V TUNE
PLL VCO OUTPUT
J2410
C14
100PF
PLL_SIG\I
OUT
PLL_SIGNAL A1
8

Appendix A: Diagrams

Appendix B: Instrument Care

This section includes:

- Care and Maintenance
- Shipping the QuickStart8 board

Care and Maintenance

The QuickStart8 board does not require scheduled or periodic maintenance. However, to keep good electrical contact and efficient heat dissipation, keep the board free of dirt, dust, and contaminants. When not in use, store the QuickStart8 board in the original shipping bag.

Cleaning. Clean dirt and dust with a soft bristle brush. For more extensive cleaning, use only a damp cloth moistened with deionized water; do not use any other chemical cleaning agents.

Preventing Electrostatic Discharge. When handling the QuickStart8 board, adhere to the following precautions to avoid damaging electronic components.

CAUTION. *Static discharge can damage semiconductor components on the QuickStart8 board.*

1. Minimize handling of the board by touching only the edges.
2. Transport and store the board in the static-protected container.
3. Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling the training board.
4. Do not place anything capable of generating or holding a static charge on the work station surface.

Shipping the QuickStart8 board.

To commercially transport the QuickStart board or transformer, package the board or transformer as follows:

1. Obtain a corrugated card board shipping carton with inside dimensions at least six inches greater than the board or transformer dimensions and with a carton test strength of at least 889.6 Newton Lbs/200 pounds.
2. If you are shipping the package to a Tektronix service center for Warranty service, attach a tag to the board or transformer showing the following:
   - Owner's name and address
   - Name of a person who can be contacted
   - Board or transformer type and serial number
   - Description of the problem
3. Place the board in an antistatic bag to protect static-sensitive components.
4. Tightly pack dunnage or urethane foam between the carton and the board or transformer (allowing 7.62 cm/three inches on each side) to cushion the board or transformer on all sides.

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