AEROFLEX

PRELIMINARY

XPDR/DME/TCAS ADS-B/TIS/TIS-B Test Set IFR 6000

Maintenance Manual

1002-5800-400

PRELIMINARY

MAINTENANCE MANUAL

XPDR/DME/TCAS/ADS-B/TIS/TIS-B

TEST SET

IFR 6000

PUBLISHED BY
Aeroflex

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FOR QUALIFIED SERVICE PERSONNEL ONLY

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Cable Statements:

For continued EMC compliance, all external cables must be double shielded.

For continued EMC compliance, all external cables must be 3 meters or less in length.

Nomenclature Statement:

In this manual Test Set or Unit refers to the IFR 6000 XPDR/DME/TCAS/ADS-B/TIS/TIS-B Test Set.

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SAFETY FIRST: TO ALL OPERATIONS PERSONNEL

REFER ALL SERVICING OF UNIT TO QUALIFIED TECHNICAL PERSONNEL. THIS UNIT CONTAINS NO OPERATOR SERVICEABLE PARTS.

WARNING: USING THIS EQUIPMENT IN A MANNER NOT SPECIFIED BY THE ACCOMPANYING DOCUMENTATION MAY IMPAIR THE SAFETY PROTECTION PROVIDED BY THE EQUIPMENT.

CASE, COVER OR PANEL REMOVAL

Opening the Case Assembly exposes the operator to electrical hazards that can result in electrical shock or equipment damage. Do not operate this Test Set with the Case Assembly open.

SAFETY IDENTIFICATION IN TECHNICAL MANUAL

This manual uses the following terms to draw attention to possible safety hazards, that may exist when operating or servicing this equipment.

CAUTION: THIS TERM IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN EQUIPMENT OR PROPERTY DAMAGE (E.G., FIRE).

WARNING: THIS TERM IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN PERSONAL INJURY OR DEATH.

SAFETY SYMBOLS IN MANUALS AND ON UNITS

CAUTION: Refer to accompanying documents. (This symbol refers to specific CAUTIONS represented on the unit and clarified in the text.)

AC OR DC TERMINAL: Terminal that may supply or be supplied with AC or DC voltage.

DC TERMINAL: Terminal that may supply or be supplied with DC voltage.

AC TERMINAL: Terminal that may supply or be supplied with AC or alternating voltage.

EQUIPMENT GROUNDING PRECAUTION

Improper grounding of equipment can result in electrical shock.

USE OF PROBES

Check the specifications for the maximum voltage, current and power ratings of any connector on the Test Set before connecting it with a probe from a terminal device. Be sure the terminal device performs within these specifications before using it for measurement, to prevent electrical shock or damage to the equipment.

POWER CORDS

Power cords must not be frayed, broken nor expose bare wiring when operating this equipment.

USE RECOMMENDED FUSES ONLY

Use only fuses specifically recommended for the equipment at the specified current and voltage ratings.

INTERNAL BATTERY

This unit contains a Lithium Ion Battery, serviceable only by a qualified technician.

CAUTION: SIGNAL GENERATORS CAN BE A SOURCE OF ELECTROMAGNETIC INTERFERENCE (EMI) TO COMMUNICATION RECEIVERS. SOME TRANSMITTED SIGNALS CAN CAUSE DISRUPTION AND INTERFERENCE TO COMMUNICATION SERVICES OUT TO A DISTANCE OF SEVERAL MILES. USERS OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION THAT RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY) AND SHOULD TAKE NECESSARY PRECAUTIONS TO AVOID POTENTIAL COMMUNICATION INTERFERENCE PROBLEMS.

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TABLE OF CONTENTS

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INTRODUCTION

This manual contains the information necessary to test and repair the IFR 6000.

It is strongly recommended that personnel be thoroughly familiar with the contents of this manual before attempting to perform maintenance on this equipment.

Only qualified personnel should perform maintenance on this equipment.

ORGANIZATION

This manual is divided into the following Chapters and Sections:

CHAPTER 2 - MAINTENANCE

Section 1 - SERVICING (preventive maintenance)

Section 2 - TROUBLESHOOTING (theory of operation, troubleshooting procedures, calibration/verification, assembly drawings)

Section 3 - DISASSEMBLY/REASSEMBLY

Section 4 - PARTS LIST

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CHAPTER TWO

IFR 6000 NAV/COMM TEST SET

MAINTENANCE MANUAL

TABLE OF CONTENTS

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LIST OF ILLUSTRATIONS

LIST OF TABLES

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SECTION 1 - SERVICING

1. Preventive Maintenance Procedures

Contains routine maintenance instructions for cleaning and inspecting the Test Set.

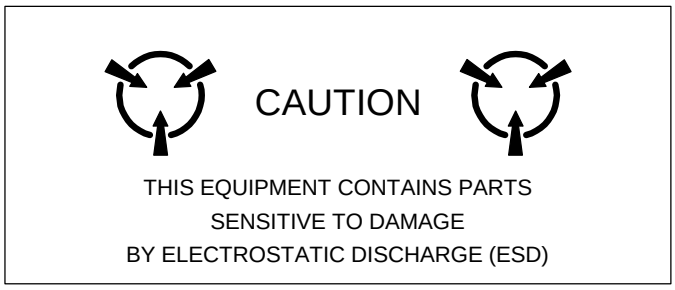
CAUTION: DISCONNECT POWER FROM TEST SET TO AVOID POSSIBLE DAMAGE TO ELECTRONIC CIRCUITS.

A. External Cleaning

STEP	PROCEDURE

1. Clean front panel and display face with soft lint-free cloth. If dirt is difficult to remove, dampen cloth with water and mild liquid detergent.
2. Remove grease, fungus and ground-in dirt from surfaces with soft lint-free cloth dampened (not soaked) with isopropyl alcohol.
3. Remove dust and dirt from connectors with soft-bristled brush.
4. Cover connectors, not in use, with suitable dust cover to prevent tarnishing of connector contacts.
5. Clean cables with soft lint-free cloth.
6. Paint exposed metal surface to avoid corrosion.

B. Internal Cleaning



CAUTION: DO NOT MOVE COMPONENTS ON CIRCUIT BOARDS OR DISASSEMBLE CONNECTORS NEEDLESSLY TO AVOID POSSIBLE DAMAGE.

CAUTION: DO NOT OPEN COMPLEX INTERNAL MODULES FOR SOLE PURPOSE OF CLEANING AND INSPECTION.

Remove dust with hand-controlled dry air jet of 15 psi (1.054 kg/cm^2) and wipe internal chassis parts and frame with soft lint-free cloth moistened with isopropyl alcohol.

C. Visual Inspection

STEP	PROCEDURE

1. Inspect Chassis for:
   - Tightness of sub-assemblies and chassis mounted connectors.
   - Corrosion or damage to metal surfaces.
2. Inspect Capacitors for:
   - Loose mounting, deformities or obvious physical damage.
   - Leakage or corrosion around leads.
3. Inspect Connectors for:
   - Loose or broken parts, cracked insulation and bad contacts.
4. Inspect Circuit Boards for:
   - Corrosion or damage to connectors.
   - Damage to mounted components including crystals and ICs.
   - Freedom from foreign material.
5. Inspect Resistors for:
   - Cracked, broken, charred or blistered bodies.
   - Loose or corroded soldering connections.
6. Inspect Semiconductors for:
   - Cracked, broken, charred or discolored bodies.
   - Correct placement and condition of seals around leads.
7. Inspect Wiring for:
   - Broken or loose ends and connections.
   - Proper dress relative to other chassis parts.

   NOTE: Verify wrapped wiring is tight.

SECTION 2 - TROUBLESHOOTING

1. Theory of Operation

A. Power Supply PCB Assy

The Power Supply PCB Assy is responsible for supplying power to the internal modules for operation and for charging the internal batteries. The Power Supply PCB Assy operates from externally supplied DC power and provides simultaneous run and battery charge, or battery charge only. The battery charge time increases when in the run and charge mode. The Power Supply Assy consists of a DC-DC Converter, ON/OFF Control circuitry and the Battery Charger circuitry. The external DC input is supplied from an External DC Power Supply (supplied).

The internal batteries are removable/replaceable Li Ion battery packs with an internal "gas-gauge" feature that allows accurate determination of remaining battery life. Maximum operating and storage temperature for Li Ion batteries is -20°C to +60°C and the maximum charging temperature is 0°C to +45°C.

The Power Supply PCB Assy contains a synchronous buck converter to convert the input voltage to a fixed output voltage (+10 Vdc). The Power Supply PCB Assy also contains a low-pass filter to reduce the amount of internal emissions. The Input Converter Assembly is capable of providing enough output current to charge the battery at full current and run the Test Set at the same time, as long as the input voltage is within range.

(1) Battery Charger

The battery charger is a boost type converter. This battery charger monitors the battery voltage and temperature to determine if the battery is capable of being recharged, and if it is safe to attempt to recharge the battery. The battery must be at least at a 9.2 V level and the temperature must be between 0° and 45°C before a charge cycle initiates.

(2) Output Circuitry

The output converters are comprised of a dual-phase synchronous buck converter for developing +3.3 and +5 V outputs. The converter also has an auxiliary output that is used to generate +16 V from the +VS source (either the battery or input converter). A separate buck/boost converter is used to generate the -5 V output. The primary converter provides dual phase control, as well as gate drive for the switching mosfets and over-current protection. The main converter runs at 220 kHz, while the auxiliary converter runs at 1.2 MHz.

Both +3.3 and +5 V outputs are capable of delivering up to 3 A of current and the 16 V output can deliver up to 80 mA. If any of these three outputs experience a severe over-current, the supply turns OFF.

The -5 V converter is a stand-alone buck/boost converter that runs at approximately 220 kHz and can deliver up to 400 mA of current before starting to fold back. If the supply experiences a severe over-current condition, the supply stays in fold-back mode until the short is removed.

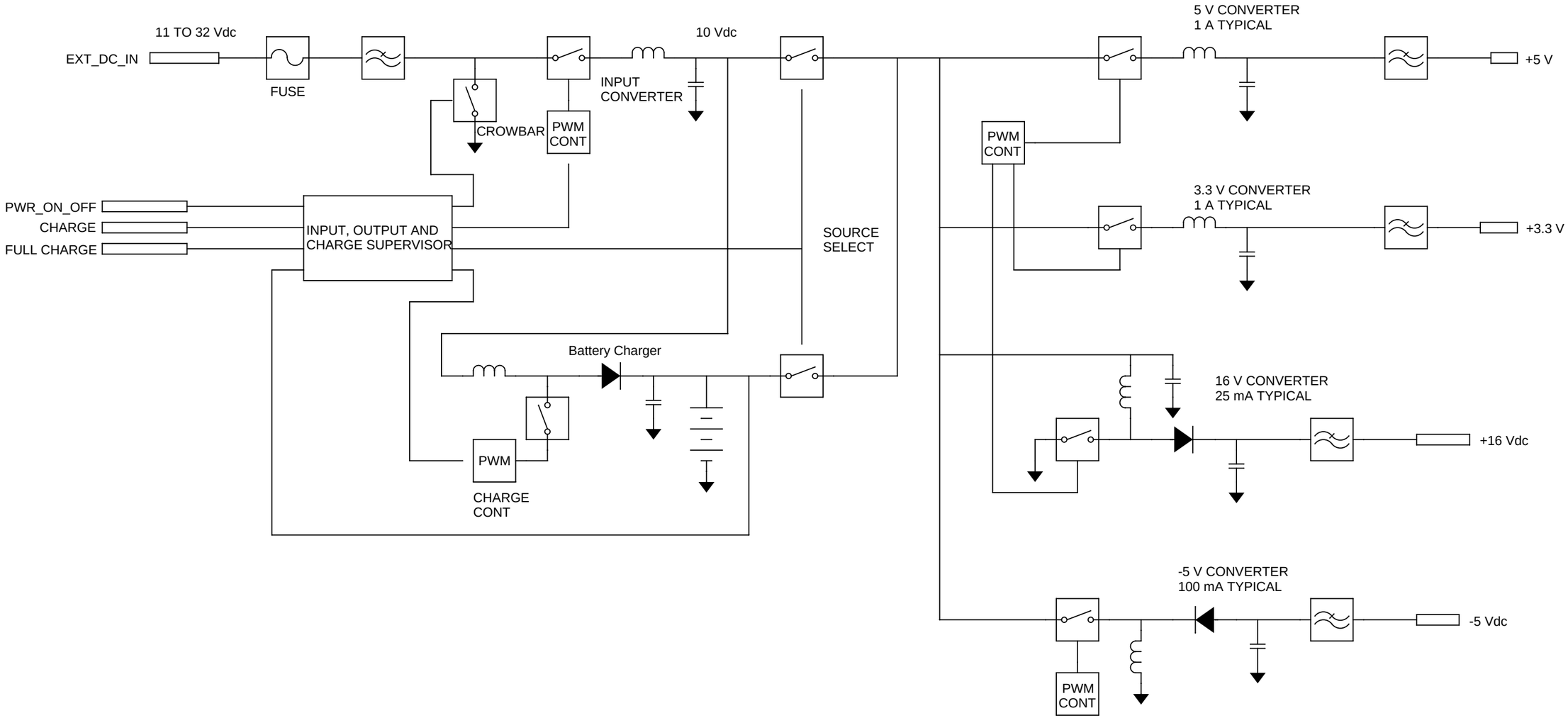
(3) Source Select Circuitry

The source select circuitry is designed to be a low-loss switch that selects the appropriate source when the output of the ON/OFF circuitry is high. The external DC (+Vdc) is selected if present. If external DC is not present, the battery (VBAT+) connects to +VS. If the Test Set is running on external DC or Line Voltage, and that power source is removed, the Test Set shuts OFF.

The second function of the switching circuitry is to prevent battery current from flowing into the input converter section when the Test Set is running on battery power. A low voltage cutoff is also incorporated into the ON/OFF circuitry.

(4) Protection Circuitry

The protection circuitry has four basic functions related to the DC input. The battery has internal protection circuitry. The external DC input has a fuse, an over-voltage crowbar and reverse protection diodes. The fuse is the primary disconnect to protect against any of the fault conditions. If the DC input is too high (>32 V), the over-voltage crowbar triggers and the SCR opens the fuse. If the DC input polarity is incorrect, the input clamp diodes forward bias and open the fuse. If the input converter fails and the output of the converter is above 12 V, the SCR triggers and opens the fuse. If the DC input voltage is too low, the input converter is disabled until the input voltage is within the allowable range.



056M-01
Power Supply PCB Assembly Block Diagram
Figure 1

FOLDOUT

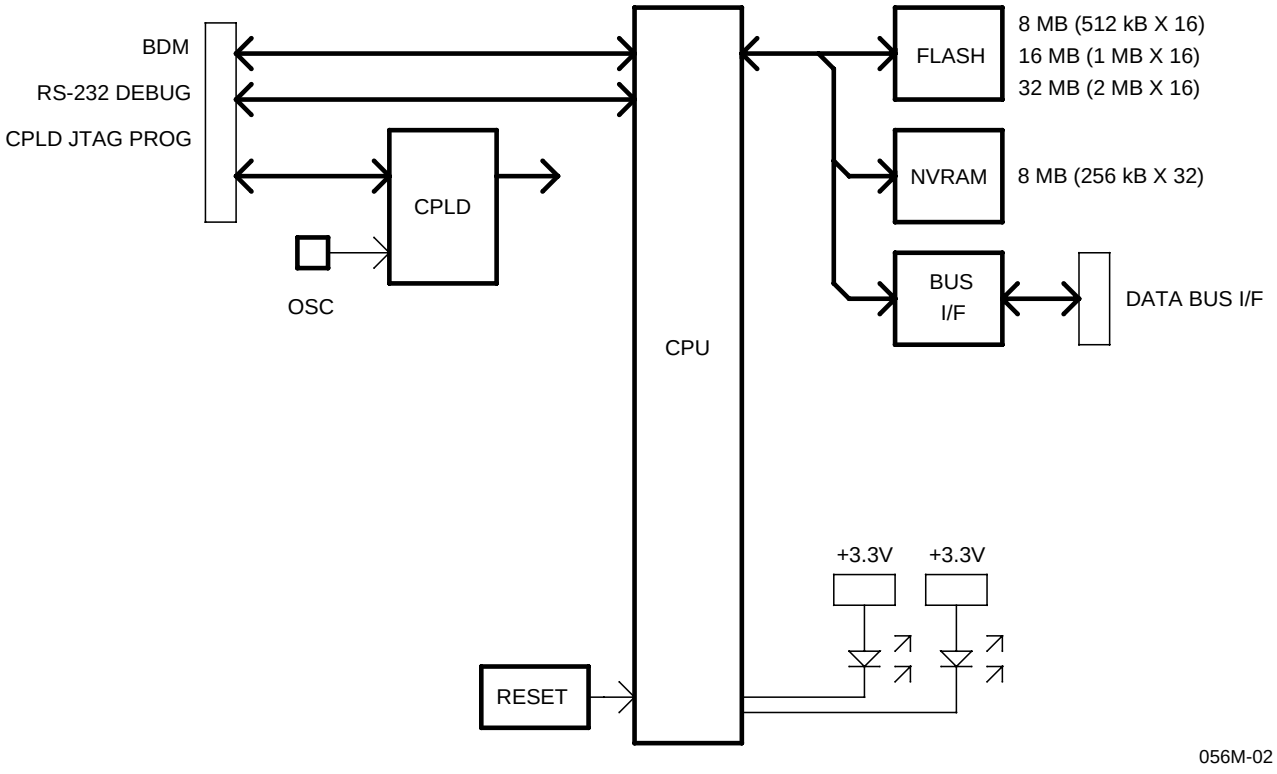
(Drawing to be released soon)

B. Multi-Function PCB Assy

(Information to be released soon)

C. Processor PCB Assy

The Processor PCB Assy contains the processor, FLASH, NVRAM, Serial Ports and an interface bus for controlling the Test Set.



Processor PCB Assy Block Diagram
Figure 3

(1) CPU

The microprocessor used contains a DRAM controller, DMA controller, interrupt controller, timers, parallel and serial interfaces and on-chip debug support. The microprocessor contains 4 kB of cache and 8 kB of on-chip SRAM. The microprocessor runs at a maximum clock speed of 40 MHz. The Processor PCB Assy contains a 36.864 MHz oscillator, divided by two within the CPLD, and then provided to the CPU.

(2) External Memory (FLASH)

The Processor PCB Assy memory arrangement is 256k x 16, 512k x 16, 1M x 16 or 2M x 16.

During reset, the external interrupts are sampled to define the port size and wait-state generation for chip select CS0 (FLASH). The interrupts are strapped for a 16-bit port with 15 wait states to allow the start program execution from the FLASH.

(3) External Memory (NVRAM)

There is 256k x32 of NVRAM on the CPU board. It is accessible as bytes, words and long words (32 bit). The NVRAM is battery backed up by a battery located on the Multi-Function board. The power and chip select for the NVRAM is controlled by Uxx. This device monitors the +3.3 V supply voltage and will switch over to battery power and disable the SRAM chip enable when the supply voltage drops to 2.55 to 2.70 V. Uxx also provides a battery status output. This signal will go low when the battery voltage is below 2.5 V. It is checked at power up. This input is read via the status register in the CPLD.

(4) Reset Circuit

The Processor PCB Assy contains a voltage supervisory reset circuit. The voltage supervisory device (U5) provides a reset pulse at power-up and during “brown-out” conditions. If the +3.3 V drops below 2.55 to 2.70 V, the reset goes low until the voltage returns to normal. A reset is generated while the reset input is held low.

(5) CPLD

The CPLD controls chip select generation and buffer control for devices on the Processor PCB Assy and Multi-Function PCB Assy. The CPLD also contains a status register, F/W version register, clock divider and a FPGA programming port for the FPGA on the Multi-Function PCB Assy.

The version register is an 8-bit device that contains the version for the CPLD F/W. The status register is an 8-bit device that provides the H/W configuration, user definable jumpers and the NVRAM battery status.

The FPGA on the Multi-Function PCB Assy supports Slave Serial, Master Serial, Slave Parallel and Boundary Scan mode. In Master Serial, a local (local to the Multi-Function PCB Assy) serial PROM provides the configuration data. In Slave Parallel mode, the Processor PCB Assy provides the configuration data. Configuration resistors on the Multi-Function PCB Assy provide for selecting one of the two programming methods. If the Multi-Function PCB Assy is strapped for Master Serial mode, the Processor PCB Assy is not responsible for the FPGA configuration, but can monitor the status. If the Multi-Function PCB Assy is strapped for Slave Parallel Mode, the Processor PCB Assy loads the configuration data. There is a FPGA Control Register, Status Register and Configuration Data port for configuring the FPGA. The FPGA Configuration Data port accepts data and provides configuration data to the FPGA.

(6) Serial Ports

The Processor PCB Assy has two RS-232 ports. Both ports provide RX, TX, RTS and CTS capability. COMM Port 1 is available as the system port and can be accessed via the RS-232 Connector. COMM Port 2 is accessed via the TEST Connector. Both COMM Port signals are at a 3.3 V level.

(7) Bus Interface

The Bus Interface communicates with the Multi-Function PCB Assy and consists of address lines A0-A23, data lines D0-D31, R/W, /Reset, CPU Clock, DMA, Timer, Interrupt, I^2C bus, and chip selects. The address, data, reset, clock and chip selects are buffered. The data bus buffer enable and direction is controlled via the CPLD.

D. RF Assy

(Information to be released soon)

2. Troubleshooting Procedures

A. Guidelines

Troubleshooting is divided into a Symptom Index and a Troubleshooting Table.

The Troubleshooting Table lists common malfunctions which may occur during operation of Test Set. Perform tests/inspections and corrective actions in order listed.

NOTE: This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions.

NOTE: If a malfunction is not listed or is not corrected by listed corrective actions, the troubleshooting technique (the formulation of a logical approach in locating the source of trouble) is left to the technician's discretion.

Following is a list of aids to be used when troubleshooting the Test Set:

- The Test Set has a built-in Self Test to assist the technician in troubleshooting.
- Many problems on Test Sets in service are caused by corrosion. Sometimes removing and reseating an affected cable or circuit card corrects the malfunction. Cleaning connector and/or switch contacts with alcohol repairs many types of digital and analog circuit malfunctions.
- The following inspection procedures are used to locate obvious malfunctions with the Test Set:
  - Inspect all external surfaces of the Test Set for physical damage, breakage, loose or dirty contacts and missing components.

    CAUTION: DO NOT DISCONNECT OR REMOVE ANY BOARD ASSEMBLIES IN THE TEST SET UNLESS THE UNIT IS REMOVED FROM ANY AC POWER SOURCES. SOME ASSEMBLIES CONTAIN DEVICES THAT CAN BE DAMAGED IF THE ASSEMBLY IS REMOVED WHEN POWER IS ON. SEVERAL COMPONENTS, INCLUDING MOS DEVICES, CAN BE DAMAGED BY ELECTROSTATIC DISCHARGE. USE CONDUCTIVE FOAM AND GROUNDING STRAPS WHEN SERVICING IS REQUIRED AROUND SENSITIVE COMPONENTS. USE CARE WHEN UNPLUGGING ICS FROM HIGH-GRIP SOCKETS.

  - Inspect printed circuit board surfaces for discoloration, cracks, breaks and warping and printed circuit board conductors for breaks, cracks. cuts, erosion or looseness.
  - Inspect all assemblies for burnt or loose components.
  - Inspect all chassis-mounted components for looseness, breakage, loose contacts or conductors.
  - Inspect Test Set for disconnected, broken, cut, loose or frayed cables or wires.

B. Precautions

(1) Safety

WARNING: REMOVE ALL JEWELRY OR OTHER COSMETIC APPAREL BEFORE PERFORMING ANY TROUBLESHOOTING INVOLVING LIVE CIRCUITS.

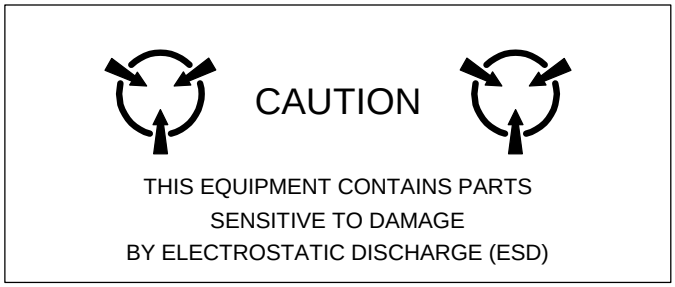
WARNING: WHEN WORKING WITH LIVE CIRCUITS OF HIGH POTENTIAL, KEEP ONE HAND IN POCKET OR BEHIND BACK TO AVOID SERIOUS SHOCK HAZARD.

WARNING: USE ONLY INSULATED TROUBLESHOOTING TOOLS WHEN WORKING WITH LIVE CIRCUITS.

WARNING: FOR ADDED INSULATION, PLACE RUBBER BENCH MAT UNDERNEATH ALL POWERED BENCH EQUIPMENT, AS WELL AS A RUBBER MAT UNDERNEATH TECHNICIAN'S CHAIR.

WARNING: HEED ALL WARNINGS AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.

(2) ESD



CAUTION: THE POWER SUPPLY ASSY, MULTI-FUNCTION PCB ASSY, RF ASSY AND PROCESSOR PCB ASSY CONTAIN PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING TROUBLESHOOTING PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED.

(3) EMC and Safety Compliance

All assemblies, cables, connectors, plastic fasteners, gaskets, fingerstock and miscellaneous hardware within the Test Set are configured to satisfy the safety and EMC compliance standards.

CAUTION: UPON COMPLETION OF ANY MAINTENANCE ACTION; ALL ASSEMBLIES, CABLES, CONNECTORS, PLASTIC FASTENERS, GASKETS, FINGERSTOCK AND MISCELLANEOUS HARDWARE MUST BE CONFIGURED AS INSTALLED AT THE FACTORY.

SYMPTOM INDEX

TROUBLESHOOTING TABLE

NOTE: The Troubleshooting Table lists common malfunctions found during normal operation or maintenance of the Test Set or components. The tests or inspections and corrective actions should be performed in the order listed. Failure to do so may result in troubleshooting recommendations that replace working assemblies.

MALFUNCTION / *TEST OR INSPECTION* / *CORRECTIVE ACTION*	
1	**External DC Power Supply failure**
	Step 1. Connect External DC Power Supply to a verifiable AC Power Source.
	Step 2. Connect DMM to External DC Power Supply output.
	Step 3. Verify +18 Vdc (±1 Vdc)
	◆ If incorrect, probable source of failure is the External DC Power Supply.
2	**POWER Indicator does not light**
	Probable sources of failure are the circuit between Power Supply PCB Assy and the LCD Assy and a short on the Multi-Function PCB Assy or the RF Assy.
3	**CHARGE Indicator does not light**
	Probable sources of failure are the Battery, Power Supply PCB Assy and the LCD Assy.
4	**Blows Fuse**
	Probable source of failure is the Power Supply PCB Assy .
5	**Battery does not charge**
	Probable source of failure is the Battery.
6	**Display is blank or abnormality exists in Display**
	Probable sources of failure are the Power Supply PCB Assy, Multi-Function PCB Assy, LCD Assy and the interconnecting cables.
7	**Keys Inoperable**
	Probable sources of failure are the Keypad PCB Assy, Multi-Function PCB Assy and the interconnecting cables.

3. Calibration/Verification

A. General

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(1) Calibration/Verification Schedule

The Calibration/Verification Procedures should be performed as a result of one or more of the following conditions:

- Failure to Meet Specifications

  If, during the course of normal operation, the Test Set or any major function thereof fails to meet the performance specifications according to Appendix F, the Calibration/Verification Procedures should be performed.

  If any failure occurs during performance of the Verification Procedures, the user is instructed as to the pertinent Calibration Procedure or hardware failure associated with the failure.

- Module/Assembly Replacement

  If one or more of the Test Set assemblies are replaced, the Calibration Procedures should be performed.

- Annual Calibration/Verification

  Aeroflex recommends an annual Calibration/Verification on the Test Set to maintain proper testing standards.

(2) Controls, Connectors and Indicators

Refer to Appendix E for location of the Test Set Controls, Connectors and Indicators.

(3) Test Record

Verification Data Sheets are provided for recording the results obtained while performing the Verification Procedures.

NOTE: It is recommended the technician reproduce copies of the Verification Data Sheets, rather than use copies in this manual.

B. Precautions

The Calibration and Verification Procedures are performed with the Test Set Covers in place. No internal adjustments or probing points are required.

C. Requirements

(1) Performance

It is strongly recommended that personnel thoroughly read and understand all steps of the procedures prior to performing each procedure. Knowledge of external test equipment connections and operation is also recommended.

(2) Test Equipment

Appendix B contains a list of test equipment suitable for performing any procedure contained in this manual. Other equipment meeting specifications listed in Appendix B may be substituted in place of recommended models.

NOTE: For certain procedures in this manual, the equipment listed in Appendix B may exceed minimum required specifications.

(3) Disassembly

No disassembly is required to perform the Calibration and Verification Procedures.

(4) Environment

For best results, environmental conditions should be identical to the conditions at the normal operating location.

D. Verification

(1) Self Test

TEST EQUIPMENT: None

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect Test Set to appropriate AC power source with the External DC Power Supply. Press Power Key to turn unit ON.
2. Press the SETUP Key repeatedly until the SETUP-GENERAL screen is displayed.
3. Press the H/W TOOLS Soft Key to display the SETUP-HARDWARE TOOLS screen.
4. Press the SELF TEST Soft Key to display the SETUP-SELF TEST Screen.
5. Press the RUN TEST Soft Key to initiate the Self Test.
6. Verify all tests pass.

(2) VSWR at ANT and RF I/O Ports

TEST EQUIPMENT: Spectrum Analyzer
VSWR Bridge

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect Tracking Generator to the 'Input' port of the VSWR Bridge.
2. Connect the output of the VSWR Bridge to the Spectrum Analyzer input.
3. Set up Spectrum Analyzer as follows:

Tracking Generator:	0dBm
Start Frequency:	950MHz
Stop Frequency:	1230MHz
Reference Level:	-10dBm
Scale:	10dB/div.
Marker 1:	ON

4. Record the level readings from the Spectrum Analyzer at 962, 1030, 1090, 1150, and 1213MHz using Marker 1.
5. Press the SETUP key twice to display the SETUP-DME screen.
6. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
7. Press the DIAG Soft Key to display the DME DIAGNOSTICS screen.
8. Press the SELECT Soft Key to display the DME DIAG- CW screen.
9. Set up the UUT as follows:

FREQ:	1000MHz
RVLVL:	-65dBm

10. Connect the 'Device Under Test' port of the VSWR Bridge directly to the ANT port.
11. Get the level readings from the Spectrum Analyzer at 962, 1030, 1090, 1150, and 1213MHz and calculate the return loss at each frequency.
12. From the return loss, calculate the VSWR as:

$$\Gamma = 10 \text{ ^ } (- RL / 20)$$
$$VSWR = (1 + \Gamma) / (1 - \Gamma)$$

13. Where: Γ = Reflection Coefficient
RL = Return Loss
14. Verify *VSWR < 1.7*
15. Move the 'Device Under Test' port of the VSWR Bridge to the RF I/O port.
16. Get the level readings from the Spectrum Analyzer at 962, 1030, 1090, 1150, and 1213MHz and calculate the return loss.
17. From the return loss, calculate the VSWR as in equation above.
18. Verify *VSWR < 1.3*

(3) Output Frequency Accuracy

TEST EQUIPMENT: Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the ANT port to the frequency counter.
2. Press the SETUP key twice to display the SETUP-DME screen.
3. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
4. Press the DIAG Soft Key to display the DME DIAGNOSTICS screen.
5. Press the SELECT Soft Key to display the DME DIAG- CW screen.
6. Set the RFLVL to –2dBm.
7. Set up the UUT for the first frequency listed below:

   962MHz

   1030MHz

   1090MHz

   1150MHz

   1213MHz
8. Press the RUN TEST Soft Key.
9. Verify that Measured Frequency equals Setting Freq. ± 10 kHz.
10. Press the STOP TEST Soft Key.
11. Repeat above steps for each frequency listed.

(4) Output Level Accuracy (ANT Port)

TEST EQUIPMENT: Power Meter
Power Sensor
Measuring Receiver
Receiver Sensor

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the Power Sensor to the Power Meter (Power REF Connector) and zero the Power Meter.
2. Disconnect the Power Sensor from the Power Meter (Power REF Connector) and connect the Power Sensor to the ANT Connector.
3. Press the SETUP key twice to display the SETUP-DME screen.
4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
5. Press the DIAG Soft Key to display the DME DIAGNOSTICS screen.
6. Press the SELECT Soft Key to display the DME DIAG- CW screen.
7. Set up the UUT as follows:

   FREQ: 962MHz

   RVLVL: -30dBm
8. Press the RUN TEST Soft Key.
9. Verify that the Measured Level equals –30dBm ± 2dB.
10. Press the STOP TEST Soft Key.
11. Change the FREQ to 1030, 1090, 1150, 1213 MHz, respectively.
12. At each frequency setting, run test and verify that the Measured Level equals –30dBm ± 2dB at each frequency setting.
13. Set FREQ to 1030MHz.
14. Change RFLVL from –2dBm to –52dBm in 10dB steps, respectively.
15. At each step, run test and verify that Measured Level equals Setting Level ± 2dB.
16. Set RFLVL to –65dBm.
17. Disconnect Power Meter Sensor from ANT Connector.
18. Set up the Measuring Receiver for Tuned RF Level measurement at 1030 MHz with 3.8 Special selected.
19. Connect the Measuring Receiver Sensor directly to the ANT port.
20. Run test and verify that Measured Level equals –65dBm ± 2dB.
21. Press the STOP TEST Soft Key
22. Change RFLVL from –3dBm to –9dBm in 1dB steps, respectively.
23. At each step, run test and verify that the level difference between steps equals 1dB ± 0.25dB.

(5) Output Level Accuracy (RF I/O Port)

TEST EQUIPMENT: Power Meter
Power Sensor
Measuring Receiver
Receiver Sensor

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the Power Sensor to the Power Meter (Power REF Connector) and zero the Power Meter.
2. Disconnect the Power Sensor from the Power Meter (Power REF Connector) and connect the Power Sensor to the RF I/O Connector.
3. Press the SETUP key twice to display the SETUP-DME screen.
4. Verify the RF PORT shows DIRECT CONNECT. If necessary, change it to DIRECT CONNECT.
5. Press the DIAG Soft Key to display the DME DIAGNOSTICS screen.
6. Press the SELECT Soft Key to display the DME DIAG- CW screen.
7. Set up the UUT as follows:

   FREQ: 962MHz

   RVLVL: -50dBm
8. Press the RUN TEST Soft Key.
9. Verify that the Measured Level equals –50dBm ± 1dB.
10. Press the STOP TEST Soft Key.
11. Change the FREQ to 1030, 1090, 1150, 1213 MHz, respectively.
12. At each frequency setting, run test and verify that the Measured Level equals –50dBm ± 1dB at each frequency setting.
13. From the recorded levels, verify that the Flatness is ≤ 2dB.
14. Disconnect the Power Meter Sensor from the RF I/O Connector.
15. Set FREQ to 1090MHz.
16. Set up the Measuring Receiver for Tuned RF Level measurement at 1090MHz with 3.8 Special selected.
17. Connect the Measuring Receiver Sensor directly to the RF I/O port.
18. Change RFLVL from –47dBm to –115dBm in 10dB steps, respectively.
19. At each step, run test and verify that Measured Level equals Setting Level ± 1dB (± 2dB for levels < –95 dBm).

(6) DME Reply Pulse Characteristics

TEST EQUIPMENT: Oscilloscope
Pulse Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the Detector directly to the ANT port.
2. Connect the other end of the Detector to Scope CH1.
3. Set Scope CH1 to 50-ohm impedance, invert on.
4. Connect UUT SYNC port to Scope CH2.
5. Set Scope to trigger off CH2 at 2V.
6. Press the SETUP key twice to display the SETUP-DME screen.
7. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
8. Press the DIAG Soft Key to display the DME DIAGNOSTICS screen.
9. Press the ▼ Key to highlight the FIXED PRF PULSES line.
10. Press the SELECT Soft Key to display the DME DIAG- PULSES screen.
11. Set up the UUT as follows:

FREQ:	978MHz
RVLVL:	-2dBm
CHAN:	X
PRF:	100

12. Press the RUN TEST Soft Key.
13. Verify spacing of P1-P2 equals 12.0µS ± 0.1µS.
14. Verify pulse widths of P1 and P2 equals 3.5µS ± 0.5µS.
15. Verify rise and fall time of P1 equals 2.5µS ± 0.25µS
16. Press the STOP TEST Soft Key.
17. Change CHAN from X to Y.
18. Press the RUN TEST Soft Key.
19. Verify spacing of P1-P2 equals 30.0µs ± 0.1µs.
20. Press the STOP TEST Soft Key.

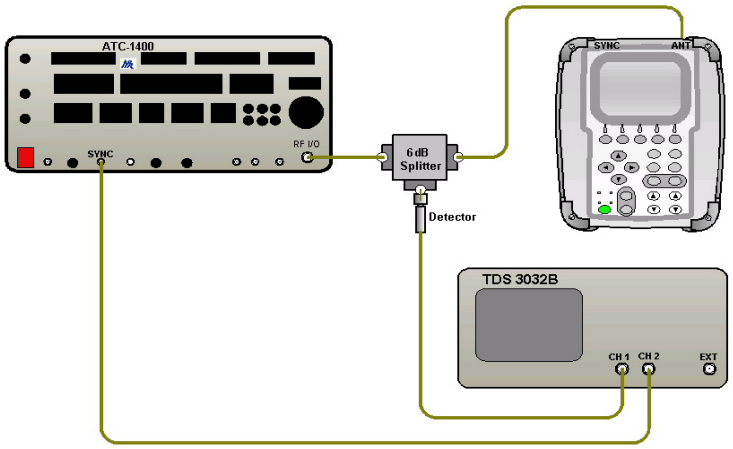
(7) DME Reply Delay and Range

TEST EQUIPMENT: Oscilloscope
ATC-1400A
6dB Splitter
Pulse Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 5.



DME Reply Delay and Range Test Connection
Figure 5

2. Set the ATC-1400A switch settings as follows:

FREQ/Function Select:	1041 MHz X
MAN/AUTO/MAN STEP:	MAN
DME Reply Efficiency:	100%
SYNC:	T_D
RF LEVEL:	–2dBm
CW/NORM/OFF:	NORM
PRF/SQTR:	100
DME P2 Toggle Switch:	CAL
Self-Interrogation:	ON
Remaining toggle switches	OFF/CAL position

3. Set Scope to trigger off CH2 at 2V and set CH1 to 50Ω impedance, invert on.
4. Press the SETUP key twice to display the SETUP-DME screen.
5. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.

STEP PROCEDURE

6. Press the DME Key to display the DME screen.
7. Set up the UUT as follows:

RVLVL:	-38.2dBm (-2dBm)
CHAN:	17X
PRF:	100
RATE:	STOP
RANGE:	0.0nm
SQTR:	OFF
IDENT:	OFF
ECHO:	OFF
REPLY:	100%

8. Press the RUN TEST Soft Key and verify spacing between the first pulse of interrogation and the first pulse of reply equals 50.0µS ± 0.1 µS
9. Press the STOP TEST Soft Key.
10. Set the ATC-1400 as follows:

FREQ/Function Select:	1041 MHz Y
DME P2 DEV:	6.0
DME P2 Flip Switch:	+Δ

11. Change the UUT CHAN to 17Y.
12. Press the RUN TEST Soft Key and verify spacing between the first pulse of interrogation and the first pulse of reply equals 56.0µS ± 0.1µS
13. Press the STOP TEST Soft Key.
14. Set the ATC-1400 as follows:

FREQ/Function Select:	1041 MHz X
DME P2 Flip Switch:	CAL

15. Change the UUT CHAN to 17X.
16. Set the UUT RANGE for 10.0nm.
17. Press the RUN TEST Soft Key and verify the range delay is 123.59µS ±0.12359µS (Scope reading - 50.0µS Range Delay reading.)
18. Press the STOP TEST Soft Key.

(8) DME Echo Reply Position and Amplitude

TEST EQUIPMENT: Oscilloscope
ATC-1400A
6dB Splitter
Pulse Detector
Spectrum Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 7.1 in previous test.
2. Set up the ATC-1400 as follows.

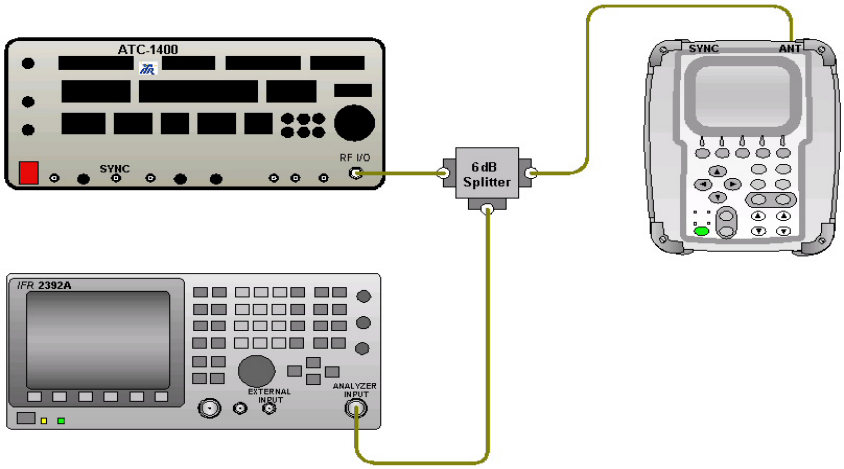
FREQ/Function Select:	1041 MHz X
MAN/AUTO/MAN STEP:	MAN
DME Reply Efficiency:	100%
SYNC:	T_D
RF LEVEL:	–2dBm
CW/NORM/OFF:	NORM
PRF/SQTR:	100
DME P2 Toggle Switch:	CAL
Self-Interrogation:	ON
Remaining toggle switches	OFF/CAL position

3. Press the SETUP key twice to display the SETUP-DME screen.
4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
5. Press the DME Key to display the DME screen
6. Set up the UUT as follows:

RVLVL:	-38.2dBm (-2dBm)
CHAN:	17X
PRF:	100
RATE:	STOP
RANGE:	0.0nm
SQTR:	OFF
IDENT:	OFF
ECHO:	ON
REPLY:	100%

7. Press the RUN TEST Soft Key and verify the echo position is 370.77µS ±12.359µS) after P1 of the UUT Reply.

8. Make the connection as shown in Figure 6.



DME Echo Reply Position and Amplitude Test Connection
Figure 6

9. Set Spectrum Analyzer as follows:

Frequency:	978MHz
Input Attn:	20dB
RBW:	5MHz
VBW:	None
Span:	0Hz
REF:	–5dB
Sweep:	5µS
Trigger	Video
Trig. Mode:	Normal
Scale:	5dB
Marker:	On

10. Measure and record the level of P1 reply pulse.
11. Set the trigger delay to 370µS.
12. Measure and record the level of P1 echo reply pulse.
13. Verify the echo reply pulse level is –11dB ± 1dB below the P1 reply level.
14. Press the STOP TEST Soft Key.
15. Set ECHO to OFF.

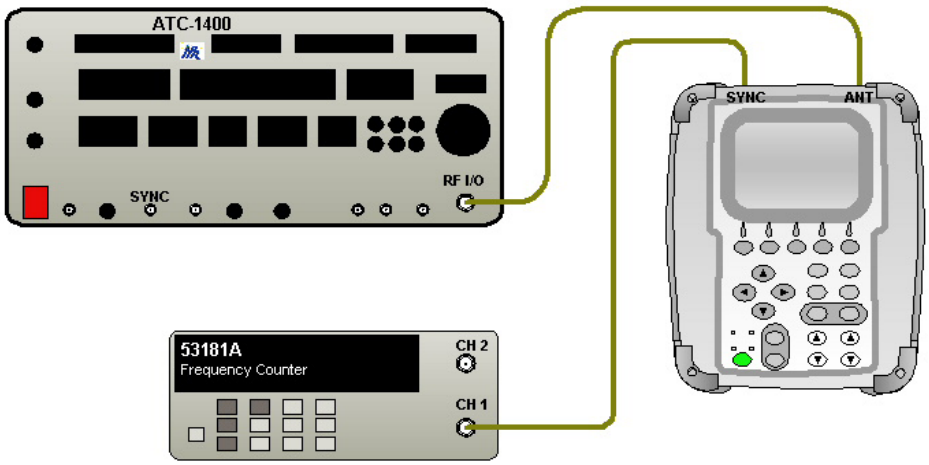
(9) DME Reply Efficiency

TEST EQUIPMENT: Frequency Counter
ATC-1400A

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 7.



DME Reply Efficiency Test Connection
Figure 7

2. Set up the ATC-1400A as follows:

FREQ/Function Select:	1041 MHz X
RF LEVEL:	–10 dBm NORM
PRF/SQTR:	300
DME P2 Toggle Switch:	CAL
Self-Interrogation:	ON
Remaining toggle switches:	OFF/CAL position

3. Press the SETUP key twice to display the SETUP-DME screen.
4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
5. Set ANT RANGE to 250ft.
6. Press the DME Key to display the DME screen.

STEP PROCEDURE

7. Set up the UUT as follows:

RVLVL:	-64.6dBm (-2dBm)
CHAN:	17X
RATE:	STOP
RANGE:	0.0nm
SQTR:	OFF
IDENT:	OFF
ECHO:	OFF

8. Set UUT REPLY to 10%.
9. Press the RUN TEST Soft Key.
10. Note the frequency displayed on the Frequency Counter.
11. Calculate the percent reply using the following formula:

$$\text{Percent Reply} = \frac{\text{Measured Frequency}}{\text{Interrogation PRF}} \text{ X } 100$$

12. Verify Percent Reply equals Reply Setting ± 0.5%
13. Press the STOP TEST Soft Key.
14. Repeat the above steps for UUT REPLY settings of 40%, 70% and 100%.
15. Verify Percent Reply equals Reply Setting ± 0.5% at each setting.

(10) DME Squitter

TEST EQUIPMENT: Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the UUT Sync connector to the frequency counter.
2. Set the counter for a 10 second gate time.
3. Press the DME Key to display the DME screen
4. Set up the UUT as follows:

CHAN:	17X
RATE:	STOP
RANGE:	0.0nm
SQTR:	ON
IDENT:	OFF
ECHO:	OFF

5. Press the RUN TEST Soft Key.
5. Verify the frequency equals 2700Hz ± 54Hz on the frequency counter.
6. Press the STOP TEST Soft Key.

(11) DME Measurement - Interrogation Pulse Timing

TEST EQUIPMENT: ATC-1400A
Oscilloscope
Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Set up the ATC-1400A as follows:

   FREQ/Function Select: 1041 MHz X

   RF LEVEL Control: –2 dBm

   CW/NORM/OFF: NORM

   PRF: 200

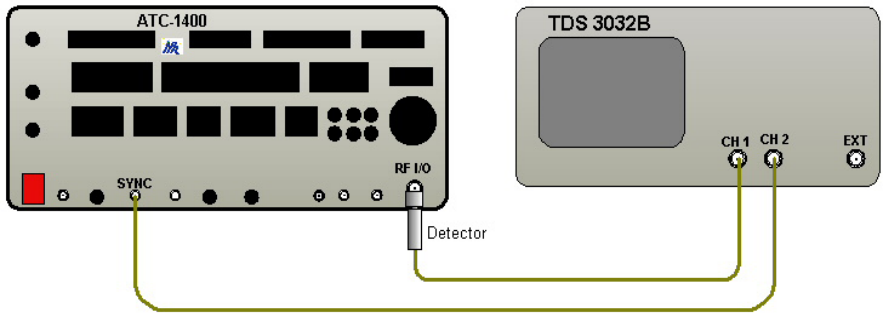
   DME P2 Switch: CAL

   SYNC: T_D

   Self Interrogation: ON

   Set other toggle switches to OFF/CAL position.

2. Make the connection as shown in Figure 8.



DME Measurement - Interrogation Pulse Timing
Test Connection 1
Figure 8

3. Set Scope to trigger off CH2 at 2V and CH1 to 50-ohm impedance, invert on.
4. Measures and record the following values from the scope:

   Pulse widths of P1 and P2

   Pulse Spacing of X channel P1 to P2

5. Change the ATC-1400A settings as follows:

   FREQ/Function Select: 1041 MHz X

   DME P2 DEV: 6.0

   DME P2 Switch: +Δ

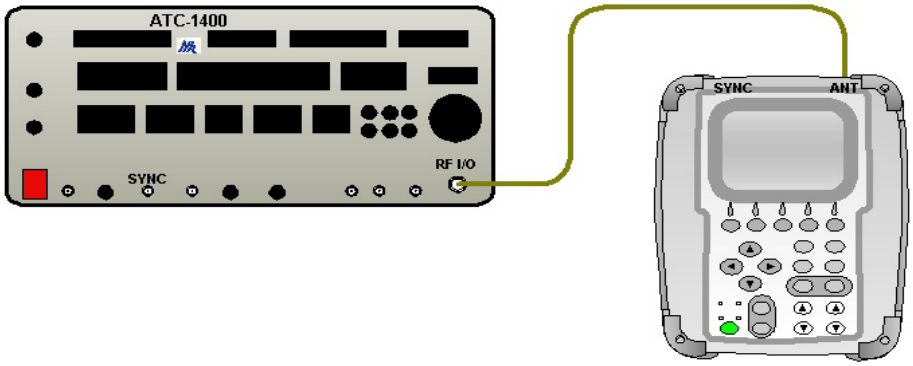
STEP PROCEDURE

6. Measure and record the pulse spacing of Y channel P1 to P2 on the scope.
7. Change the ATC-1400A settings as follows:

   FREQ/Function Select: 1041 MHz X

   DME P2 Switch: CAL

   RF LEVEL Control: –10dBm
8. Make the connection as shown in Figure 9.



DME Measurement - Interrogation Pulse Timing
Test Connection 2
Figure 9

9. Press the SETUP key twice to display the SETUP-DME screen.
10. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
11. Set the ANT RANGE to 250ft.
12. Press the DME Key to display the DME screen
13. Set up the UUT as follows:

    RFLVL: -64.6dBm (-2dBm)

    CHAN: 17X

    Rate: STOP

    Range: 0.0nm
14. Press the RUN TEST Soft Key.
15. Verify the following pulse width and spacing values on the UUT.

    P1 Pulse Width equals recorded P1value ± 0.05µS

    P2 Pulse Width equals recorded P2 value ± 0.05µS

    P1-P2 Spacing equals recorded X channel P1-P2 value ± 0.02µS
16. Press the STOP TEST Soft Key.
17. Change the ATC-1400A settings as follows:

    FREQ/Function Select: 1041 MHz Y

    DME P2 Switch: +Δ

STEP	PROCEDURE

18. Change the UUT CHAN: to 17Y.
19. Press the RUN TEST Soft Key.
20. Verify the UUT P1-P2 pulse spacing equals recorded channel P1-P2 value ± 0.02µS.
21. Press the STOP TEST Soft Key.

(12) DME Measurement - Interrogation PRF

TEST EQUIPMENT: ATC-1400A

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 11.2.
2. Set up the ATC-1400A as follows:

   FREQ/Function Select: 1041 MHz X

   RF LEVEL Control: –10 dBm

   CW/NORM/OFF: NORM

   DME P2 Switch: CAL

   Self Interrogation: ON

   Set other toggle Switches to OFF/CAL position
3. Press the SETUP key twice to display the SETUP-DME screen.
4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
5. Set the ANT RANGE to 250ft.
6. Press the DME Key to display the DME screen
7. Set up the UUT:

   CHAN: 17X

   RFLVL: –64.6dBm (-2dBm)

   RATE: STOP

   RANGE: 0.0 nm
8. Press the RUN TEST Soft Key.
9. On the ATC-1400A, set PRF to 10, 101, 201, and 300 Hz, respectively.
10. At each PRF setting, verify the PRF value shown on the UUT is equals ATC-1400A PRF Setting ± 2 Hz
11. Press the STOP TEST Soft Key.

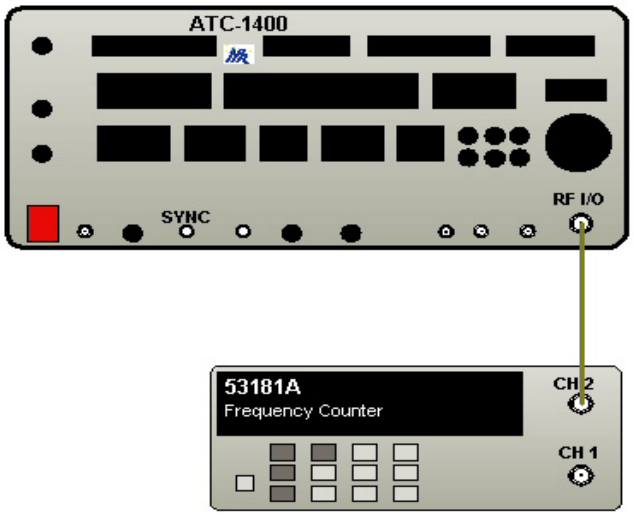
(13) DME Measurement - Interrogation Frequency

TEST EQUIPMENT: ATC-1400A
Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 10:



DME Measurement - Interrogation Frequency Test Connection
Figure 10

2. On the ATC-1400A, set RF output to –10 dBm and CW/NORM/OFF switch to CW.
3. Set frequency (in MHz) to 1025, 1064, 1110, and 1150 respectively.
4. At each setting, record the frequency displayed on the Frequency Counter.
5. Set up the ATC-1400A:

   FREQ/Function Select: 1025 MHZ X
   RF LEVEL Control: –10 dBm
   CW/NORM/OFF: NORM
   DME P2 Switch: CAL
   Self Interrogation: ON
   Set other toggle Switches to OFF/CAL position

6. Move cable from the frequency counter to the ANT port.
7. Press the SETUP key twice to display the SETUP-DME screen.
8. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
9. Press the DME Key to display the DME screen

STEP PROCEDURE

10. Set up the UUT for the first listed frequency below:

UUT Channel X	ATC-1400 Frequency (MHz)
1	1025
40	1064
86	1110
126	1150

11. Press the RUN TEST Soft Key.
12. Verify the interrogation frequency displayed on the UUT equals Recorded Frequency ± 20kHz.
13. Press the STOP TEST Soft Key.
14. Repeat the above 4 steps with each setting listed.

(14) XPDR Pulse Characteristics - ATCRBS

TEST EQUIPMENT: Oscilloscope
Pulse Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the Detector directly to the ANT port.
2. Connect the other end of the Detector to Scope CH1.
3. Connect the UUT SYNC port to Scope CH2.
4. Set Scope to trigger off CH2 at 2V and CH1 to 50-ohm impedance, invert on.
5. Press the SETUP key to display the SETUP-XPDR screen.
6. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
7. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
8. Use the key to highlight the ATCRBS MODE A line.
9. Press the SELECT Soft Key to display the XPDR DIAG-ATCRBS MODE A screen.
10. Set up the UUT as follows:

    RFLVL: -3dBm

    PRF: 100

    SLS: 0dB
11. Press the RUN TEST Soft Key.
12. Use the Scope to verify the following:

    Pulse spacing P1-P2 equals 2.0µS ± 25nS

    Pulse spacing P1-P3 equals 8.0µS ± 25nS

    Pulse width of P1 equals 0.8µS ± 50nS

    Rise time of P1 is between 50nS and 100nS

    Fall time of P1 is between 50nS and 200nS
13. Press the STOP TEST Soft Key.
14. Set SLS to OFF
15. Press the NEXT TEST Soft Key to display the XPDR DIAG-ATCRBS MODE C screen.
16. Press the RUN TEST Soft Key.
17. Use the Scope to verify the following:

    Pulse spacing P1-P3 equals 21.0µS ± 25nS
18. Press the STOP TEST Soft Key.
19. Press the NEXT TEST Soft Key to display the XPDR DIAG-ITM MODE A screen.
20. Press the RUN TEST Soft Key.

STEP	PROCEDURE

21. Use the Scope to verify the following:

    Pulse spacing P1-P3 equals 8.0µS ± 25nS

    Pulse spacing P1-P4 equals 10.0µS ± 25nS

    Pulse width of P4 equals 0.8µS ± 50nS

22. Press the STOP TEST Soft Key.
23. Press the NEXT TEST Soft Key to display the XPDR DIAG-ITM MODE C screen
24. Press the RUN TEST Soft Key.
25. Use the Scope to verify the following:

    Pulse spacing P1-P3 equals 21.0µS ± 25nS

    Pulse spacing P1-P4 equals 23.0µS ± 25nS

    Pulse width of P4 equals 0.8µS ± 50nS

26. Press the STOP TEST Soft Key.
27. Press the NEXT TEST Soft Key to display the XPDR DIAG-ITM MODE A/S screen.
28. Press the RUN TEST Soft Key.
29. Use the Scope to verify the following:

    Pulse width of P4 equals 1.6µS ± 50nS

30. Press the STOP TEST Soft Key.
31. Press the NEXT TEST Soft Key to display the XPDR DIAG-ITM MODE C/S screen
32. Press the RUN TEST Soft Key.
33. Use the Scope to verify the following:

    Pulse width of P4 equals 1.6µS ± 50nS

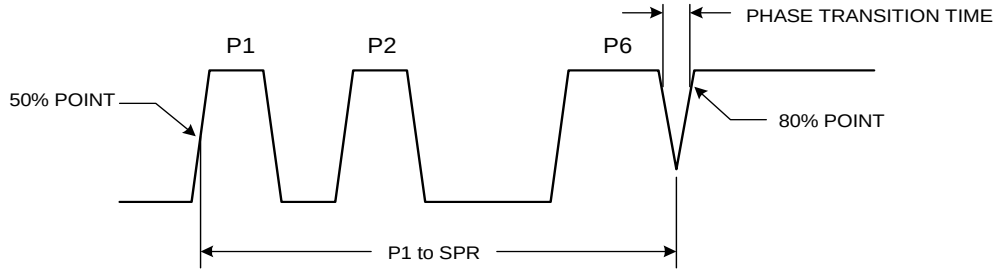
34. Press the STOP TEST Soft Key.

(15) XPDR Pulse Characteristics – Mode S

TEST EQUIPMENT: Oscilloscope
Pulse Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP PROCEDURE



Mode S Interrogation
Figure 11

1. Connect the Detector directly to the ANT port.
2. Connect the other end of the Detector to Scope CH1.
3. Connect the UUT SYNC port to Scope CH2.
4. Set Scope to trigger off CH2 at 2V and CH1 to 50-ohm impedance, invert on.
5. Press the SETUP key to display the SETUP-XPDR screen.
6. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
7. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
8. Press the SELECT Soft Key to display the XPDR DIAG-FORMAT 0 screen.
9. Set up the UUT as follows:

RFLVL:	-3dBm
PRF:	100
ADDRESS:	000000
SLS:	OFF

10. Press the RUN TEST Soft Key.
11. Use the Scope to verify the following pulse spacing:

    P1-P2 equals 2.0µS ± 25nS

    P1-P6 equals 3.5µS ± 25nS

    P1-SPR equals 4.75µS ± 25nS

STEP PROCEDURE

12. Verify the following pulse widths:

    P1 equals 0.8µS ± 50nS

    P6 equals 16.25µS ± 50nS

    Rise time of P1 is between 50nS and 100nS

    Fall time of P1 is between 50nS and 200nS

    Phase transition time of SPR is < 80nS

13. Press the STOP TEST Soft Key.
14. Press the NEXT TEST Soft Key until the XPDR DIAG-FORMAT 16 screen is displayed.
15. Press the RUN TEST Soft Key.
16. Verify pulse width of P6 equals 30.25µS ± 50nS
17. Press the STOP TEST Soft Key.

(16) XPDR Interrogation PRF

TEST EQUIPMENT: Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP PROCEDURE

1. Connect the UUT SYNC port to the Frequency Counter CH1.
2. Press the SETUP key to display the SETUP-XPDR screen.
3. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
4. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
5. Use the key to highlight the ATCRBS MODE A line.
6. Press the SELECT Soft Key to display the XPDR DIAG-ATCRBS MODE A screen.
7. Select the following PRF frequencies and verify they are correct.

PRF	Freq. (Hz)	Tol. (± Hz)
235	235	5
118	118	5
90	90	5
70	70	5
50	50	5

8. Press the STOP TEST Soft Key to stop the tests.

(17) XPDR SLS Level

TEST EQUIPMENT: Spectrum Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the ANT port to the Spectrum Analyzer Input.
2. Connect the UUT SYNC port to the Spectrum Analyzer External Input.
3. Set Spectrum Analyzer as follows:

Frequency=	1030MHz
Input Att. =	20dB
VBW=	None
RBW =	5MHz
Span =	0Hz
REF =	0dB
Sweep=	1µS
Trigger=	Ext Front
Trig Mode=	Normal
Trig Level=	2.5V
Scale=	2dB

4. Press the SETUP key to display the SETUP-XPDR screen.
5. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
6. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
7. Use the key to highlight the ATCRBS MODE A line.
8. Press the SELECT Soft Key to display the XPDR DIAG-MODE A screen.
9. Set up the UUT as follows:

PRF:	235
RF Level:	–3dBm
SLS:	-9dB

10. Press the RUN TEST Soft Key.
11. Verify P2 level is less than P1 level by 9dB (-1/+0dB tolerance).
12. Press the STOP TEST Soft Key.
13. Set SLS to 0dB
14. Press the RUN TEST Soft Key.
15. Verify P2 level equals P1 level (-0/+1dB tolerance).
16. Press the STOP TEST Soft Key.
17. Set SLS to OFF.

STEP	PROCEDURE

18. Press the RUN TEST Soft Key.
19. Verify P2 is not present.
20. Press the STOP TEST Soft Key.

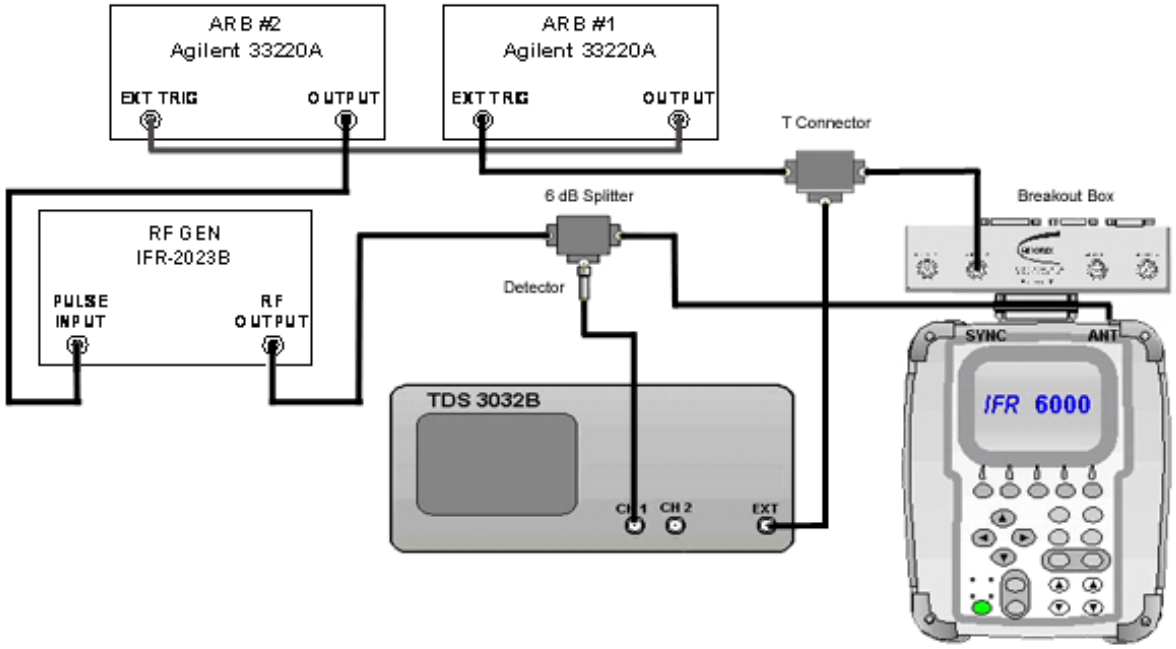
(18) XPDR Measurement - Reply Accuracy - ATCRBS

TEST EQUIPMENT: RF Generator
2 ARB Generators
Oscilloscope
Computer with Tera Term Pro and Intuilink software
6000 Breakout Box

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the coax connections as shown in Figure 12.



XPDR Measurement - Reply Accuracy - ATCRBS Test Connection
Figure 12

2. Set the RF Generator to –10 dBm @ 1090 MHz, external pulse modulation.
3. Press the SETUP key to display the SETUP-XPDR screen.
4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA and select BOTTOM ANTENNA.
5. Set the ANT RANGE to 12ft. and ANT HEIGHT to 1ft. for the BOTTOM ANTENNA.
6. Press the XPDR key to display the XPDR screen and verify the UUT shows GENERIC ATCRBS on the XPDR-AUTO TEST.
7. Press the TEST LIST Soft Key to display the XPDR-TEST LIST screen.

STEP PROCEDURE

8. Use the ▯ key to highlight the A/C F1/F2 SPACE/WIDTH line and press the SELECT TEST Soft key to display the XPDR- A/C SPACE/WIDTH screen.
9. Connect a computer COMM port to the RS-232 connector on the Break out Box.
10. Using the Tera Term terminal program, send the 'MTL_Disable' file, found on the IFR 6000 maintenance manual CD, to the UUT to override the MTL function of the unit. Press the LOCAL Soft Key to return unit to local mode.
11. Connect ARB #2 to the computer USB port and start the Intuilink software. Send the file "ATCRBS.wvf", found on the IFR 6000 maintenance manual CD, to ARB #2 volatile memory. Enter the required Frequency and Output voltage from table 18.1 when prompted.
12. Verify ARB #1 and ARB #2 are set as:

Function	**ARB #1**	**ARB #2**
Frequency	1kHz	48.192771kHz
Output	Pulse, 5Vpp, 0V Offset	Arbitrary, 5V high, 0V
Trigger	External, positive slope	External, negative slope
Mode	Burst, 1 cycle	Burst, 1 cycle
Impedance	High Z	50 Ohm

13. Set the pulse width on ARB #1 to the first pulse width listed below in table 18.2.
14. Press the RUN TEST Soft key.
15. Measure the pulse spacing between P3 of the interrogation and F1 of the reply using the scope to verify it matches the first Reply Delay. If needed, adjust the pulse width of ARB #1 till Reply Delay is correct.
16. Verify the reply delay value on the UUT is:

Mode	**ARB #1 Pulse Width (µs)**	**Reply Delay (µs)**	**Tolerance (µs)**
A	9.8 11.0	1.8 3.0	0.05
C	24.0 28.0	3.0 7.0	0.05

17. Repeat above steps for each Pulse Width and Reply Delay listed.
18. Set the pulse width on ARB #1 to 11µS. Measure the F1-F2 spacing, F1 pulse width and F2 pulse width on the scope.
19. Verify the F1-F2 spacing, F1 pulse width and F2 pulse width on the UUT equal the oscilloscope readings ±0.02µS.
20. Press the STOP TEST Soft key.

STEP PROCEDURE

21. Connect ARB #1 to the computer USB port and using the Intuilink software, send the file “JIT_1r0.wvf”, found on the IFR 6000 maintenance manual CD, to ARB #1 volatile memory. Enter the required Frequency and Output voltage from table 18.3 when prompted.
22. Verify ARB #1 Generator is set as:

Function	**ARB #1**
Frequency	.222222kHz
Output	Pulse, 4Vpp, 2V Offset
Trigger	External, positive slope
Mode	Burst, 1 cycle
Impedance	High Z

23. Verify the reply delay jitter value on the UUT is .82µS ±.02µS.
24. Press the STOP TEST Soft key.
25. Disconnect the coax from the UUT ANT connector and connect it to Ch.2 on the frequency counter.
26. Set the RF Generator for CW output and measure the frequency of the RF Generator at 1087, 1090, and 1093MHz.
27. Disconnect the coax from Ch.2 of the frequency counter and reconnect it to the UUT ANT connector.
28. Set the RF Generator for external pulse modulation.
29. Press the NEXT TEST Soft Key on the UUT to display the XPDR-POWER/FREQ screen.
30. Press the RUN TEST Soft key.
31. Verify that the UUT displays the measured RF Generator frequency ±50kHz at 1087, 1090, and 1093MHz.
32. Press the STOP TEST Soft key.

(19) XPDR Measurement - Reply Accuracy – Mode S

TEST EQUIPMENT: RF Generator
2 ARB Generators
Oscilloscope
Computer with Tera Term Pro and Intuilink software
6000 Breakout Box

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP PROCEDURE

1. Make the coax connections as shown in Figure 18.1 except use Aux 1 instead of Aux 2.
2. Set the RF Generator to –10 dBm @ 1090 MHz, external pulse modulation.
3. Press the SETUP key to display the SETUP-XPDR screen.
4. Set up the UUT as follows:

   RF PORT: ANTENNA, BOTTOM ANTENNA SELECTED
   RANGE: 12FT
   HEIGHT: 1FT
   UUT ADDRESS: MANUAL
   MANUAL AA: A92492

5. Press the XPDR key to display the XPDR screen and verify the UUT shows GENERIC MODE S on the XPDR-AUTO TEST.
6. Press the TEST LIST Soft Key to display the XPDR-TEST LIST.
7. Use the key to highlight the S REPLY TIMING line and press the SELECT TEST Soft key to display the XPDR-S RPLY TIMING screen.
8. Connect the computer COMM port to the RS-232 connector on the Break out Box.
9. Using the Tera Term terminal program, send the ‘MTL_Disable’ file, found on the IFR 6000 maintenance manual CD, to the UUT to override the MTL function of the unit. Press the LOCAL Soft Key to return unit to local mode.
10. Connect ARB #2 to the computer and start the Intuilink software. Send the file “DF4.wvf”, found on the IFR 6000 maintenance manual CD, to ARB #2 memory #1. Enter the required Frequency and Output voltage when prompted as:

Function	ARB #1	ARB #2
Frequency	1kHz	15.625kHz
Output	Pulse, 4Vpp, 0V Offset	Arbitrary, 5V high, 0V
Trigger	External, positive slope	External, negative slope
Mode	Burst, 1 cycle	Burst, 1 cycle
Impedance	High Z	50 Ohm

STEP PROCEDURE

11. Verify ARB #1 and ARB #2 are set according to table 19.1.
12. Set the pulse width on ARB #1 to the first pulse width listed below in table 19.2.
13. Press the RUN TEST Soft key.
14. Measure the pulse spacing between the SPR of the interrogation and P1 of the reply using the scope to verify it matches the first Reply Delay. If needed, adjust the pulse width of ARB #1 till Reply Delay is correct.
15. Verify the reply delay value on the UUT is:

Mode	ARB #1 Pulse Width (µs)	Reply Delay (µs)	Tolerance (µs)
S	129.75 132.75	125 128	0.05

16. Repeat above steps for the other Pulse Width and Reply Delay listed.
17. Press the STOP TEST Soft key.
18. Press the PREV TEST Soft Key to display the XPDR-S ALL CALL screen.
19. Load the file “DF11.wvf”, found on the IFR 6000 maintenance manual CD, to volatile memory and set ARB #2 for external trigger.
20. Set the pulse width on ARB #1 to the first pulse width listed below in table 19.3. Recall DF4.waveform from memory on ARB #2.
21. Press the RUN TEST Soft key.
22. Wait until the UUT replies and select the DF11 waveform as an output from volatile memory on ARB #2 while test is running.
23. Measure the pulse spacing between the P4 of the interrogation and P1 of the reply using the scope to verify it matches the first Reply Delay. If needed, adjust the pulse width of ARB #1 till Reply Delay is correct.
24. Verify the reply delay value on the UUT is:

Mode	ARB #1 Pulse Width (µs)	Reply Delay (µs)	Tolerance (µs)
ITM A	135 138	125 128	0.05

25. Repeat above steps for the other Pulse Width and Reply Delay listed.
26. Press the STOP TEST Soft key.
27. Press the NEXT TEST Soft Key twice to display the XPDR-S REPLY screen.
28. Set the pulse width on ARB #1 to 132.75µS.
29. Select the DF4 waveform as an output from memory #1 on ARB #2.
30. Press the RUN TEST Soft key.

STEP	PROCEDURE

31. Wait until the UUT replies and select the DF11 waveform as an output from volatile memory on ARB #2 while test is running.
32. Set ARB #1 to internal trigger. Set burst period on ARB #1 to 0.1 sec , 2.0 sec, and 4.88 sec. respectively
33. At each setting, verify the period shown on the UUT equals 0.1, 2.0, and 4.88 sec ± 0.01 sec respectively.
34. Press the STOP TEST Soft key.

(20) Altitude Encoder

TEST EQUIPMENT: 6000 Breakout Box
Wire with clips (jumper) and two crimp pins

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP PROCEDURE

1. Install the 6000 Breakout Box onto the UUT.
2. Press the XPDR button twice to display the XPDR-Encoder screen.
3. Verify the UUT is set for ENCODER.
4. Connect each end of the jumper wire to a crimp pin.
5. Insert one crimp pin into pin 13 of J6 connector on the 6000 Breakout box.
6. Press the RUN TEST Soft Key.
7. Insert the other crimp pin into each of the J6 connector holes listed:

A1	A2	A4	B1	B2	B4	C1	C2	C4	D2	D4
Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 11	Pin 12

8. Verify that the correct pulse shown on the UUT screen becomes unmasked when the crimp pin is inserted.
9. Press the STOP TEST Soft Key.

(21) Generate Video

TEST EQUIPMENT: Oscilloscope

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the UUT VIDEO port to Scope CH1.
2. Connect the UUT SYNC port to Scope CH2.
3. Set Scope to trigger off CH2 at 2V and CH1 to 50-ohm impedance.
4. Press the SETUP key to display the SETUP-XPDR screen.
5. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
6. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
7. Use the ▯ key to highlight the ATCRBS MODE A line.
8. Press the SELECT Soft Key to display the XPDR DIAG-ATCRBS MODE A screen.
9. Set up the UUT as follows:

   RFLVL: -67dBm

   PRF: 100

   SLS: OFF
10. Press the RUN TEST Soft Key.
11. Verify that the output level of the Video port is as follows:

    Baseline equals 0V ± 0.5V.

    Peak-to-Peak equals 1.0Vpp ± 0.5Vpp.

    P1 pulse width equals 0.8µS ± 50nS

    P1-P3 pulse spacing equals 8.0µs ± 25nS
12. Press the STOP TEST Soft Key.
13. Press the NEXT TEST Soft Key to display the XPDR DIAG-ATCRBS MODE C screen.
14. Press the RUN TEST Soft Key.
15. Verify P1-P3 pulse spacing equals 21.0µS ± 25nS
16. Press the STOP TEST Soft Key.
17. Press the PREV TEST Soft Key until the XPDR DIAG-FORMAT 0 screen is displayed.
18. Press the RUN TEST Soft Key.
19. Verify P1-P2 pulse spacing equals 2.0µS ± 25nS.
20. Press the STOP TEST Soft Key.

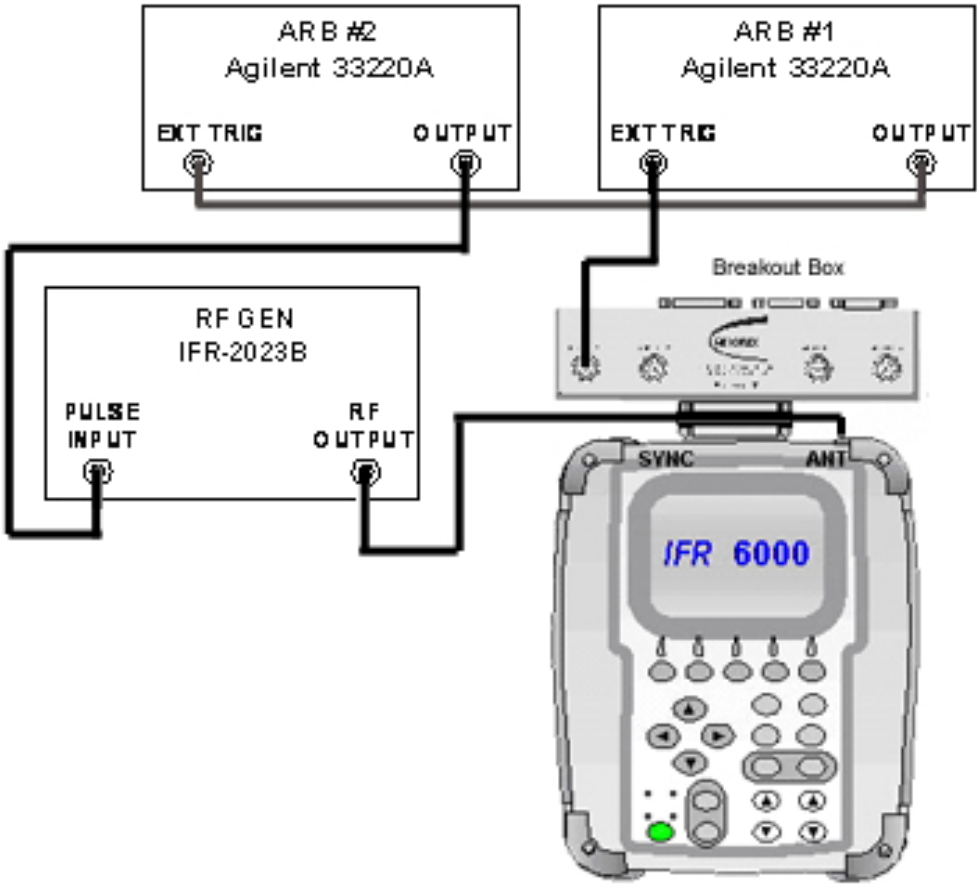
(22) ADSB Receive DF17 and DF20– Squitter Period

TEST EQUIPMENT: RF Generator
2 ARB Generators
Oscilloscope
Computer with Tera Term Pro and Intuilink software
6000 Breakout Box

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the coax connections as shown in Figure 13, using Aux 1.



ADSB Receive DF17 and DF20– Squitter Period Test Connection
Figure 13

2. Set the RF Generator to –10 dBm @ 1090 MHz, external pulse modulation.
3. Set UUT for GENERIC MODE S and press the SETUP key to display the SETUP-XPDR screen.

STEP PROCEDURE

4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA and select BOTTOM ANTENNA.
5. Set up the SETUP-XPDR screen as follows:

   BOTTOM ANT: RANGE 12ft., HEIGHT 1ft.

   UUT ADDRRESS: MANUAL A92492

   CHECK CAP: YES
6. Press the ADSB SETUP key to display the SETUP-ADSB screen.
7. In SETUP-ADSB screen, set up the UUT as follows:

   POS DECODE : GLOBAL

   LAT: 0 0 0 N

   LONG: 0 0 0 E

   ADSB GEN: DF17

   ADSB MON: DF17

   GICB: DF20
8. Connect the computer COMM port to the RS-232 connector on the Breakout Box.
9. Using the Tera Term terminal program, send the 'MTL_Disable' file, found on the IFR 6000 maintenance manual CD, to the UUT to override the MTL function of the unit. Press the LOCAL Soft Key to return unit to local mode.
10. Connect ARB #2 to the computer and start the Intuilink software. Send the file "DF4.wvf" to ARB #2 memory #1 and "DF17.wvf" to volatile memory on ARB #2. Both files can be found on the IFR 6000 maintenance manual CD. Enter the required Frequency and Output voltage from table 22.1 for the DF4 waveform when prompted.
11. Verify ARB #1 and ARB #2 are set as:

Function	ARB #1	ARB #2
Frequency	1kHz	15.625kHz
Output	Pulse, 4Vpp, 0V Offset	Arbitrary, 5V high, 0V
Trigger	External, positive slope	External, negative slope
Mode	Burst, 1 cycle	Burst, 1 cycle
Impedance	High Z	50 Ohm

12. Set pulse width on ARB #1 to 132.75 µs.
13. Press the XPDR button until the ADS-B/GCIB MAIN screen is displayed.
14. Press the ADS-B MON Soft Key to DISPLAY THE ADS-B MON DF17 screen.
15. Select the ADSB MON test #1 (0,5 AIRBORNE POS) and press the BDS DATA Soft Key to display the ADS-B MON BDS 0,5 screen.
16. Press the RUN TEST Soft Key
17. Wait until the UUT is showing replies and select the DF17 waveform as an output from volatile memory on ARB #2 while test is running and set ARB #2 frequency to 8.3333kHz.

STEP PROCEDURE

18. Set ARB #1 to internal trigger.
19. Set burst period on ARB #1 to 0.1 sec, 1.0 sec, and 5.0 sec., respectively.
20. At each setting, verify the PERIOD shown on the UUT equals setting ± 0.01sec.
21. Verify the ADS-B MON BDS 0,5 screen shows the following information:

    BDS=: 0,5 Airborne POS

    TYPE =: 20

    ME=: A0084000000000

    GNSS ALT =: 126700 ft
22. Press the STOP TEST Soft Key.
23. Press the SETUP button to display the XPDR-SETUP screen.
24. Set CHECK CAP to NO.
25. Press the XPDR button to return to the ADS-B MON BDS 0,5 screen.
26. Press the RETURN Soft Key until the ADS-B/GICB MAIN screen is displayed.
27. Press the GICB Soft Key to display the GICB DF20 screen.
28. Press the BDS DATA Soft Key to display the GICB BDS 0,5 screen.
29. Load the file “DF20_Air.wvf”, found on IFR 6000 maintenance manual CD, to volatile memory on ARB #2.
30. Recall the DF4 waveform from the memory #1 on ARB #2 and set ARB #2 frequency to 15.625kHz.
31. Set ARB #1 back to external trigger.
32. Press the RUN TEST Soft Key.
33. Wait until the UUT is showing replies and select the file “DF20_Air waveform as an output from volatile memory on ARB #2 while test is running and set ARB #2 frequency to 8.3333kHz.
34. Verify the ADS-B MON BDS 0,5 screen shows the following information:

    BDS=: 0,5

    AIRBORNE POS.

    TYPE =: 20

    ME=: A011000000000

    GNSS ALT =: -975 ft
35. Press the STOP TEST Soft Key.
36. Load the file “DF20_Sur.wvf”, found on IFR 6000 maintenance manual CD, to volatile memory on ARB #2.
37. Recall the DF4 waveform from the memory #1 on ARB #2 and set ARB #2 frequency to 15.625kHz
38. Press the NEXT TEST Soft Key to display the GICB BDS 0,6 screen.
39. Press the RUN TEST Soft Key.
40. Wait until the UUT is showing replies and select the file “DF20_Sur waveform as an output from volatile memory on ARB #2 while test is running and set ARB #2 frequency to 8.3333kHz.

STEP	PROCEDURE

41. Verify the ADS-B MON BDS 0,5 screen shows the following information:

    BDS=: 0,6

    SURFACE POS.

    TYPE =: 8

    ME=: 47C00000000000

    MOVEMENT =: 175 kt

42. Press the STOP TEST Soft Key.

(23) ADSB Generate DF17 and DF18 – Squitter Period

TEST EQUIPMENT: IFR 6000 with opt. 3
Computer with Tera Term software
6000 Breakout Box

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the ANT port of the IFR-6000 to the ANT port of the UUT.
2. On the IFR 6000, press the SETUP key to display the SETUP-XPDR screen.
3. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA and select BOTTOM ANTENNA.
4. Connect the 6000 Breakout Box to the IFR 6000 and connect the computer to the Breakout Box via a RS-232 cable.
5. Using a terminal program, send to the IFR-6000 the RCI command “I:ADSB:MTL SKIP” to skip MTL.
6. Set up the SETUP-XPDR screen as follows:

BOTTOM ANT:	RANGE 100ft., HEIGHT 1ft.
UUT ADDRRESS:	MANUAL
AA MANUAL:	A92492
CHECK CAP:	YES

7. Press the ADSB SETUP key on the IFR 6000 to display the SETUP-ADSB screen.
8. On the SETUP-ADSB screen, set up the IFR 6000 as follows:

POS DECODE:	GLOBAL
LAT:	0 0 0 N
LONG:	0 0 0 E
ADSB GEN:	DF17
ADSB MON:	DF17
GICB:	DF20

9. On the IFR 6000, press the XPDR Key until the ADS-B/GICB Main screen is displayed.
10. Press the ADSB MON Soft Key to display the ADS-B MON DF17 screen.
11. Press the BDS DATA Soft Key to display the ADS-B MON BDS 0,5 screen.
12. On the UUT, press the SETUP key to display the SETUP-XPDR screen.
13. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA and select BOTTOM ANTENNA.

STEP PROCEDURE

14. Set up the SETUP-XPDR screen as follows:

BOTTOM ANT:	RANGE 100ft., HEIGHT 1ft.
UUT ADDRRESS:	MANUAL
AA MANUAL:	A92492
CHECK CAP:	YES

15. Press the ADSB SETUP key to display the SETUP-ADSB screen.
16. On the SETUP-ADSB screen, set up the UUT as follows:

POS DECODE:	GLOBAL
LAT:	0 0 0 N
LONG:	0 0 0 E
ADSB GEN:	DF17
ADSB MON:	DF17
GICB:	DF20

17. On the UUT, press the XPDR Key until the ADS-B/GICB Main screen is displayed.
18. ress the ADSB GEN Soft Key to display the ADS_B GEN DF17 screen.
19. Press the BDS DATA Soft Key to display the ADS-B GEN BDS 0,5 screen.
20. Set the ADS-B GEN BDS 0,5 screen. as follows:

TYPE:	9
DF17 AA:	A92492
PERIOD:	0.50 s
BARO PRES ALT:	1000 ft

21. On the IFR-6000, press the RUN TEST Soft Key to the run ADSB MON test #1 (0,5 AIRBORNE POS).
22. On the UUT, press the BDS ON Soft Key and then the RUN TEST Soft Key to run ADS-B GEN BDS 0,5.
23. Ensure that the DF17 message from the UUT is decoded correctly on the IFR-6000 by verifying the following information is present on the IFR 6000:

BDS =:	0,5 AIRBORNE POS
TYPE:	9
ME=:	480B0400000000
BARO PRES ALT:	1000 ft

24. Verify that the PERIOD equals 0.5 sec. ± 0.2 sec.
25. On the UUT, change the PERIOD to 1.0 and 5.0 sec. respectively.
26. At each setting, verify the PERIOD displayed on the IFR-6000 equals setting ± 0.2 sec.
27. Press the STOP TEST Soft Key on both UUT and the IFR-6000.
28. On the IFR 6000, press the SETUP button and then the ADSB SETUP Soft Key to display the SETUP-ADSB screen.
29. Change the ADSB MON setting to DF18.

STEP PROCEDURE

30. Press the XPDR Key on the IFR 6000 to return to the ADSB MON test #1 (0,5 AIRBORNE POS).
31. On the UUT, press the SETUP button and then the ADSB SETUP Soft Key to display the SETUP-ADSB screen.
32. Change the ADSB GEN setting to DF18.
33. Press the XPDR Key on the UUT to return to the ADS-B GEN BDS 0,5 screen.
34. Set the fields as follows:

TYPE:	10
DF18 AA:	A92492
PERIOD:	0.50 s
BARO PRES ALT:	2000 ft

35. On the UUT, press the RUN TEST Soft Key.
36. On the IFR-6000, press the RUN TEST Soft Key).
37. Ensure that the DF18 message from the UUT is decoded correctly on the IFR-6000 by verifying the following information is present on the IFR 6000:

BDS =:	0,5 AIRBORNE POS
TYPE:	10
ME=:	500F8400000000
BARO PRES ALT:	2000 ft

38. Verify that the PERIOD equals 0.5 sec. ± 0.2 sec.
39. On the UUT, change the PERIOD to 1.0 and 5.0 sec. respectively.
40. At each setting, verify the PERIOD displayed on the IFR-6000 equals setting ± 0.2 sec.
41. Press the STOP TEST Soft Key on both UUT and the IFR-6000.

(24) TIS Receive

TEST EQUIPMENT: RF Generator
2 ARB Generators
Oscilloscope
Computer with Tera Term Pro and Intuilink software
6000 Breakout Box

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP PROCEDURE

1. Make the coax connections as shown in Figure 22.1.
2. Press the SETUP button until the SETUP-TIS screen is displayed.
3. On the SETUP-TIS screen, set up the UUT as follows:

   RF PORT: ANTENNA

   ANT RANGE: 12 ft

   ANT HEIGHT: 1 ft

   UUT ADDRESS: MANUAL

   MANUAL AA: A92492
4. Press the TCAS button twice to display the TIS screen
5. Set the RF Generator to –10 dBm @ 1090 MHz, external pulse modulation.
6. Connect the computer COMM port to the RS-232 connector on the Break out Box.
7. Using the Tera Term terminal program, send the 'MTL_Disable' file, found on the IFR 6000 maintenance manual CD, to the UUT to override the MTL function of the unit. Press the LOCAL Soft Key to return the UUT back to local mode.
8. Connect ARB #2 to the computer USB port and start the Intuilink software. Send the file, "TIS.wvf", found on the IFR 6000 maintenance manual CD to ARB #2 volatile memory. Enter the required Frequency and Output voltage when prompted as:

Function	ARB #1	ARB #2
Frequency	1kHz	15.625kHz
Output	Pulse, 5Vpp, 0V Offset	Arbitrary, 5V high, 0V
Trigger	External, positive slope	External, negative slope
Mode	Burst, 1 cycle	Burst, 1 cycle
Impedance	High Z	50 Ohm

9. Verify ARB #1 and ARB #2 are set according to table 25.1.
10. Set the pulse width on ARB #1 to 132.75µS.
11. Press the RUN TEST Soft Key.

STEP	PROCEDURE

12. Verify the following fields at the bottom of the UUT screen are as follows:

    ADDR= A92492

    ALT = 31200

    INFO= 0400

13. Press the STOP TEST Soft Key.

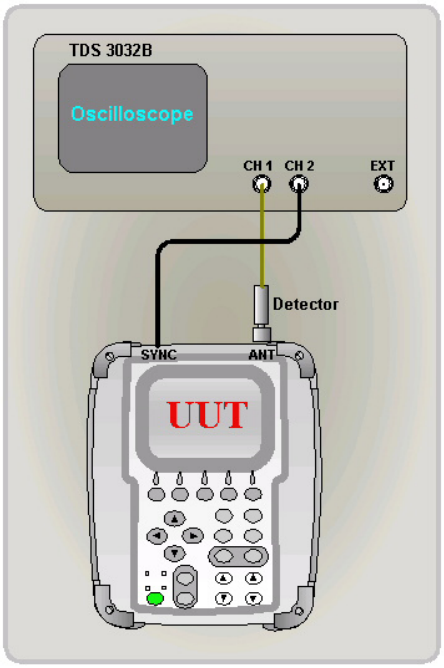
(25) TCAS Reply Pulse Characteristics

TEST EQUIPMENT: Oscilloscope
Pulse Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 14.



TCAS Reply Pulse Characteristics Test Connection
Figure 14

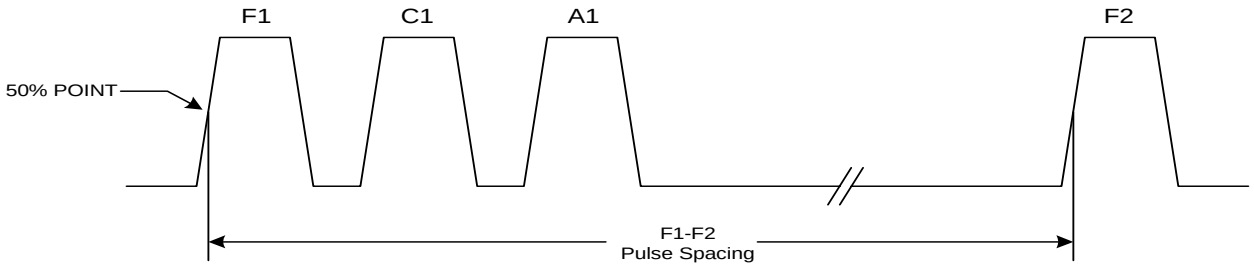
2. Set Scope CH1 to 50-ohm impedance, invert on.
3. Set the Scope to trigger off CH2 at 2V.
4. Press the TCAS and then the SETUP key to display the SETUP-TCAS screen.
5. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
6. Press the DIAG Soft Key to display the TCAS-DIAGNOSTICS screen
7. Press the Select Soft Key to display the TCAS-DIAG MODE C REPLY screen.
8. Set the UUT as follows:

   Level : –2 dBm

   ALT: 30300 ft.

STEP PROCEDURE

9. Press the RUN TEST Soft Key.



Reply Mode C
Figure 15

10. Verify the following pulse characteristics on the scope:

    F1-C1 equals 1.45µs ± 25nS

    F1-A1 equals 2.90µS ± 25nS

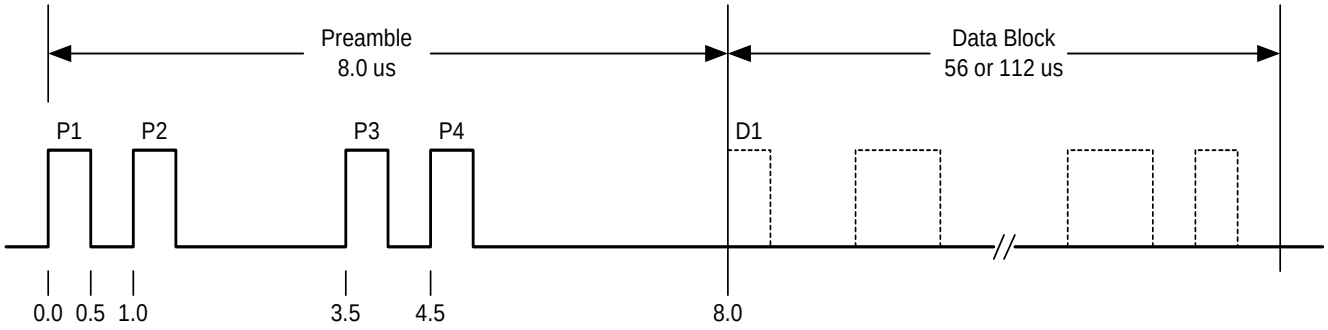
    F1-F2 equals 20.30µS ± 25nS

    F1 pulse width equals 0.45µS ± 50nS

    F1 rise time is between 50nS and 100nS

    F1 fall time is between 50nS and 200nS

11. Press the STOP TEST Soft Key.
12. Press the NEXT TEST Soft Key until the TCAS DIAG-DF16 screen is displayed.
13. Press the RUN TEST Soft Key.



Reply Mode C
Figure 16

STEP	PROCEDURE

14. Verify the following pulse characteristics on the scope:

    P1-P2 equals 1.0µS ± 25nS

    P1-P3 equals 3.5µS ± 25nS

    P1-P4 equals 4.5µS ± 25nS

    P1-D1 equals 8.0µS ± 25nS

    P1 pulse width equals 0.50µS ± 50nS

    P1 rise time is between 50nS and 100nS

    P1 fall time is between 50nS and 200nS

15. Press the STOP TEST Soft Key.
16. Press the PREV TEST Soft Key until the TCAS DIAG-MODE C REPLY screen is displayed.
17. Set ALT: to -1000ft.
18. Press the RUN TEST Soft Key.
19. Verify only the C2 pulse is displayed on the Oscilloscope between F1 and F2 pulses and that the F1 to C2 pulse spacing is 4.35µS ± 25nS.
20. Press the STOP TEST Soft Key.
21. Set ALT: to 126700ft.
22. Press the RUN TEST Soft Key.
23. Verify only the C4 and D2 pulses are displayed on the Oscilloscope between F1 and F2 pulses, that F1 to C4 pulse spacing is 7.25µS ± 25nS, and that F1 to D2 pulse spacing is 15.95µS ± 25nS.
24. Press the STOP TEST Soft Key.

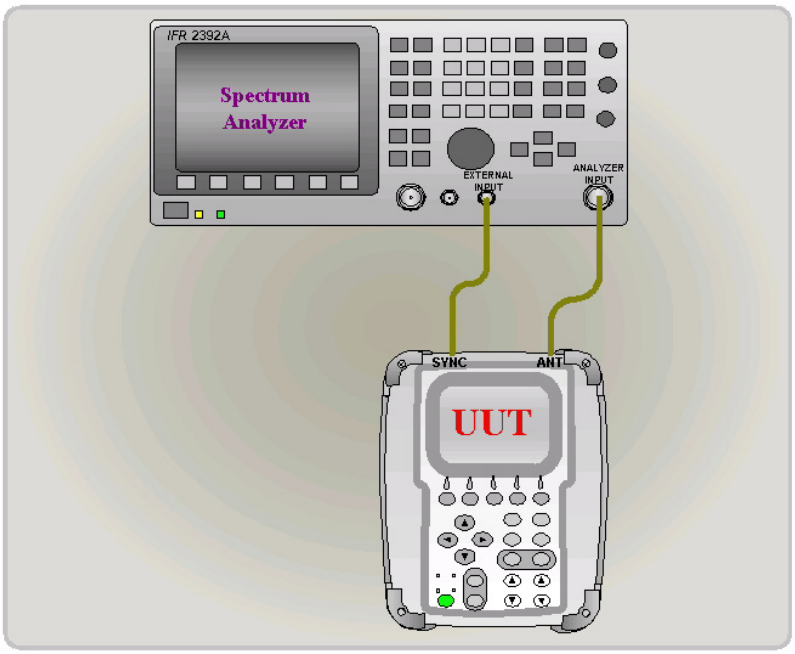
(26) TCAS Reply Pulse Amplitudes

TEST EQUIPMENT: Spectrum Analyzer

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 17.



TCAS Reply Pulse Amplitudes Test Connection
Figure 17

2. Set Spectrum Analyzer as follows:

Center Freq:	1090 MHz
Span:	0 Hz
Input Attn.:	20 dB
RBW:	5 MHz
VBW:	None
REF:	0 dB
Sweep:	1us
Trigger:	Ext Front
Trig Mode:	Normal
Trig Level:	2.5V
Scale:	5 dB

STEP	PROCEDURE

3. Press the TCAS and then the SETUP key to display the SETUP-TCAS screen.
4. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
5. Press the DIAG Soft Key to display the TCAS-DIAGNOSTICS screen
6. Press the Select Soft Key to display the TCAS DIAG-MODE C REPLY screen.

   Set the UUT as follows:

   Level : –2 dBm

   ALT: 30300 ft.
7. Press the RUN TEST Soft Key.
8. Record amplitude of F1.
9. Verify C1 and A1 pulse amplitudes are equal to F1 amplitude (±1dB).
10. Press the STOP TEST Soft Key.
11. Press the NEXT TEST Soft Key until the TCAS DIAG-DF16 screen is displayed.
12. Press the RUN TEST Soft Key.
13. Record amplitude of P1.
14. Verify P2, P3, P4 pulse amplitudes are equal to P1 amplitude (±1dB).
15. Press the STOP TEST Soft Key.

(27) TCAS Squitter Period

TEST EQUIPMENT: Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Connect the UUT SYNC port to the Frequency Counter CH1.
2. Set up the frequency counter as follows:

   Meas. Type: Period

   Gate time: 10 sec.

   Auto Trig.: Off

   Trig. Level: 2.0V
3. Press the TCAS and then the SETUP keys to display the SETUP-TCAS screen.
4. Set SQUITTERS: to ON.
5. Press the TCAS Key to display the TCAS screen.
6. Set INTRUDER TYPE: to MODE S.
7. Press the RUN TEST Soft Key.
8. Verify Squitter Period on the frequency counter equals 1.0 sec ± 200ms.
9. Press the STOP TEST Soft Key.

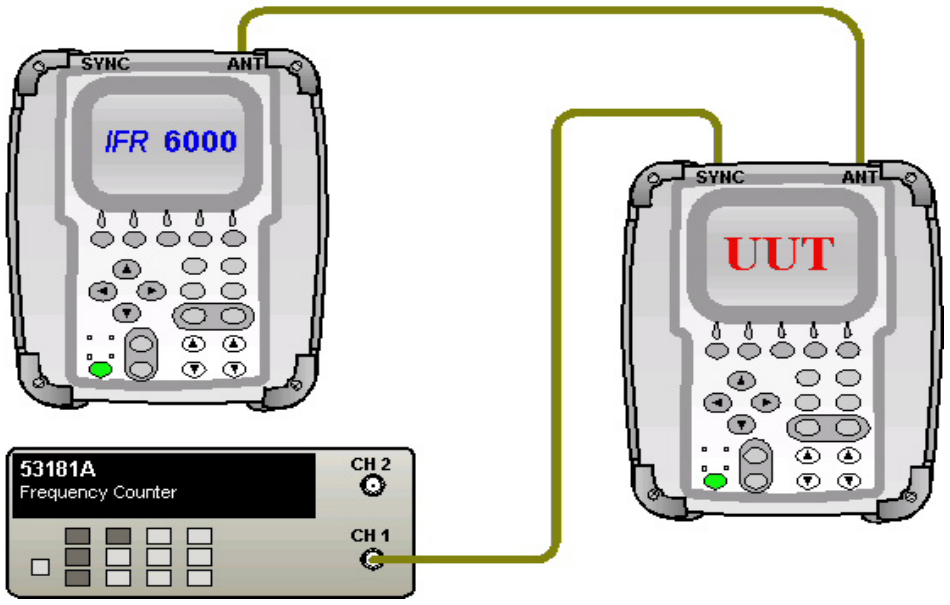
(28) TCAS Percent Reply

TEST EQUIPMENT: Frequency Counter
IFR 6000

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 18.



TCAS Percent Reply Test Connection
Figure18

2. Press the SETUP key on the IFR 6000 to display the SETUP-XPDR screen.
3. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
4. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
5. Use the ▯ key to highlight the ATCRBS MODE C line.
6. Press the SELECT Soft Key to display the XPDR DIAG-ATCRBS MODE C screen.
7. Set up the IFR 6000 as follows:

RF Level:	–10 dBm
PRF:	300
SLS:	OFF

8. On the UUT, press the TCAS and then the SETUP key to display the SETUP-TCAS screen.

STEP PROCEDURE

9. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
10. Change the ANT RANGE: to 250ft and ANT HEIGHT: to 1ft.
11. Set SQUITTERS: to ON.
12. Press the TCAS Key.
13. Set up the UUT as follows:

    TCAS Type: TCAS I

    Intruder Type: ATCRBS

    Range Start: 0.35 nm

    Range Rate: 0 kts

    ALT Rate: 0 fpm
14. Set UUT % REPLY to 10.
15. Press the RUN TEST Soft Key on both IFR 6000 and the UUT.
16. Note the reply frequency displayed on the frequency counter.
17. Calculate the percent reply by using this formula:

$$\text{Percent Reply} = \frac{\text{Measured Frequency}}{\text{Interrogation PRF}} \times 100\%$$

18. Verify Percent Reply equals % Reply Setting ± 1%.
19. Repeat the above steps for each UUT % REPLY setting and verify the percent reply as:

UUT % Reply	Low Limit (%)	High Limit (%)
40	39	41
70	69	71
100	99	100

20. Press the STOP TEST Soft Key on both IFR 6000 and the UUT.

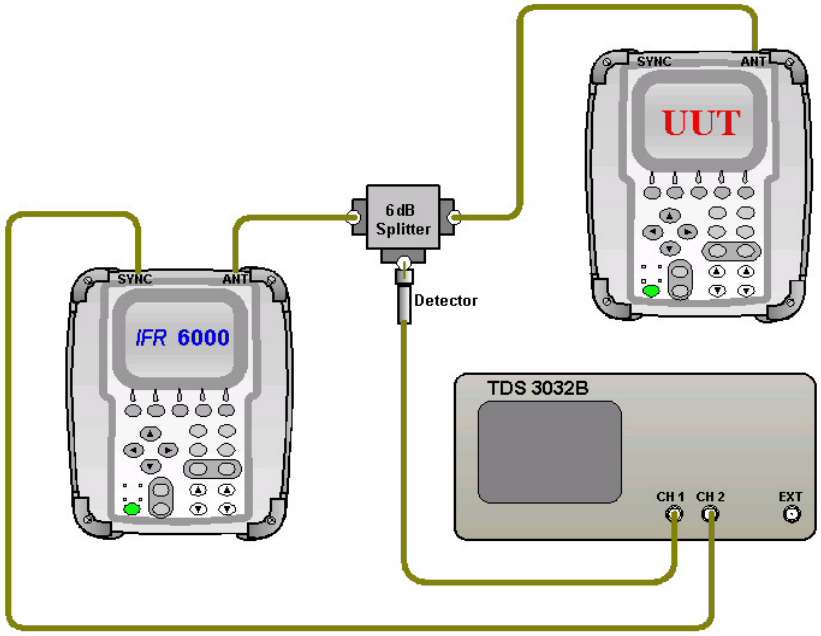
(29) TCAS Reply Delay and Range

TEST EQUIPMENT: Oscilloscope
IFR 6000
6dB Splitter
Detector

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 19.



TCAS Reply Delay and Range Test Connection
Figure 19

2. Press the SETUP key on the IFR 6000 to display the SETUP-XPDR screen.
3. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
4. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
5. Use the ▯ key to highlight the ATCRBS MODE C line.
6. Press the SELECT Soft Key to display the XPDR DIAG-ATCRBS MODE C screen.
7. Set up the IFR 6000 as follows:

RF Level:	–3 dBm
PRF:	100
SLS:	OFF

STEP PROCEDURE

8. On the UUT, press the TCAS and then the SETUP key to display the SETUP-TCAS screen.
9. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
10. Set the SETUP-TCAS screen as follows:

    ANT RANGE: 250ft
    ANT HEIGHT: 1ft
    UUT ADDR: AUTO
    SQUITTERS OFF

11. Press the TCAS Key.
12. Set up the UUT as follows:

    TCAS Type: TCAS I
    Intruder Type: ATCRBS
    % Reply: 100
    Range Start: 0.35 nm
    Range Rate: 0 kts
    ALT Rate: 0 fpm

13. Set the Scope to trigger off CH2 at 2V and set CH1 to 50Ω impedance, invert on.
14. Press the RUN TEST Soft Key on both IFR 6000 and the UUT.
15. Verify spacing between the second pulse of interrogation (P3) and the first pulse of reply (F1) on the scope equals 6.817µS ± 0.05µS (Reply delay plus 3.817µS for Range and Antenna delay).
16. Press the STOP TEST Soft Key on both IFR 6000 and the UUT.
17. On the IFR 6000, press the PREV TEST Soft Key till the FORMAT 0 screen is displayed.
18. Set the ADDRESS: to A92493.
19. On the UUT, the SETUP Key to display the SETUP-TCAS screen.
20. Set the SETUP-TCAS screen as follows:

    UUT ADDR: MANUAL
    MANUAL AA: A92493

21. Press the TCAS Key.
22. Change the UUT TCAS screen setup as follows:

    TCAS Type: TCAS II
    Intruder Type: MODE S
    Range Start: 0.00 nm
    Range Stop: 0.00 nm

23. Press the RUN TEST Soft Key on both IFR 6000 and the UUT.

STEP	PROCEDURE

24. Verify spacing between the first SPR pulse of interrogation and the first pulse of reply (P1) equals 127.49µS ± 0.05µS.
25. Press the STOP TEST Soft Key on both IFR 6000 and the UUT.
26. n the IFR 6000, press the NEXT TEST Soft Key till the ATCRBS MODE C screen is displayed:
27. Change the UUT TCAS screen setup as follows:

    TCAS Type: TCAS I

    Intruder Type: ATCRBS

    Range Start: 5 nm
28. Press the RUN TEST Soft Key on both IFR 6000 and the UUT.
29. Verify the range delay is 5.0 nm ± 0.02 nm (64.286µS ± 247nS).
30. Press the STOP TEST Soft Key on both IFR 6000 and the UUT.

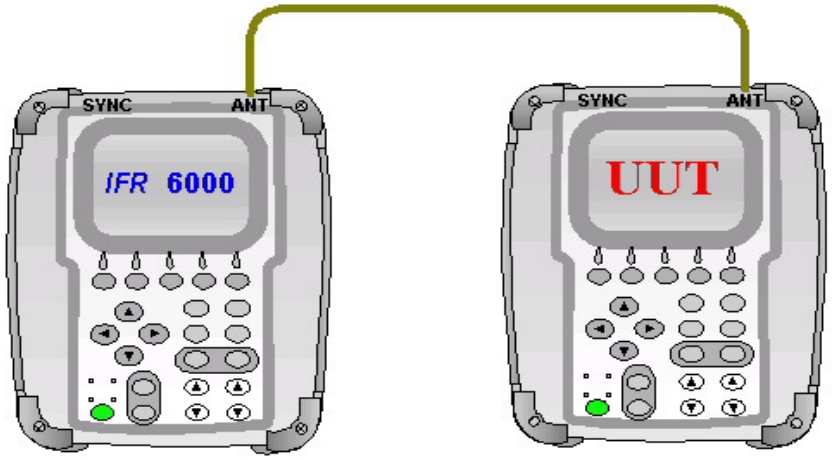
(30) TCAS Mode S Reply

TEST EQUIPMENT: IFR 6000

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 20.



TCAS Mode S Reply Test Connection
Figure 20

2. Press the SETUP key on the IFR 6000 to display the SETUP-XPDR screen.
3. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
4. Press the DIAG Key to display the XPDR DIAGNOSTICS screen.
5. Use the key to highlight the DOWNLINK FORMAT 0 line.
6. Press the SELECT Soft Key to display the TCAS DIAG-DF0 screen.
7. Set up the IFR 6000 Format 0 screen as follows:

RX ATTEN:	30 dB
RFLVL:	–10 dBm
PRF:	100
SLS:	OFF
ADDRESS:	A92493

8. On the UUT, press the TCAS and then the SETUP key to display the SETUP-TCAS screen.
9. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.

STEP PROCEDURE

10. Set up the UUT in SETUP-TCAS menu as follows:

    ANT Range: 250 ft
    ANT Height: 1 ft
    Squitters: OFF
    UUT ADDRESS: AUTO
    MANUAL AA: A92493

11. Press the TCAS key on the UUT.
12. Set the TCAS screen as follows:

    TCAS Type: TCAS II (
    Intruder Type: MODE S
    % Reply: 100
    Range Start: 0.00 nm
    Range Rate: 0 kts
    ALT START: 1000ft
    ALT RATE: 0fpm

13. Press the RUN TEST Soft Key on both IFR 6000 and the UUT.
14. Verify that both units are replying and the IFR-6000 displays the following information replied from the UUT:

    DF=0, VS=0, CC=0, SL=0, RI=0, AC=1000 and AA=A92493

15. Press the STOP TEST Soft Key on the IFR 6000.
16. On the IFR 6000, press the NEXT TEST Soft Key till the TCAS DIAG-DF16 screen is displayed.
17. Press the RUN TEST Soft Key on the IFR 6000.
18. Verify that both units are replying and the IFR-6000 displays the following information replied from the UUT:
19. DF=16, VS=0, SL=0, RI=3, MV=30000000000000, AC=1000ft and AA=A92493
20. Press the STOP TEST Soft Key on the IFR 6000.
21. On the IFR 6000, press the PREV TEST Soft Key till the TCAS DIAG-DF11 screen is displayed.
22. On the IFR-6000, set the FORMAT 11address to FFFFFF.
23. Press the RUN TEST Soft Key on the IFR 6000.
24. Verify that both units are replying and the IFR-6000 displays the following information replied from the UUT:

    DF=11, CA=0, and AA=A92493

25. Press the STOP TEST Soft Key on both IFR-6000 and the UUT.

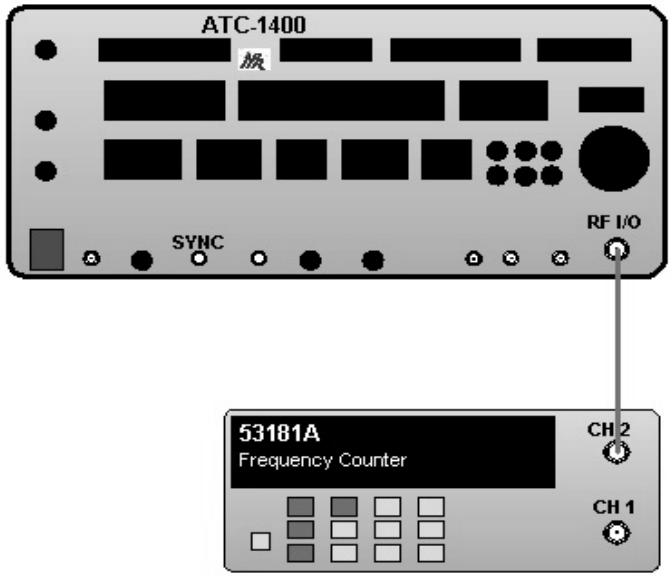
(31) TCAS Measurement – Interrogation Frequency

TEST EQUIPMENT: ATC-1400A
Frequency Counter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

STEP	PROCEDURE

1. Make the connection as shown in Figure 21.



TCAS Measurement – Interrogation Frequency Test Connection
Figure 21

2. On the ATC-1400A, set RF output to –10 dBm, CW.
3. Set frequency (in MHz) from 1029.90 to 1030.10, step = 50 kHz respectively.
4. At each setting, record the frequency displayed on the Frequency Counter.
5. Set up the ATC-1400A as follows:

FREQ/Function Select:	1029.9 XPDR
XPDR Mode:	C
RF LEVEL Control:	–10dBm
CW/NORM/OFF:	NORM
PRF:	235
PRF/Squitter:	ON

Set other toggle switches to OFF/CAL position

STEP PROCEDURE

6. On the UUT, press the TCAS and then the SETUP key to display the SETUP-TCAS screen.
7. Verify the RF PORT shows ANTENNA. If necessary, change it to ANTENNA.
8. Set up the UUT in SETUP-TCAS menu as follows:

ANT Range:	250 ft
ANT Height:	1 ft
Squitters:	OFF
UUT ADDRESS:	AUTO

9. Press the TCAS key on the UUT.
10. Set the TCAS screen as follows

TCAS Type:	TCAS I
Intruder Type:	ATCRBS
% Reply:	100
Range Start:	0.35 nm
Range Rate:	0 kts
ALT Rate:	0 fpm

11. Move cable from the frequency counter to the UUT ANT port.
12. Press the RUN TEST Soft Key on the UUT.
13. On the ATC-1400A, set frequency (in MHz) from 1029.90 to 1030.10, step = 50 kHz respectively.
14. At each setting, verify that the frequency displayed on the UUT equals Recorded Freq. ± 10 kHz.
15. Press the STOP TEST Soft Key.

(32) RF Power Measurement

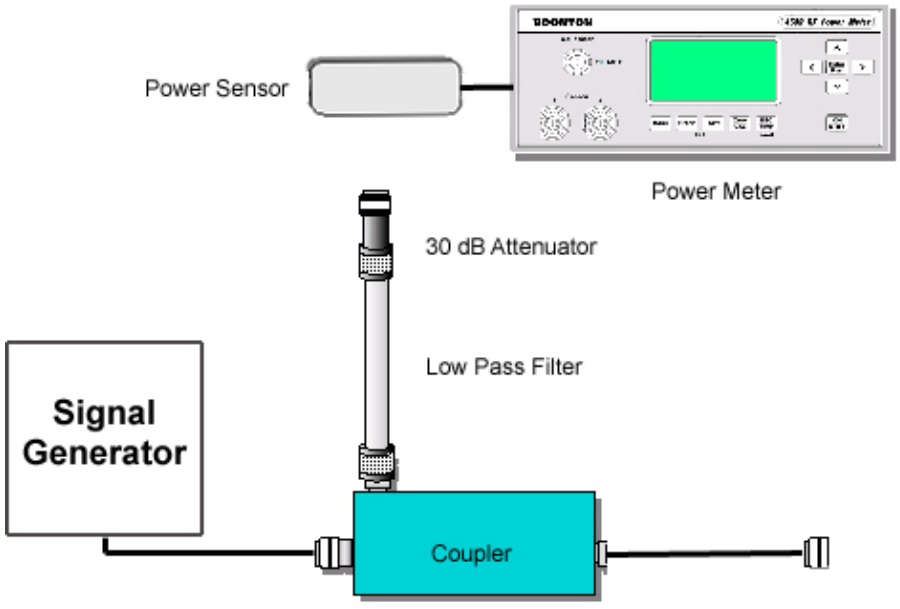
TEST EQUIPMENT:

Power Meter w/ Peak Power Sensor
DME
N Coaxial 20dB Directional Coupler
Low Pass Filter
30 dB Attenuator
4' N-N Armored Coaxial Cable
20 dB Attenuator
10 dB Attenuator
TNC Male to N Female Adapter

VERIFICATION FAILURE: If any step in this procedure fails or is out of tolerance, this indicates a failure in the Test Set. Refer to Troubleshooting for corrective action.

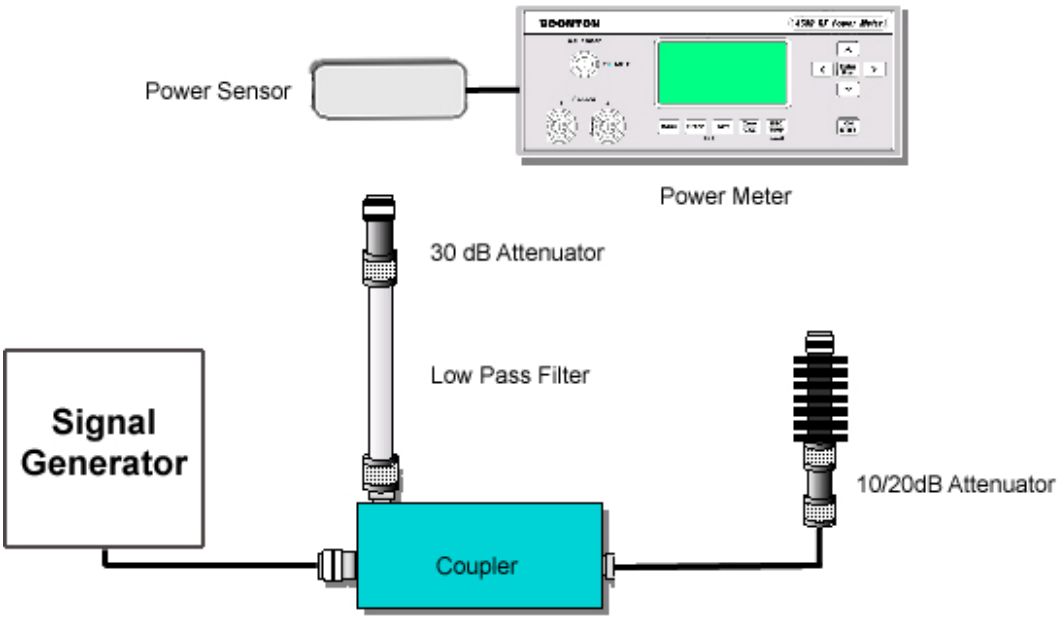
STEP PROCEDURE

1. Characterize and record the loss of the Power Meter Calibration Setup (Figure 22) at 1025, 1055, 1090, and 1150MHz:
   - Measure and record the loss between the Signal Generator and the 30dB attenuator on the coupled port of the directional coupler at each frequency. Record as A.
   - Measure and record the loss between the Signal Generator and the end of the coaxial cable going to the RF I/O Connector at each frequency. Record as B.



RF Power Measurement Test Connection 1
Figure 22

- Subtract Loss (B1) from Loss (A) at each frequency and record as CF1.
- Put the 10dB and 20dB attenuator on the end of the coax (Figure 23) and repeat the above steps to find the loss difference between B2 and A. Record as CF2.

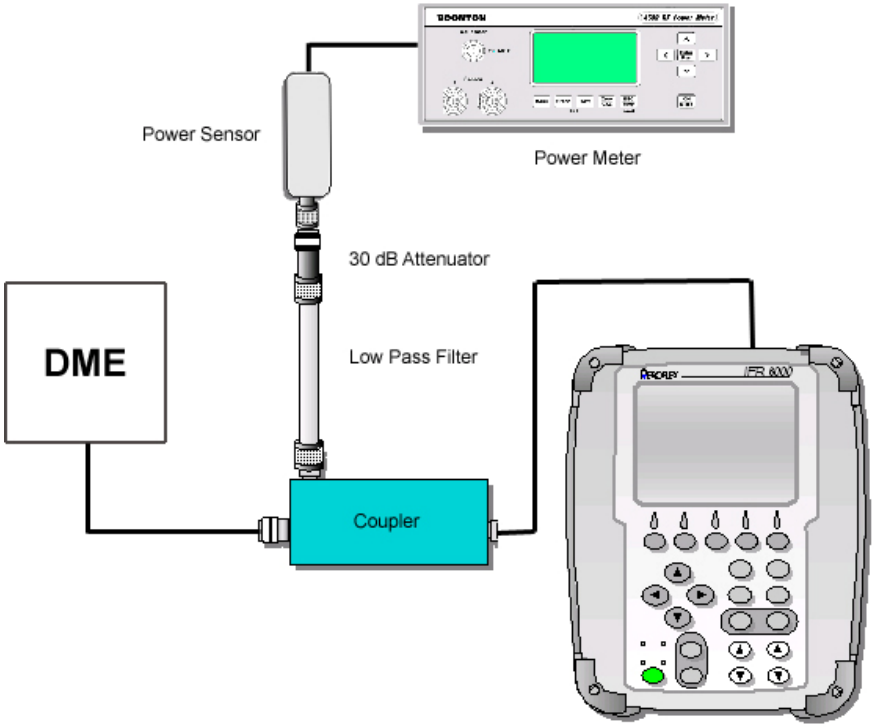


RF Power Measurement Test Connection 2
Figure 23

2. Connect the Power Sensor to the ‘Calibrator’ port on the Power Meter.
3. Start the ‘Auto Cal’ sequence on the Power Meter.
4. Wait for the Power Meter to complete the auto cal sequence before disconnecting the Power Sensor.
5. Configure the Power Meter parameters as required to allow for accurate pulse power measurements.

STEP PROCEDURE

6. Connect the equipment as shown in Figure 24.



RF Power Measurement Test Connection 3
Figure 24

7. On the UUT, press the DME key and then the SETUP key to display the SETUP-DME screen.
8. Set the SETUP-DME screen as follows:

   RF PORT: DIRECT CONNECT

   DIR CABLE LOSS: 0.0dB
9. Press the DME key to display the DME screen.
10. Set the UUT and the DME to the first setting as:

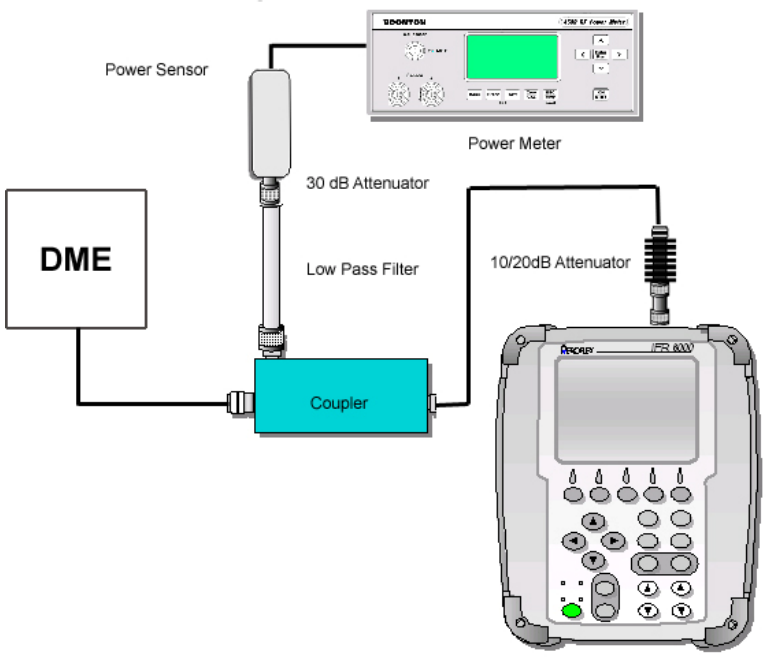
Setting	Channel	VOR (MHz)	DME XMIT Frequency (MHz)
1	1X	134.40	1025
2	31X	109.40	1055
3	66X	133.90	1090
4	126X	117.90	1150

STEP PROCEDURE

11. Enter the DME XMIT frequency of the current DME setting into the Power Meter.
12. Enter the 'CF1' for the DME frequency into the Power Meter for 'dB offset' and return the Power Meter to its 'Text' display.
13. Switch the DME to ON from 'Standby' and press the RUN TEST Soft Key on the UUT.
14. Verify that the UUT ERP reading is equal to the Power Meter 'Peak Power' value ±1dB.
15. Press the STOP TEST Soft Key on the UUT and set the DME to 'Standby'.
16. Repeat steps 10 through 15 for each frequency setting listed.
17. On the UUT, press the DME key and then the SETUP key to display the SETUP-DME screen.
18. Set the SETUP-DME screen as follows:

RF PORT:	ANTENNA
ANT RANGE:	6ft
ANT HEIGHT:	1ft
ANT CABLE LOSS:	0.0dB
ANT GAIN (1.03GHz)	0.0Db
ANT GAIN (1.09GHz)	0.0dB

19. Press the DME key to display the DME screen.
20. Disconnect the coax from the RF I/0 connector.
21. Connect the 10dB attenuator to the ANT connector and the 20dB attenuator to the 10dB attenuator (Figure 25) and connect the coax to the 20dB attenuator.



RF Power Measurement Test Connection 4
Figure 25

STEP PROCEDURE

22. Set the UUT and the DME to the first setting as:

Setting	Channel	VOR (MHz)	DME XMIT Frequency (MHz)	Antenna ERP Path loss
1	1X	134.40	1025	38.03
2	31X	109.40	1055	38.27
3	66X	133.90	1090	38.55
4	126X	117.90	1150	39.02

23. Enter the DME XMIT frequency of the current DME setting into the Power Meter.
24. Add the CF2 loss at each frequency to the Antenna ERP Path loss for the same frequency and enter the total into the Power Meter for ‘dB offset’. Return the Power Meter to its ‘Text’ display.
25. Switch the DME to ON from ‘Standby’ and press the RUN TEST Soft Key on the UUT.
26. Verify that the UUT ERP reading is equal to the Power Meter ‘Peak Power’ value ±2dB.
27. Press the STOP TEST Soft Key on the UUT and set the DME to ‘Standby’.
28. Repeat steps 22 through 27 for each frequency setting listed.

E. Verification Data Sheet

IFR Test Set S/N: _____ DATE: _____

TECHNICIAN: _____

STEP	DATA	RESULT
(1) Self Test		
6. Verify all tests pass		_____(√)
(2) VSWR (ANT and RF I/O Connectors)		
ANT CONNECTOR		
4. Record levels:		
962MHz		_____
1030MHz		_____
1090MHz		_____
1150MHz		_____
1213MHz		_____
11. Record levels:		
962MHz		_____
1030MHz		_____
1090MHz		_____
1150MHz		_____
1213MHz		_____
14. Verify VSWR:		
962MHz	<1.7	_____
1030MHz	<1.7	_____
1090MHz	<1.7	_____
1150MHz	<1.7	_____
1213Hz	<1.7	_____
RF I/O CONNECTOR		
16. Record levels:		
962MHz		_____
1030MHz		_____
1090MHz		_____
1150MHz		_____
1213MHz		_____

STEP	DATA	RESULT
18. Verify VSWR:		
962MHz	<1.3	_____
1030MHz	<1.3	_____
1090MHz	<1.3	_____
1150MHz	<1.3	_____
1213Hz	<1.3	_____
(3) Output Frequency Accuracy		
9. Verify Frequencies:		
962MHz (±10 kHz)		_____
1030MHz (±10 kHz)		_____
1090MHz (±10 kHz)		_____
1150MHz (±10 kHz)		_____
1213MHz (±10 kHz)		_____
(4) Output Level Accuracy (ANT Connector)		
8. -30dBm (±2dB) @ 962MHz		_____
11. -30dBm (±2dB) @ 1030MHz		_____
11. -30dBm (±2dB) @ 1090MHz		_____
11. -30dBm (±2dB) @ 1150MHz		_____
11. -30dBm (±2dB) @ 1213MHz		_____
14. Verify levels:		
-2dBm	-2dBm (±2dB)	_____
-12 dBm	-12dBm (±2 dB)	_____
-22dBm	-22dBm (±2 dB)	_____
-32dBm	-32dBm (±2dB)	_____
-42dBm	-42dBm (±2 dB)	_____
-52dBm	-52dBm (±2 dB)	_____
19. -65dBm (±2dB)		_____
21. 1dB (±.25dB) step level differences		_____(√)
(5) Output Level Accuracy (RF I/O Connector)		
8. -50dBm (±1dB) @ 962MHz		
11. -50dBm (±1dB) @ 1030MHz		_____
11. -50dBm (±1dB) @ 1090MHz		_____
11. -50dBm (±1dB) @1150MHz		_____
11. -50dBm (±1dB) @ 1213MHz		_____
12. RF flatness: ≤ 2dB		_____(√)

STEP	DATA	RESULT
18. Verify levels:		
	-47dBm -47dBm (±1dB)	_____
	-57dBm -57dBm (±1dB)	_____
	-67dBm -67dBm (±1dB)	_____
	-77dBm -77dBm (±1dB)	_____
	-87dBm -87dBm (±1dB)	_____
	-97dBm -97dBm (±2dB)	_____
	-107dBm -107dBm (±2dB)	_____
	-115dBm -115dBm (±2dB)	_____
(6) DME Reply Pulse Characteristics		
13. X Chan. P1-P2 spacing: 12.0µS ±0.1µS)		_____
14. P1 pulse width: 3.5µS (±0.5µS)		_____
14. P2 pulse width: 3.5µS (±0.5µS)		_____
15. P1 pulse rise time: 2.5µS ± (0.25µS)		_____
15. P1 pulse fall time: 2.5µS (±0.25µS)		_____
19. Y Chan. P1-P2 spacing: 30.0µS (±0.1µS)		_____
(7) DME Reply Delay and Range		
8. X Chan. Reply spacing: 50.0µS (±0.1µS)		_____
12. Y Chan. Reply spacing: 56.0µS (±0.1µS)		_____
17. X Chan. Range Delay: 123.59µS (±0.12359µS)		_____
(8) DME Reply Position and Amplitude		
7. Echo position: 370.77µS (±12.359µS)		_____
8. 12. Record P1 level		_____
13. Echo level: -11dBm (±1dB)		_____
(9) DME Reply Efficiency		
12. Verify levels:		
	10% (±0.5%)	_____
	40% (±0.5%)	_____
	70% (±0.5%)	_____
	100% (±0.5%)	_____
(10) DME Squitter		
5. Squitter frequency: 2700Hz (±54Hz)		_____

STEP	DATA	RESULT
(11) DME Measurement –Interrogation Pulse Timing		
4.	Recorded 1400 readings:	
	P1 pulse width:	_____
	P2 pulse width:	_____
	X Chan. P1-P2 Spacing:	_____
6.	Y Chan. P1-P2 Spacing:	_____
15.	Verify UUT readings:	
	P1 pulse width: Recorded 1400 value (±0.05µS)	_____
	P2 pulse width: Recorded 1400 value (±0.05µS)	_____
	X Chan. P1-P2 Spacing: Recorded 1400 value (±0.02µS)	_____
20.	Y Chan. P1-P2 Spacing: Recorded 1400 value (±0.02µS	_____
(12) DME Measurement –Interrogation PRF		
10.	Verify frequency:	
	10Hz (±2Hz)	_____
	101Hz (±2Hz)	_____
	201Hz (±2Hz)	_____
	300Hz (±2Hz)	_____
(13) DME Measurement –Interrogation Frequency		
4.	Record 1400 frequency:	
	1025MHz	_____
	1064MHz	_____
	1110MHz	_____
	1150MHz	_____
12.	Verify UUT frequency:	
	Recorded 1400 1025MHz value (±20kHz)	_____
	Recorded 1400 1064MHz value (±20kHz)	_____
	Recorded 1400 1110MHz value (±20kHz)	_____
	Recorded 1400 1150MHz value (±20kHz)	_____
(14) XPDR Pulse Characteristics - ATCRBS		
12.	Verify Mode A readings:	
	P1-P2 spacing: 2.0µS (±25nS)	_____
	P1-P3 spacing: 8.0µS (±25nS)	_____
	P1 pulse width: 0.8µS (±50nS)	_____
	P1 rise time between 50nS and 100nS	_____
	P1 fall time between 50nS and 200nS	_____

STEP	DATA	RESULT
17.	Mode C P1-P3 spacing: 21.0µS (±25nS)	_____
21.	Verify ITM Mode A readings:	
	P1-P3 spacing: 8.0µS (±25nS)	_____
	P1-P4 spacing: 10.0µS (±25nS)	_____
	P4 pulse width: 0.8µS (±50nS)	_____
25.	Verify ITM Mode C readings:	
	P1-P3 spacing: 21.0µS (±25nS)	_____
	P1-P4 spacing: 23.0µS (±25nS)	_____
	P4 pulse width: 0.8µS (±50nS)	_____
29.	ITM Mode A/S P4 pulse width: 1.6µS (±50nS)	_____
33.	ITM Mode C/S P4 pulse width: 1.6µS (±50nS)	_____
(15) XPDR Pulse Characteristics – Mode S		
11.	Verify readings:	
	P1-P2 spacing: 2.0µS (±25nS)	_____
	P1-P6 spacing: 3.5µS (±25nS)	_____
	P1-SPR spacing: 4.75µS (±25nS)	_____
12.	Verify readings:	
	P1 pulse width: 0.8µS (±50nS)	_____
	UF0 P6 pulse width: 16.25µS (±50nS)	_____
	P1 rise time between 50nS and 100nS	_____
	P1 fall time between 50nS and 200nS	_____
	SPR Phase Transition: <80nS	_____
16.	UF16 P6 pulse width: 30.25µS (±50nS)	_____
(16) XPDR Interrogation PRF		
7.	Verify readings:	
	235Hz (±5Hz)	_____
	118Hz (±5Hz)	_____
	90Hz (±5Hz)	_____
	70Hz (±5Hz)	_____
	50Hz (±5Hz)	_____
(17) XPDR SLS Level		
11.	P2 -9dB level: -9dB (-1dB/+0dB)	_____
15.	P2 0dB level: 0dB (-0dB/+1dB)	_____
19.	P2 not present	_____ (√)

STEP	DATA	RESULT

(18) XPDR Measurement – Reply Accuracy - ATCRBS

16. Verify Reply Delay readings:

Mode A	1.8µS (±50nS)	_____
Mode A	3.0µS (±50nS)	_____
Mode C	3.0µS (±50nS)	_____
Mode C	7.0µS (±50nS)	_____

19. Verify Reply readings:

Mode A	Record F1-F2 spacing:	_____
Mode A	Record F1 pulse width:	_____
Mode A	Record F2 pulse width:	_____

20. Verify Reply readings:

Mode A	F1-F2 spacing: 20.3µS (±20nS)	_____
Mode A	F1 pulse width: 0.45µS (±20nS)	_____
Mode A	F2 pulse width: 0.45µS (±20nS)	_____

25. Verify Reply Jitter readings:

Mode A	1.0µS (±20nS)	_____
Mode C	2.3µS (±20nS)	_____

28. Record RF Generator frequency:

1087MHz	_____
1090MHz	_____
1093MHz	_____

33. Verify UUT frequency:

Recorded RF GEN 1087MHz value (±50kHz)	_____
Recorded RF GEN 1090MHz value (±50kHz)	_____
Recorded RF GEN 1093MHz value (±50kHz)	_____

(19) XPDR Measurement – Reply Accuracy – Mode S

16. Verify Reply Delay readings:

125.0µS (±50nS)	_____
128.0µS (±50nS)	_____

23. Verify Reply Delay readings:

ITM A	125.0µS (±50nS)	_____
ITM A	128.0µS (±50nS)	_____

34. Verify Squitter period readings:

0.1 sec (±.01 sec)	_____
2 sec (± .01 sec)	_____
4.88 sec (±.01 sec)	_____

STEP	DATA	RESULT
(20) Altitude Encoder		
8.	Verify pulses are unmasked	_____(√)
(21) Generate Video		
11.	Verify Mode A video readings:	
	Baseline: OV ± 0.5V	_____
	Peak to Peak: 1Vpp ± 0.5Vpp	_____
	P1 pulse width: 0.8µS (±50nS)	_____
	P1-P3 spacing: 8.0µS (±25nS)	_____
15. `	Verify Mode C P1-P3 spacing: 21.0µS (±25nS)	_____
19.	Verify Mode S P1-P2 spacing: 2.0µS (±25nS)	_____
(22) ADS-B Receive DF17 and DF20		
20.	Verify DF17 Squitter period:	
	0.1 sec (±.01 sec)	_____
	1.0 sec (± .01 sec)	_____
	5.0 sec (±.01 sec)	_____
21.	DF17 message correctly decoded	_____(√)
34.	DF20 Airborne message correctly decoded	_____(√)
41.	DF20 Surface message correctly decoded	_____(√)
(23) ADS-B Generate DF17 and DF18		
23.	DF17 Airborne message correctly decoded	_____(√)
24.	DF17 period: 0.5 sec (±.2 sec)	_____
26.	Verify DF17 Squitter period:	
	1.0 sec (± .2 sec)	_____
	5.0 sec (±.2 sec)	_____
35.	DF18 message correctly decoded	_____(√)
43.	DF18 period: 0.5 sec (±.2 sec)	_____
45.	Verify DF18 Squitter period:	
	1.0 sec (± .2 sec)	_____
	5.0 sec (±.2 sec)	_____
(24) TIS Receive		
12.	Verify TIS readings:	
	ADDR: A92492	_____(√)
	ALT: 31200	_____(√)
	INFO: 0400	_____(√)

STEP	DATA	RESULT

(25) TCAS Reply Pulse Characteristics

10. Verify Reply readings:

F1-C1 spacing: 1.45µS (±25nS)	_____
F1-A1 spacing: 2.90µS (±25nS)	_____
F1-F2 spacing: 20.3µS (±25nS)	_____
F1 pulse width: 0.45µS (±50nS)	_____
F1 Rise time between 50nS and 100nS	_____
F1 Fall time between 50nS and 200nS	_____

16. Verify Reply readings:

P1-P2 spacing: 1.0µS (±25nS)	_____
P1-P3 spacing: 3.5µS (±25nS)	_____
P1-P4 spacing: 4.5µS (±25nS)	_____
P1-D1 spacing: 8.0µS (±25nS)	_____
P1 pulse width: 0.45µS (±20nS)	_____
P1 Rise time between 50nS and 100nS	_____
P1 Fall time between 50nS and 200nS	_____

21. Verify readings:

Only C2 pulse displayed	_____(√)
F1-C2 spacing: 4.35µS (±25nS)	_____

25. Verify readings:

Only C4 and D2 pulses displayed	_____(√)
F1-C4 spacing: 7.25µS (±25nS)	_____
F1-D2 spacing: 15.95µS (±25nS)	_____

(26) TCAS Reply Pulse Amplitude

8.	Record F1 amplitude	_____

9. Verify levels:

C1 equals F1 recorded level: (±1dB)	_____
A1 equals F1 recorded level: (±1dB)	_____

13.	Record P1 amplitude	_____

14. Verify levels:

P2equals P1 recorded level: (±1dB)	_____
P3 equals P1 recorded level: (±1dB)	_____
P4 equals P1 recorded level: (±1dB)	_____

(27) TCAS Squitter Period

8.	Squitter period: 1.0 sec (±200mS)	_____

STEP	DATA	RESULT
(28) TCAS Percent Reply		
18.	Verify readings:	
	10% (±1%)	_____
	40% (±1%)	_____
	70% (±1%)	_____
	100% (-1%/+0%)	_____
(29) TCAS Reply Delay and Range		
15.	P3 to F1 spacing: 6.817µS (±.050µS)	_____
24.	SPR to P1 spacing: 127.49µS (±.050µS)	_____
29	5.0nm Range Delay: 64.286µS (±247nS)	_____
(30) TCAS Mode S Reply		
14.	Correct information displayed	_____ (√)
18.	Correct information displayed	_____ (√)
23.	Correct information displayed	_____ (√)
(31) TCAS Measurement – Interrogation Frequency		
4.	Record readings:	
	1029.90MHz	_____
	1029.95MHz	_____
	1030.00MHz	_____
	1030.05MHz	_____
	1030.10MHz	_____
14.	Verify readings:	
	1029.90MHz: Recorded reading (±10kHz)	_____
	1029.95MHz: Recorded reading (±10kHz)	_____
	1030.00MHz: Recorded reading (±10kHz)	_____
	1030.05MHz: Recorded reading (±10kHz)	_____
	1030.10MHz: Recorded reading (±10kHz)	_____

STEP	DATA	RESULT

(32) RF Power Measurement

10. Record and verify readings at RF I/O:

DME Power Meter reading at 1025MHz	_____
UUT power reading at 1025MHz: DME reading (±1dB)	_____
DME Power Meter reading at 1055MHz	_____
UUT power reading at 1050MHz: DME reading (±1dB)	_____
DME Power Meter reading at 1090MHz	_____
UUT power reading at 1090MHz: DME reading (±1dB)	_____
DME Power Meter reading at 1150MHz	_____
UUT power reading at 1150MHz: DME reading (±1dB)	_____

26. Record and verify readings at ANT:

DME Power Meter reading at 1025MHz	_____
UUT power reading at 1025MHz: DME reading (±2dB)	_____
DME Power Meter reading at 1055MHz	_____
UUT power reading at 1050MHz: DME reading (±2dB)	_____
DME Power Meter reading at 1090MHz	_____
UUT power reading at 1090MHz: DME reading (±2dB)	_____
DME Power Meter reading at 1150MHz	_____
UUT power reading at 1150MHz: DME reading (±2dB)	_____

F. Calibration

(1) Test Setup

PREREQUISITES: Self Test

TEST EQUIPMENT: Signal Generator: IFR 2023

Measuring Receiver: HP 8902A & Sensor 11722A

Purchased External DC Power Supply 7110-5600-200

N to N coax.

Weinschel N to N 10dB attenuator.

N to N female barrel

N to TNC Adapter

Scope

STEP	PROCEDURE

1. Allow 15 minute warmup for Test Set.
2. Connect the Measuring Receiver to the Signal Generator and calibrate the Measuring Receiver in Tuned RF Level Mode with the 3.8 Special entered at the following frequencies (storing the calibration in the storage location indicated):

1	962.000 MHz
2	1030.000 MHz
3	1090.000 MHz
4	1150.000 MHz
5	1213.000 MHz

(2) RTC Calibration

PREREQUISITES: Self Test

TEST EQUIPMENT: None

STEP	PROCEDURE

1. Press the SETUP key repeatedly until the SETUP-GENERAL screen is displayed.
2. Press the H/W TOOLS Soft Key to display the SETUP-HARDWARE TOOLS screen.
3. Press the CAL Soft Key and enter the password ‘2531’ using the Soft Keys.
4. Press the SELECT Soft Key to display the RTC CALIBRATION screen.
5. Press the START Soft Key.
6. Follow the instructions on the 6000 screen.
7. When finished, the message ‘RTC CALIBRATED OK’ will be displayed
8. Press the SAVE Soft Key when finished with the calibration.
9. Press the RETURN Soft Key to display the SETUP-CALIBRATION screen.

(3) TCXO Calibration

PREREQUISITES: Self Test

TEST EQUIPMENT: Frequency Counter

STEP	PROCEDURE

1. Connect Antenna port of unit to Measuring Receiver. Enter 7.1 Special on the Measuring Receiver and then press the FREQ button.
2. Using the Arrow keys, highlight the TCXO CAL line and press the SELECT Soft key to display the TCXO CALIBRATION screen.
3. Press the START Soft Key.
4. Follow the instructions on the 6000 screen. Set the frequency as close as possible to 1000 MHz. Must be at least within +/- 300Hz.
5. Press the SAVE Soft Key when finished with the calibration.
6. Press the RETURN Soft Key to display the SETUP-CALIBRATION screen.

(4) Video Calibration

PREREQUISITES: Self Test

TEST EQUIPMENT: None

STEP	PROCEDURE

1. Use the Arrow keys to highlight the VIDEO CAL line and press the SELECT Soft Key to display the VIDEO CALIBRATION screen.
2. Press the START Soft Key.
3. Follow the instructions on the 6000 screen.
4. When finished, the message 'VIDEO CALIBRATED OK' will be displayed.
5. Press the SAVE Soft Key when finished with the calibration.
6. Press the RETURN Soft Key to display the SETUP-CALIBRATION screen.

(5) TX Level Calibration

PREREQUISITES: Self Test

TEST EQUIPMENT: Measuring Receiver

STEP	PROCEDURE

1. Use the Arrow keys to highlight the TX LEVEL CAL and press the SELECT Soft Key to display the TX LVL CALIBRATION screen.
2. Connect the measuring receiver sensor to the antenna port using an N to TNC adapter.
3. Press the START Soft Key.
4. Follow the instructions on the 6000 screen for the 28 steps, recalling the required frequencies from the measuring receiver's stored memory.
5. Press the SAVE Soft Key when finished with the calibration.
6. Press the RETURN Soft Key to display the SETUP-CALIBRATION screen.

(6) RX Level Calibration

PREREQUISITES: Self Test

TEST EQUIPMENT: Signal Generator

10dB Attenuator with 'N' connectors

N to N female barrel adapter

N to N connector coax

Measuring Receiver

STEP PROCEDURE

1. Use the Arrow keys to highlight the RX LEVEL CAL and press the SELECT Soft Key to display the RX LVL CALIBRATION screen.
2. Connect an N to N armored coax directly to the signal generator output. Connect an N to N 10dB attenuator and an N to N female barrel between the armored coax output and the measuring receiver's sensor.
3. At each frequency listed in the table below, vary the signal generator output until the measuring receiver measures -20.0dBm +/-0.05 dB in the Tuned RF Mode. Note the signal generator level at each frequency for later use.

1090MHz	1O25MHz	1030MHz	1055MHz	1125MHz	1150MHz

Table 6.1

4. Disconnect armored coax from sensor removing only the N to N female barrel. Connect the 10dB attenuator to the antenna port using an N to TNC adapter.
5. Press the START Soft Key.
6. Follow the instructions on the 6000 screen.
7. Press the SAVE Soft Key when finished with the calibration.
8. Press the RETURN Soft Key to display the SETUP-CALIBRATION screen.
9. End of Calibration.

4. Assembly Drawings

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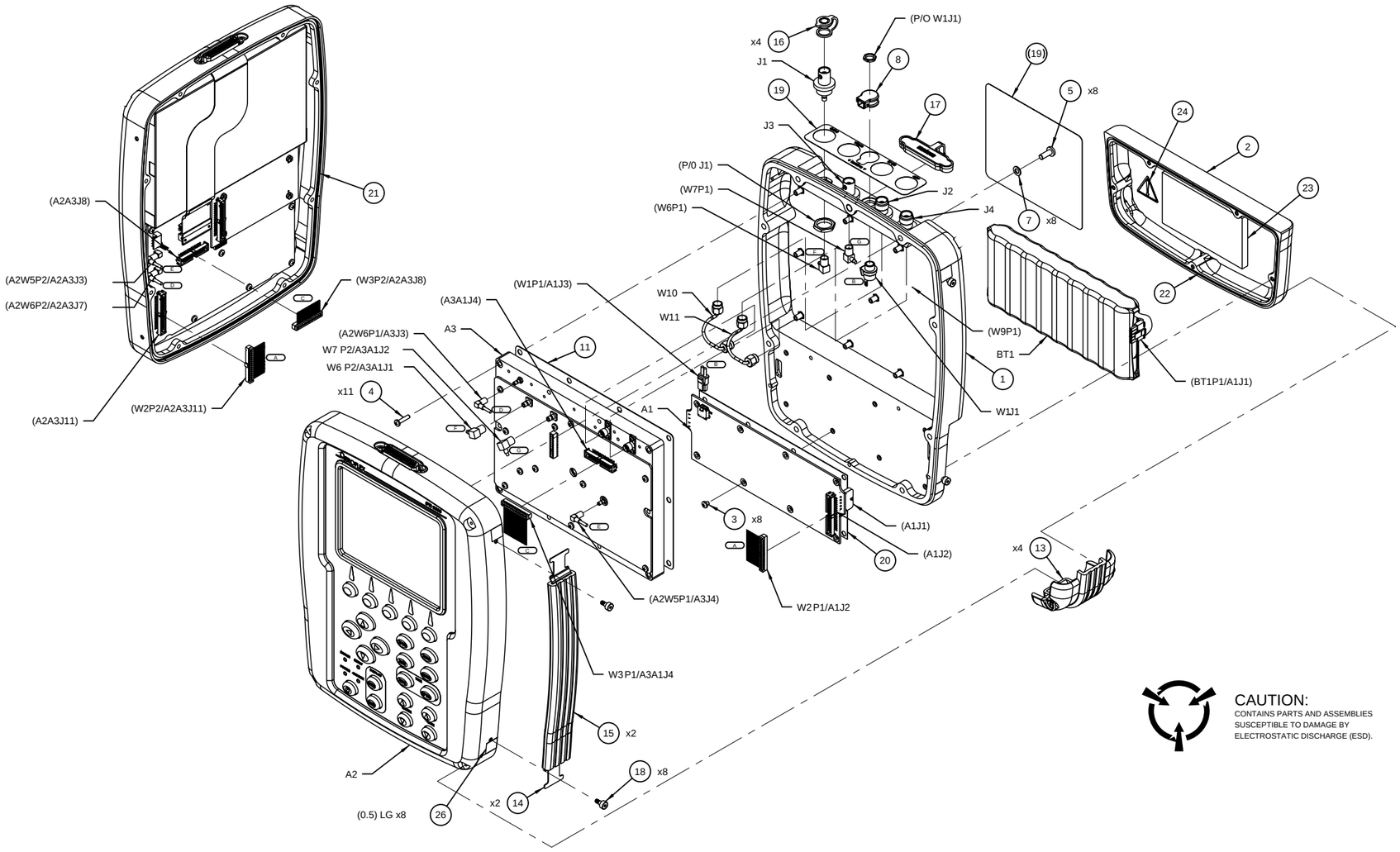
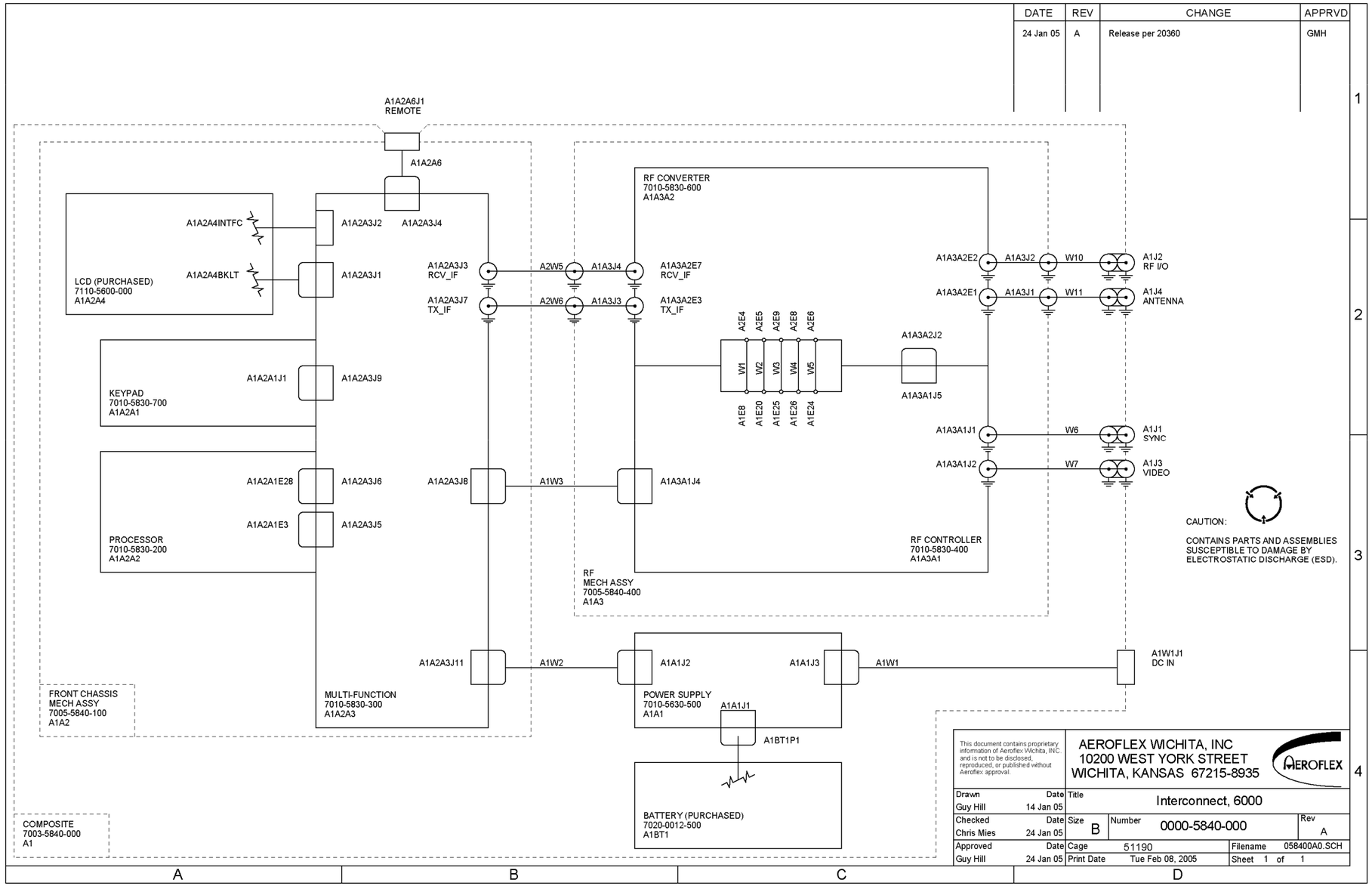


CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

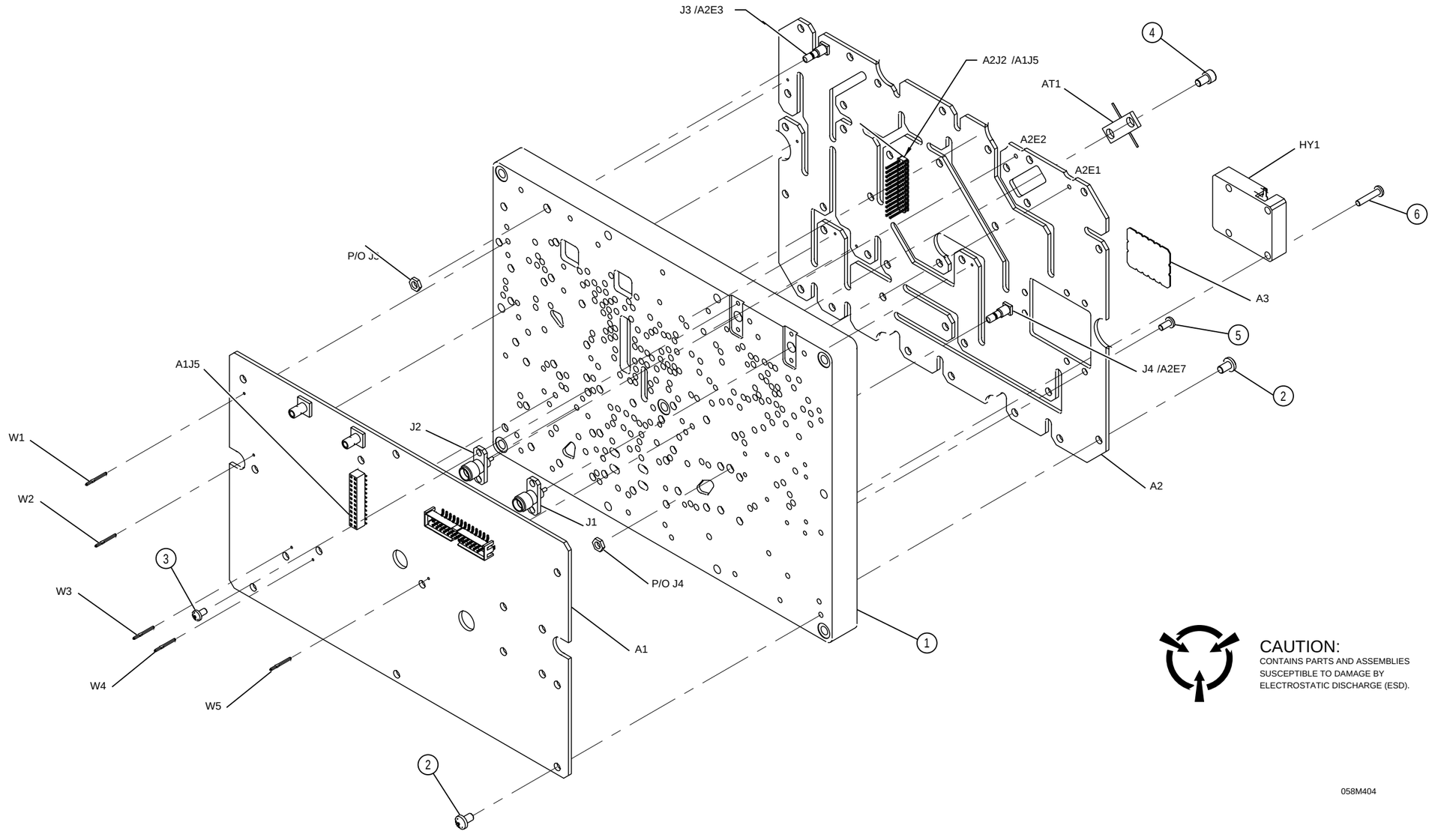
(7003-5640-000)

Composite Assembly (58A1)
(Sheet 1 of 2)
Figure 26



(0000-5840-000-A)

System Interconnect Diagram (58A1A1)
(Sheet 2 of 2)
Figure 27

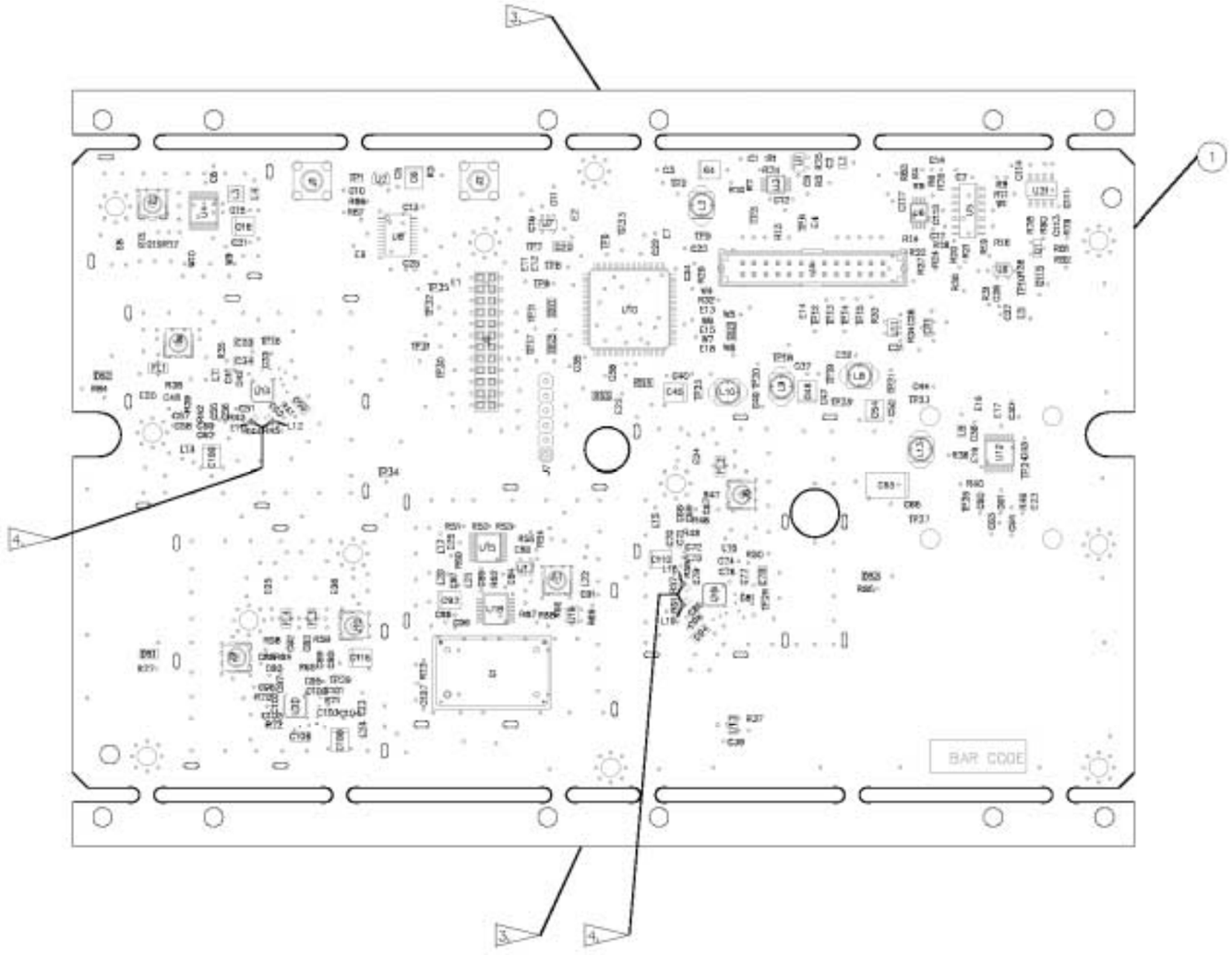


CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

058M404

(7005-5840-400-A)

RF Assembly (58A1A3)
Figure 28



TOP VIEW

NOTES:

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE, AND SYSTEM INTERCONNECT FOR APPLICATIONS WHERE USED.
2. HARDWARE THAT IS NOT PART OF BILL OF MATERIALS SHOULD NOT BE INSTALLED.
3. TO BE REMOVED PRIOR TO MECH. ASSY.
4. L11, L12, L18, AND L19 ARE POLARIZED. THE DARK HALF OF THE PART IN THIS DRAWING REPRESENTS THE BLACK HALF OF THE ACTUAL PART.

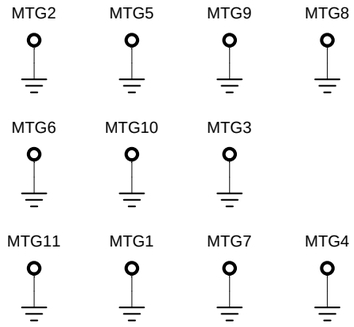
(7010-5830-400-B)

RF Controller PCB Assembly (58A1A3A1)
Figure 29

DATE	REV	CHANGE		APPRVD
22 Jun 04	A	NEVER RELEASED		
11-11-04	B	REL 20212	RLA	GH

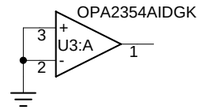
Power Table							
Ref Des	Device(Type)	Package	GND	+3.3VA	+VD	-1VA	-5VA
U3	3223-0036-000T	MSOP8	4	8			
U6	3223-0036-000T	MSOP8		8		4	
U18	3214-9674-000T	SSOP14	7		14		
U21	3221-0013-001T	SO8		8			4

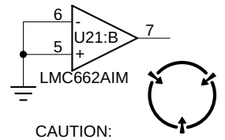
Spare Gate Table		
Last Used	Not Used	Spare Gates
C117		
CR1		
DS3		
E26	E3, E5, E6, E10, E21, E22	
ESD1		
FL4		
G1		
J11		
L24		
MTG11		
Q1		
R87	R12	
RN5		
TP35		
U21		
W10		



NOTES:
(UNLESS OTHERWISE SPECIFIED)

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE AND SYSTEM INTERCONNECT.
2. ALL RESISTORS ARE 1%, 1/8W.
3. ALL RESISTANCE IS EXPRESSED IN OHMS
   ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
   ALL INDUCTANCE IS EXPRESSED IN MICROHENRIES.
4. HIGHEST REFERENCE DESIGNATIONS:
   SEE SPARE GATE TABLE
5. REFERENCE DESIGNATIONS NOT USED:
   SEE SPARE GATE TABLE
6. COMPONENT(S) NOT INSTALLED.
7. IC FUNCTIONS NOT USED:





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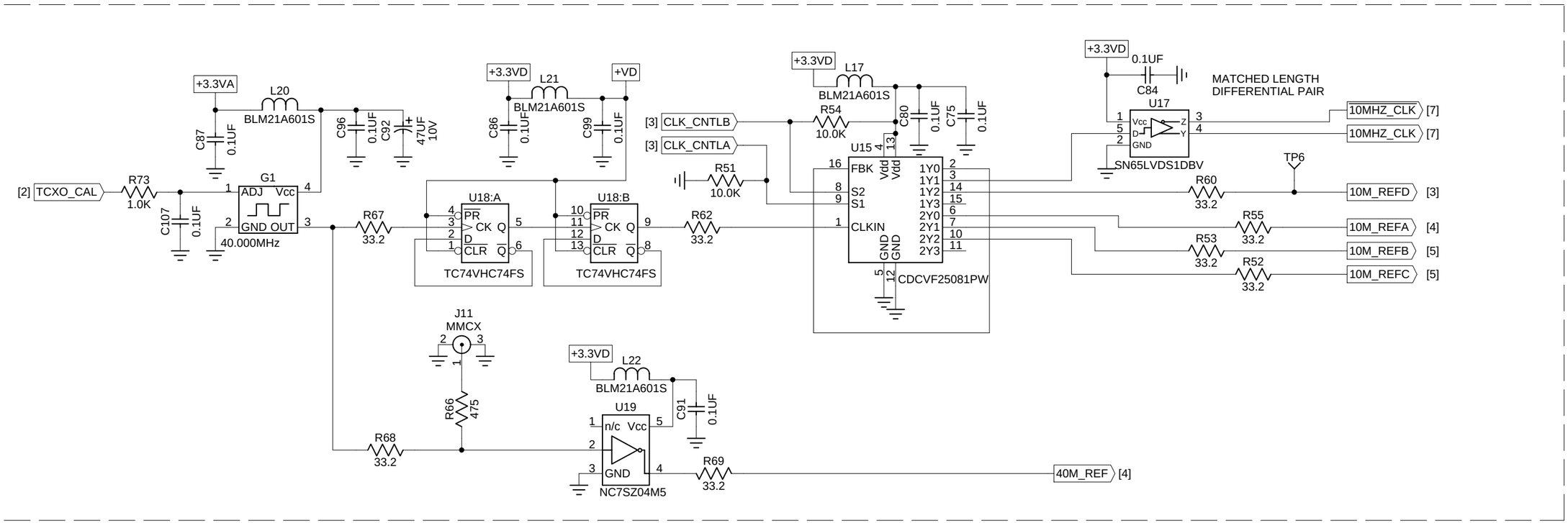
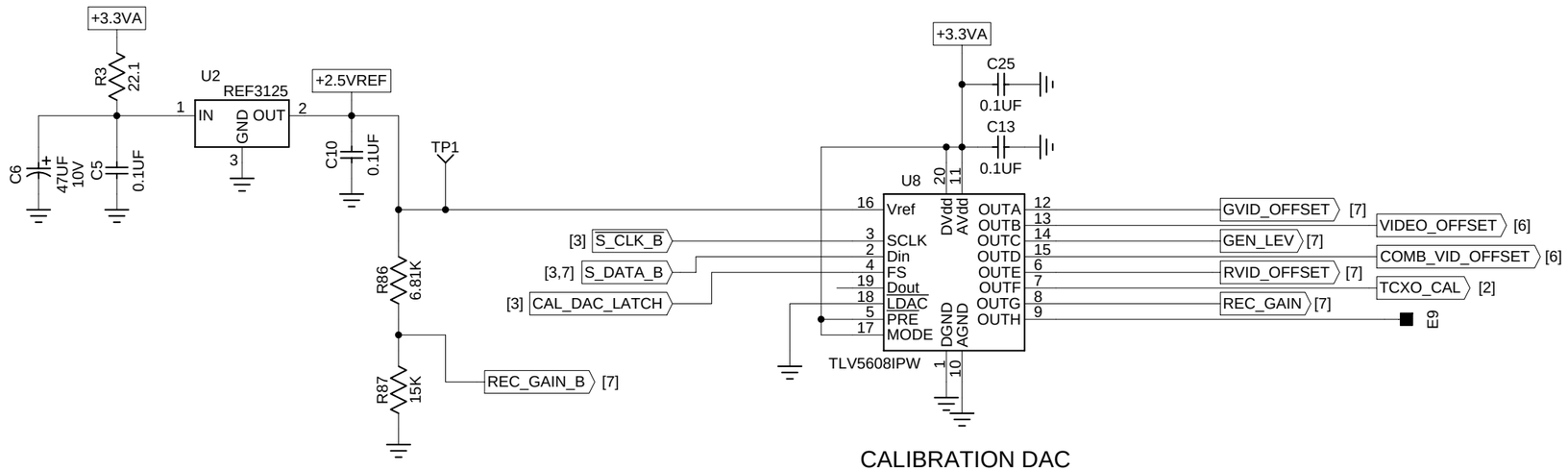
10200 WEST YORK STREET
WICHITA, KANSAS 67215-8935

Drawn	Date	Title	Schematic, RF Controller		
R. Crawford	19 May 04				
Checked	Date	Size	Number		Rev
R. Crawford	22 Jun 04	B	0000-5830-400		B
Approved	Date	Cage	51190	Filename	058304B0.SCH
G. Hill	22 Jun 04	Print Date	Fri Feb 18, 2005	Sheet	1 of 8

1 2 3 4

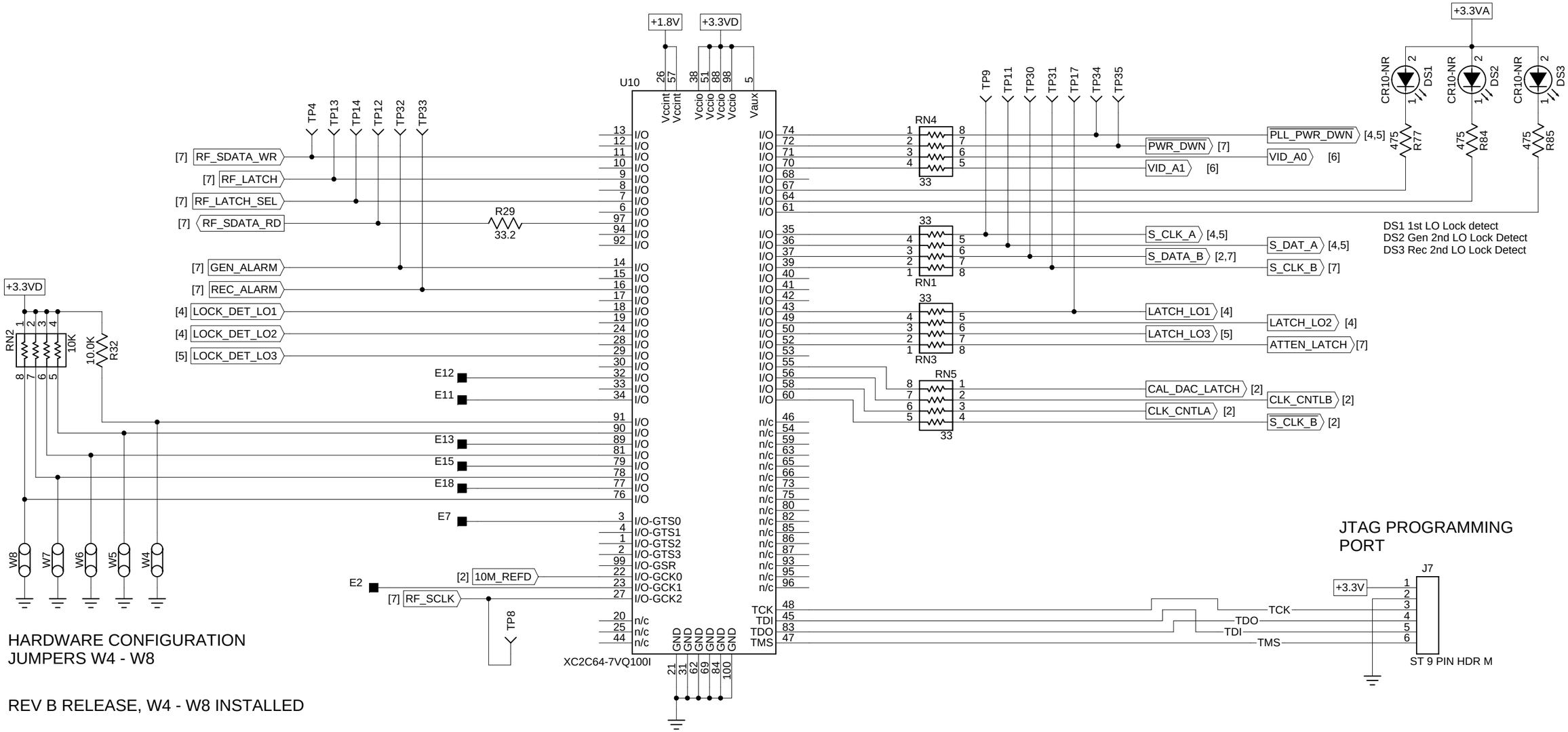
A B C D



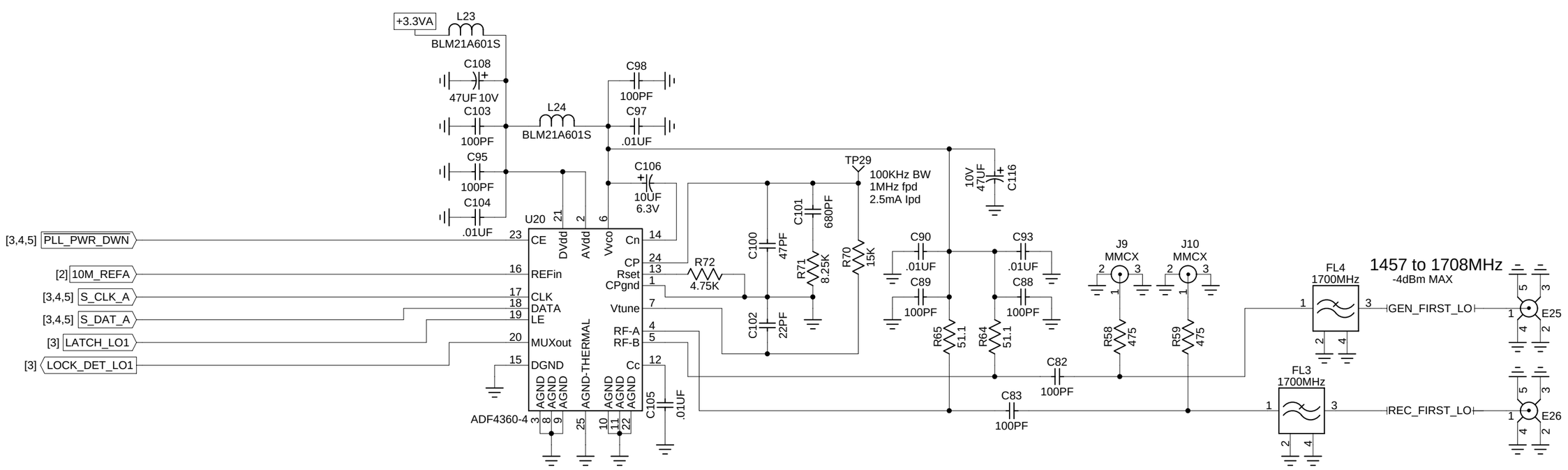


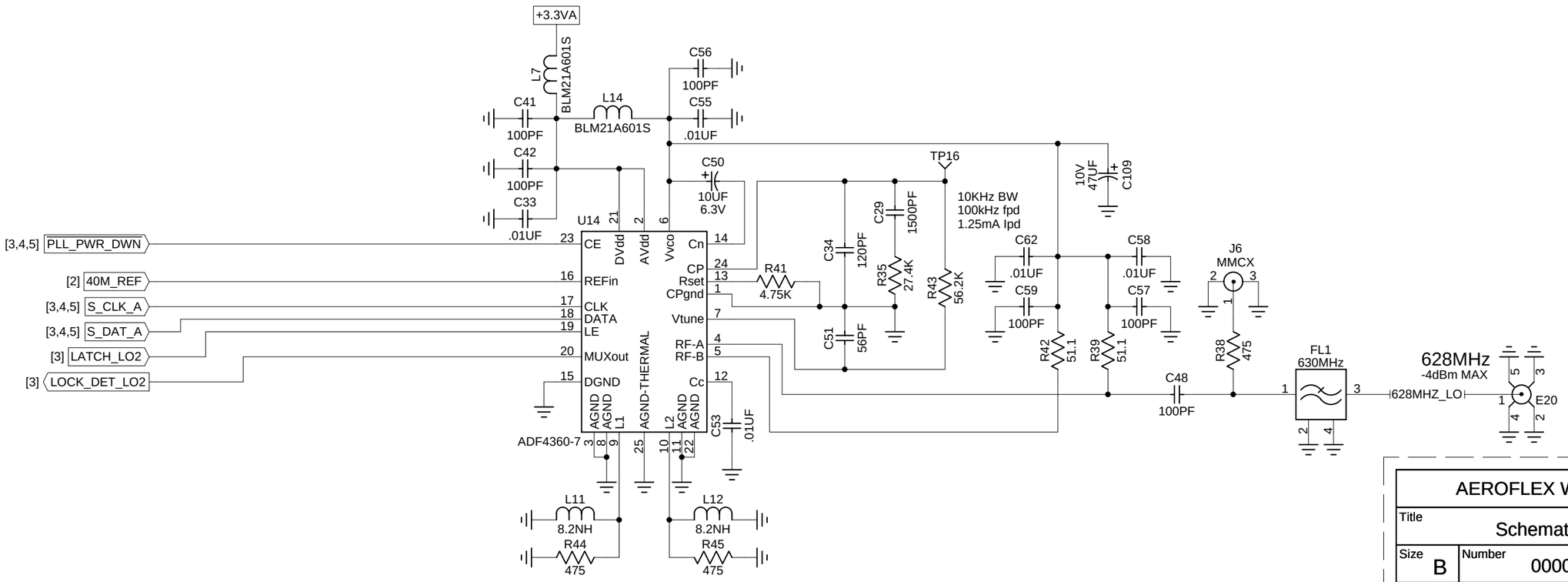
CALIBRATION DAC

AEROFLEX WICHITA, INC.			
Title: Schematic, RF Controller			
Size: B	Number: 0000-5830-400		Rev: B
Cage: 51190		Filename: 058304B0.SCH	
Print Date: Fri Feb 18, 2005		Sheet 2 of 8	

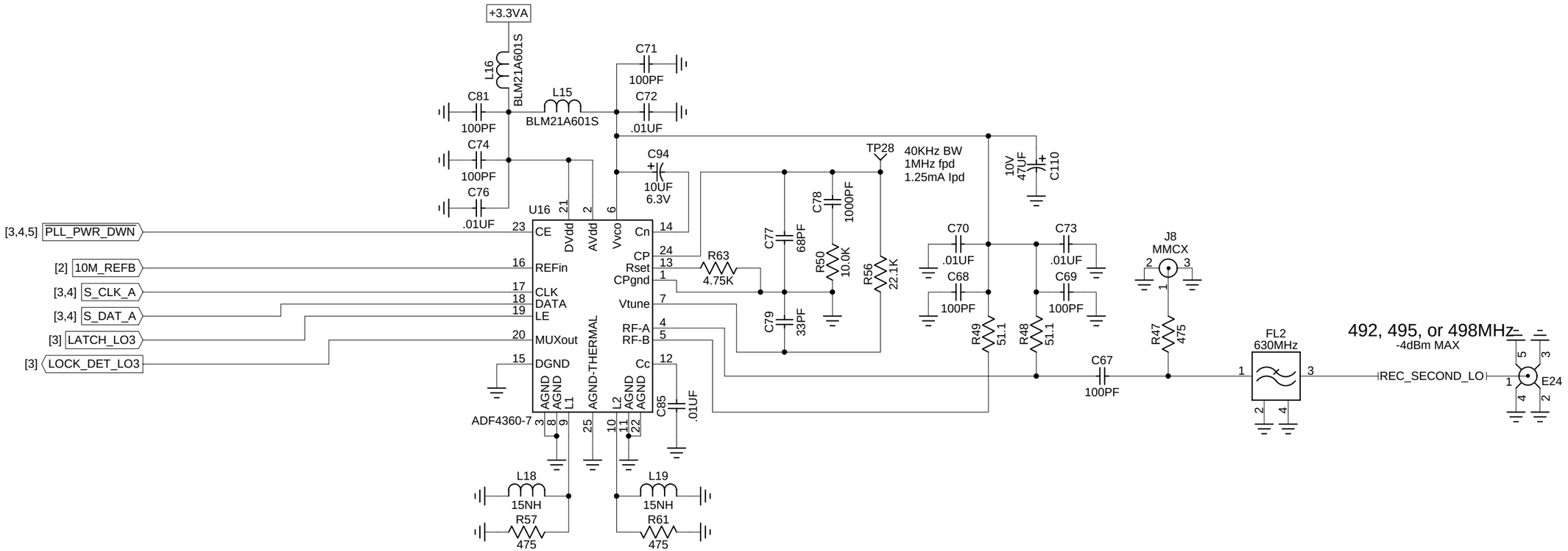


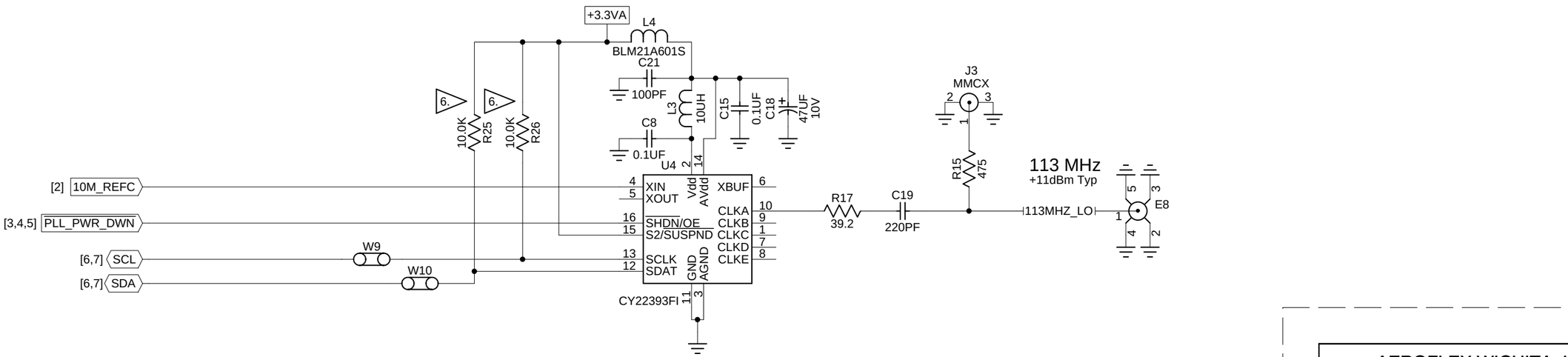
AEROFLEX WICHITA, INC.	
Title	Schematic, RF Controller
Size B	Number 0000-5830-400 Rev B
Cage 51190	Filename 058304B0.SCH
Print Date Fri Feb 18, 2005	Sheet 3 of 8





AEROFLEX WICHITA, INC.	
Title	Schematic, RF Controller
Size B	Number 0000-5830-400 Rev B
Cage 51190	Filename 058304B0.SCH
Print Date Fri Feb 18, 2005	Sheet 4 of 8





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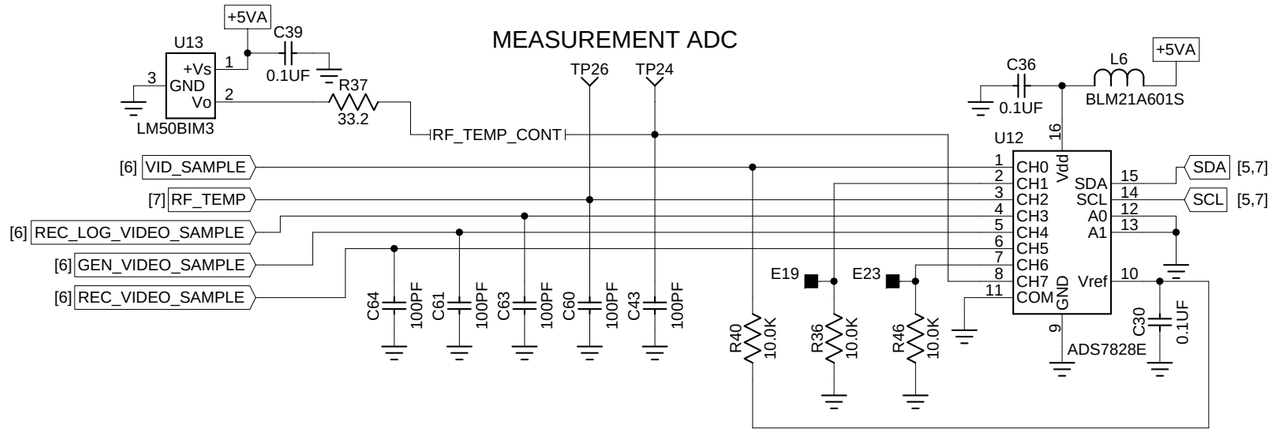
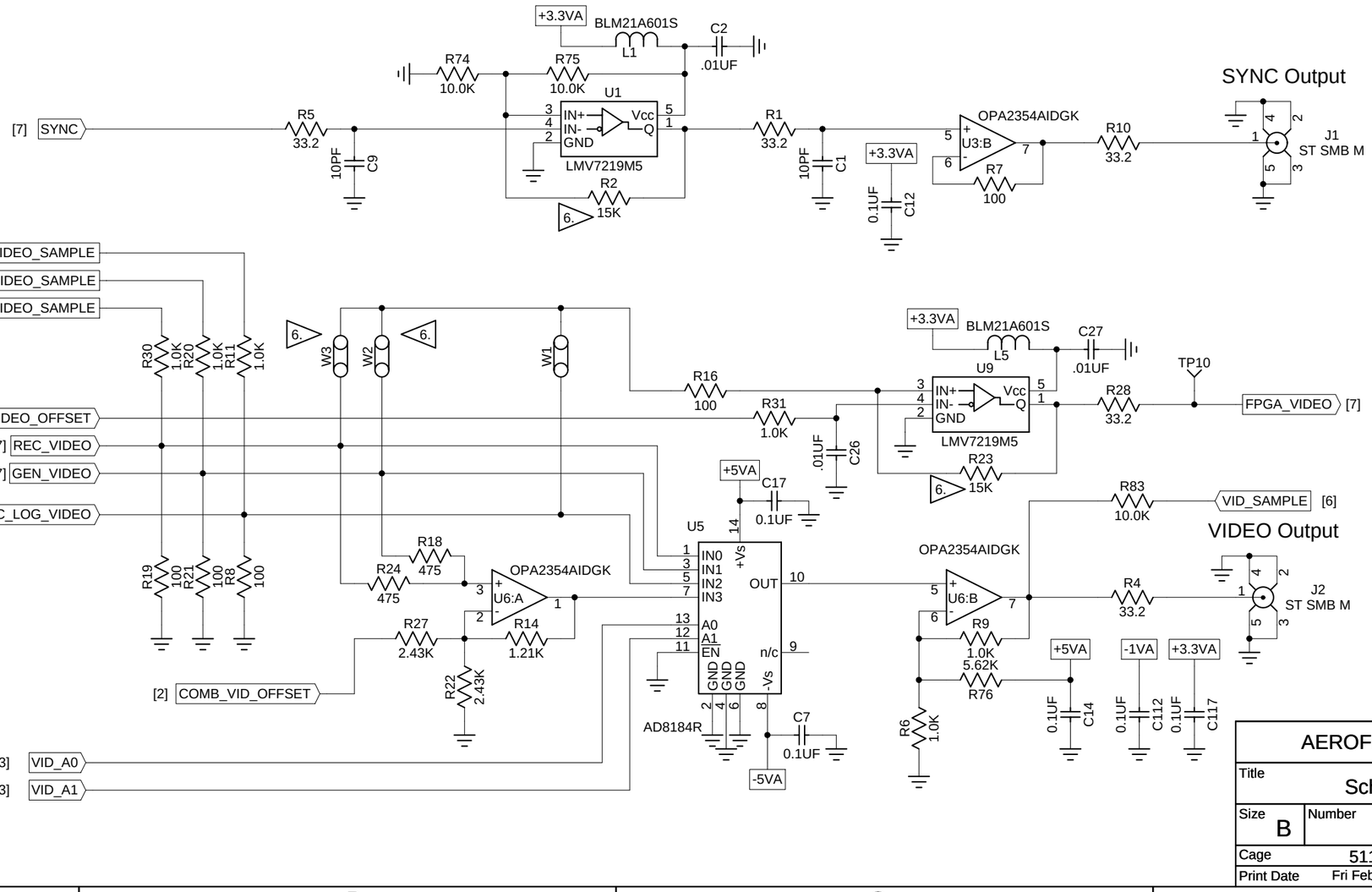
Title	Schematic, RF Controller
Size B	Number 0000-5830-400 Rev B
Cage 51190	Filename 058304B0.SCH
Print Date Fri Feb 18, 2005	Sheet 5 of 8

1 2 3 4

A B C D

MEASUREMENT ADC

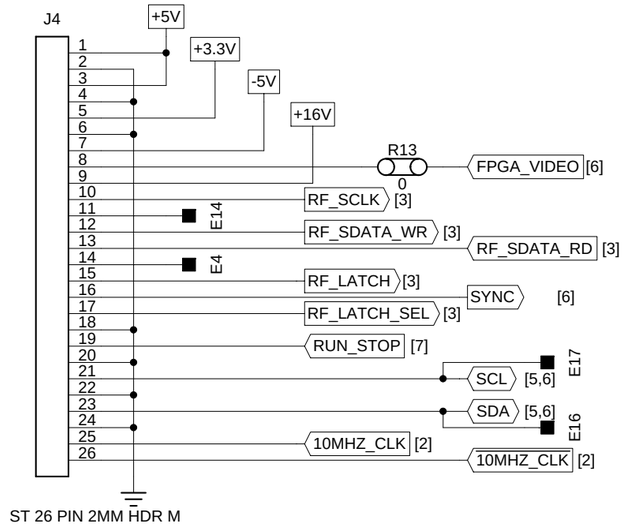




AEROFLEX WICHITA, INC.	
Title	Schematic, RF Controller
Size B	Number 0000-5830-400 Rev B
Cage 51190	Filename 058304B0.SCH
Print Date Fri Feb 18, 2005	Sheet 6 of 8

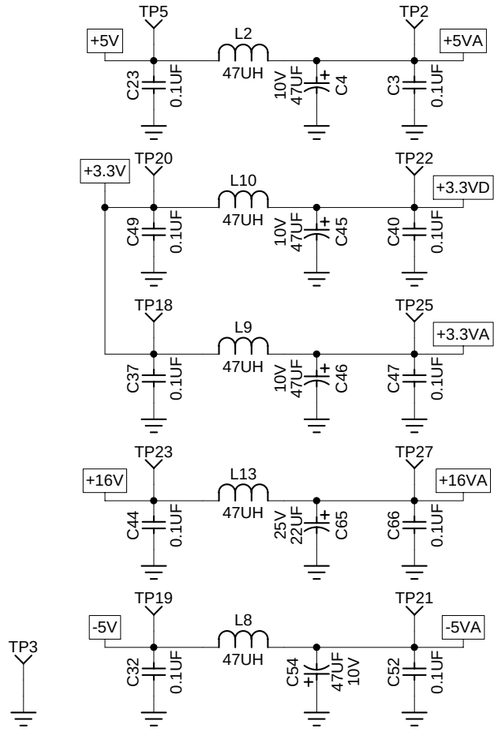
1 2 3 4

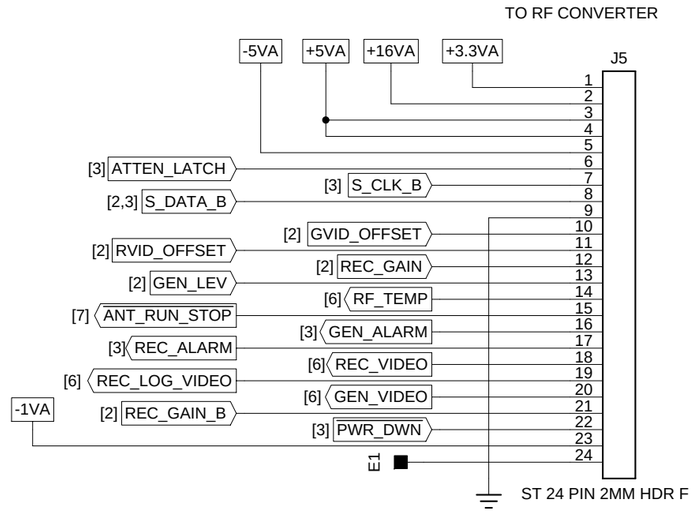
A B C D

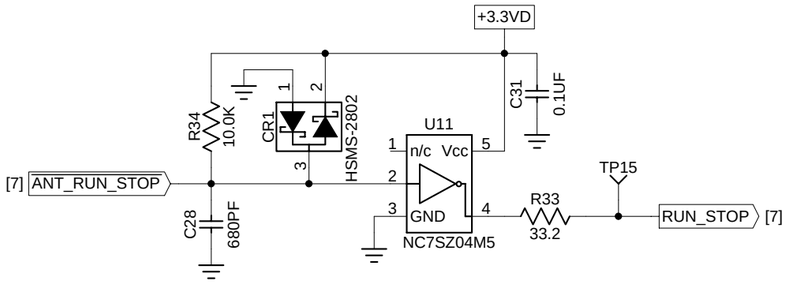


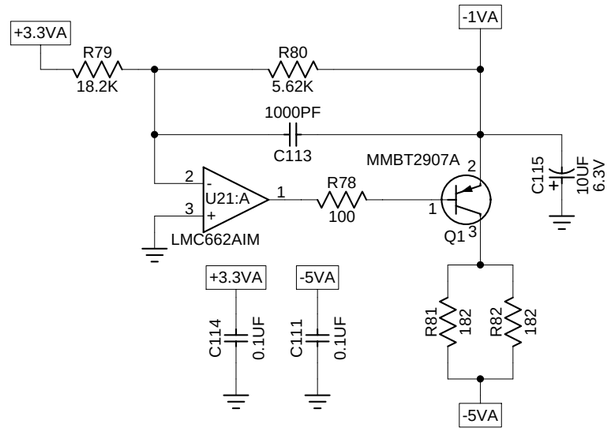
Change connector to correct DPN

FROM MULTIFUNCTION





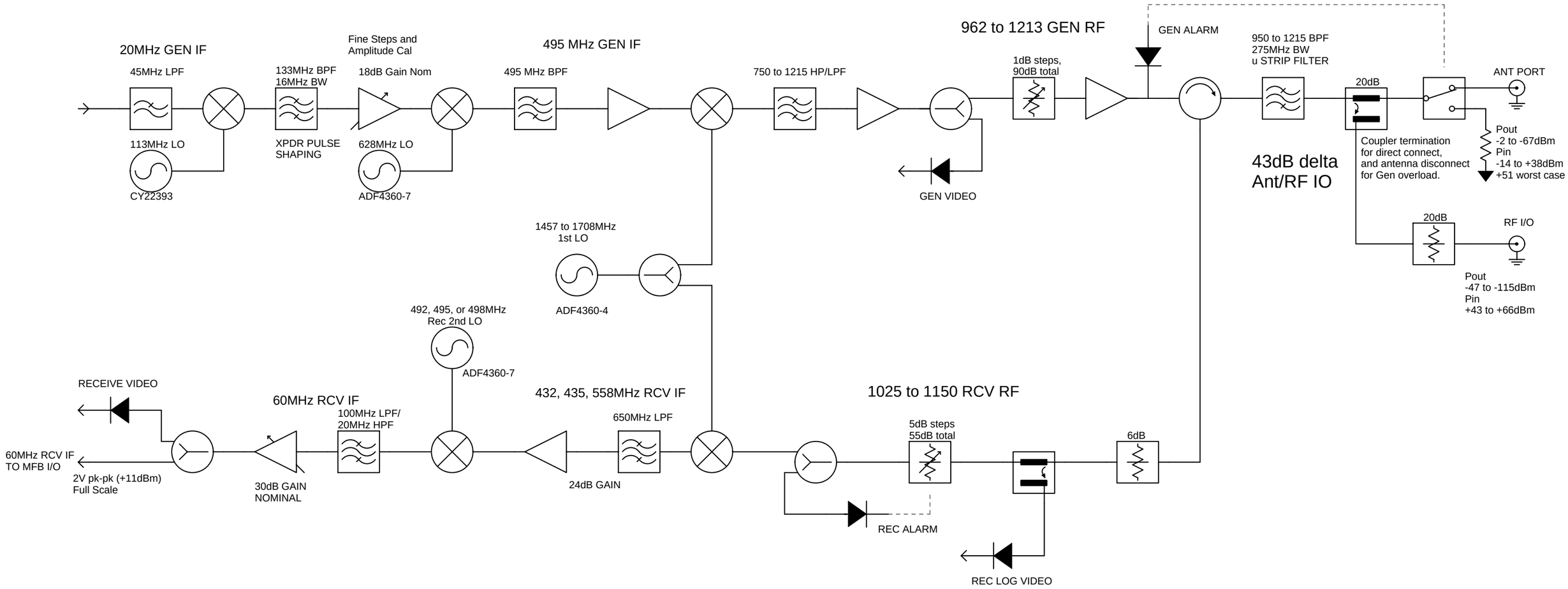




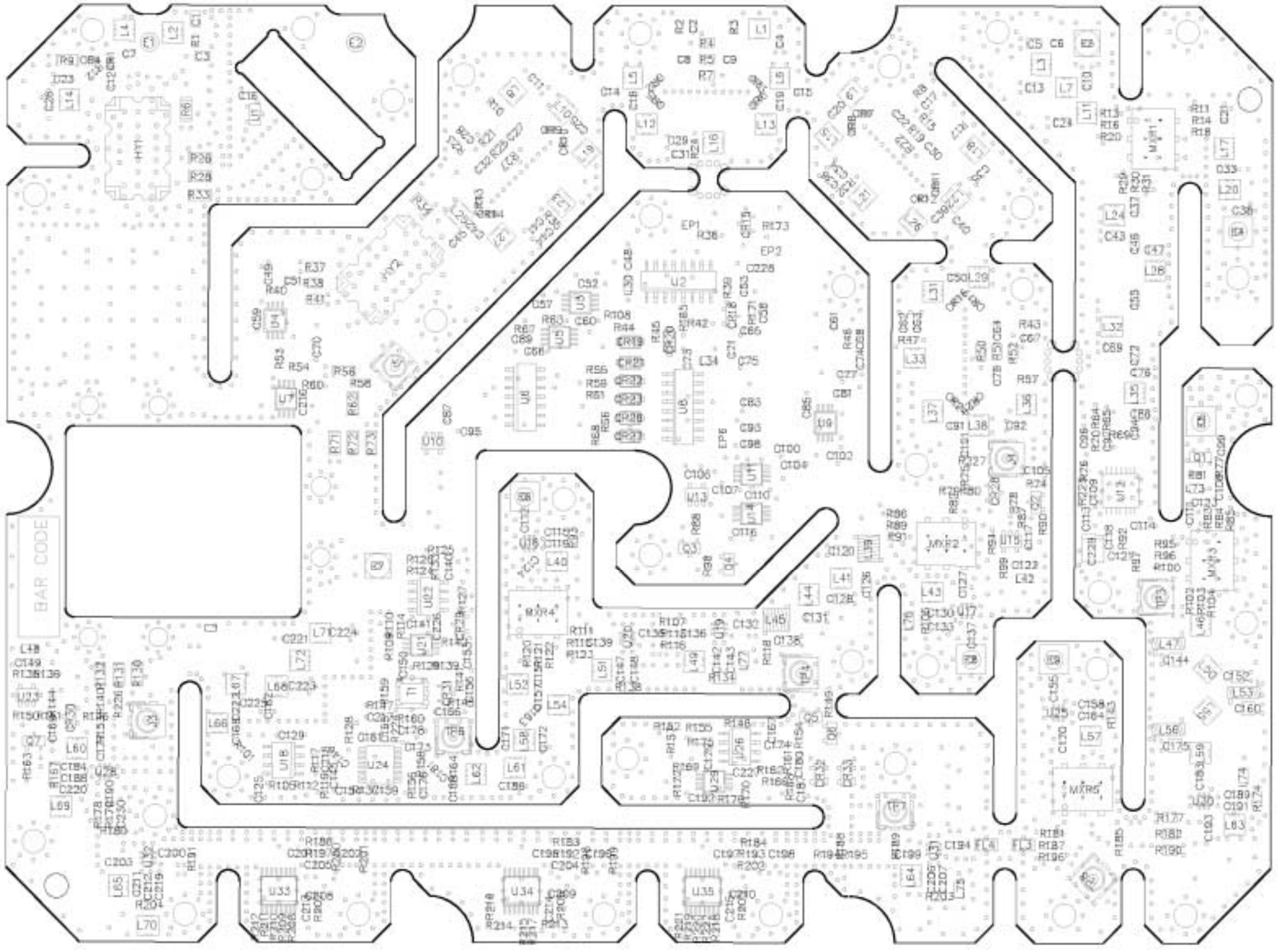
AEROFLEX WICHITA, INC.		
Title: Schematic, RF Controller		
Size: B	Number: 0000-5830-400	Rev: B
Cage: 51190	Filename: 058304B0.SCH	
Print Date: Fri Feb 18, 2005	Sheet 7 of 8	

1 2 3 4

A B C D



AEROFLEX WICHITA, INC.	
Title	Schematic, RF Controller
Size B	Number 0000-5830-400 / Rev B
Cage 51190	Filename 058304B0.SCH
Print Date Fri Feb 18, 2005	Sheet 8 of 8



(7010-5830-600-C)

PCB Assembly RF Converter (58A1A3A2)
Figure 30

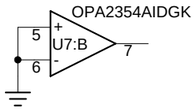
DATE	REV	CHANGE		APPRVD
22 Jun 04	A	NEVER RELEASED		
11 Nov 04	B	REL 20212	RRW	GH
11-10-05	C	REL 20508	RLA	GH

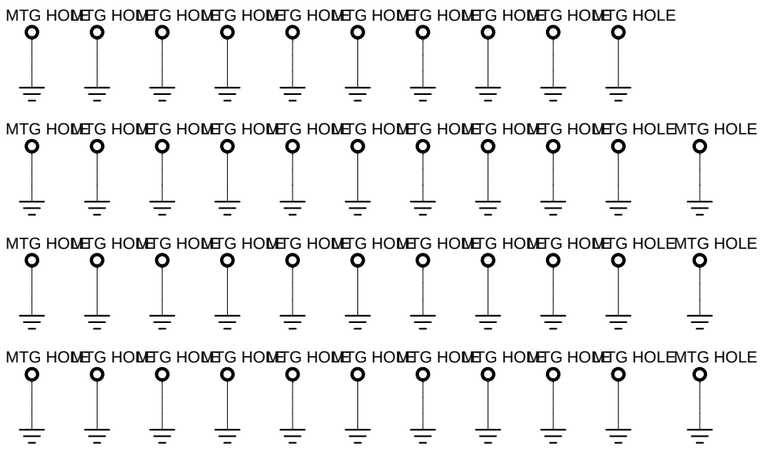
Power Table								
Ref Des	Device(Type)	Package	GND	-5VA	+16VA	+5VA	+3.3VA	-1VA
U3	3223-8272-000T	MSOP8		4	8			
U5	3223-8272-000T	MSOP8		4		8		
U6	3214-9403-020T	SO14	14	7				
U7	3223-0036-000T	MSOP8	4				8	
U9	3223-8272-000T	MSOP8		4	8			
U11	3223-8272-000T	MSOP8		4	8			
U14	3223-8272-000T	MSOP8		4	8			
U21	3223-0036-000T	MSOP8					8	4
U22	3221-0013-001T	SO8		4		8		
U26	3221-0013-001T	SO8		4		8		
U29	3223-0037-000T	MSOP8					8	4

Spare Gate Table		
Last Used	Not Used	Spare Gates
AT1		
C230		
CR33		
E9		
EP6	EP3, EP4, EP5	
ESD1		
FL4	FL2	
HY3		
J4		
L77		
MTG43		
MXR5		
Q7		
R228		
T1		
TP8	TP1, TP2, TP5	
U35	U27	
W1		

NOTES:
(UNLESS OTHERWISE SPECIFIED)

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE AND SYSTEM INTERCONNECT.
2. ALL RESISTORS ARE 1%, 1/8W.
3. ALL RESISTANCE IS EXPRESSED IN OHMS
   ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
   ALL INDUCTANCE IS EXPRESSED IN MICROHENRIES.
4. HIGHEST REFERENCE DESIGNATIONS:
   SEE SPARE GATE TABLE
5. REFERENCE DESIGNATIONS NOT USED:
   SEE SPARE GATE TABLE
6. COMPONENT(S) NOT INSTALLED.
7. IC FUNCTIONS NOT USED:
   SEE SPARE GATE TABLE
8. INSTALLED AT MECHANICAL LEVEL
9. R157 SAT
   SAT VALUES: 100K, 110K, 121K, 150K





CAUTION:

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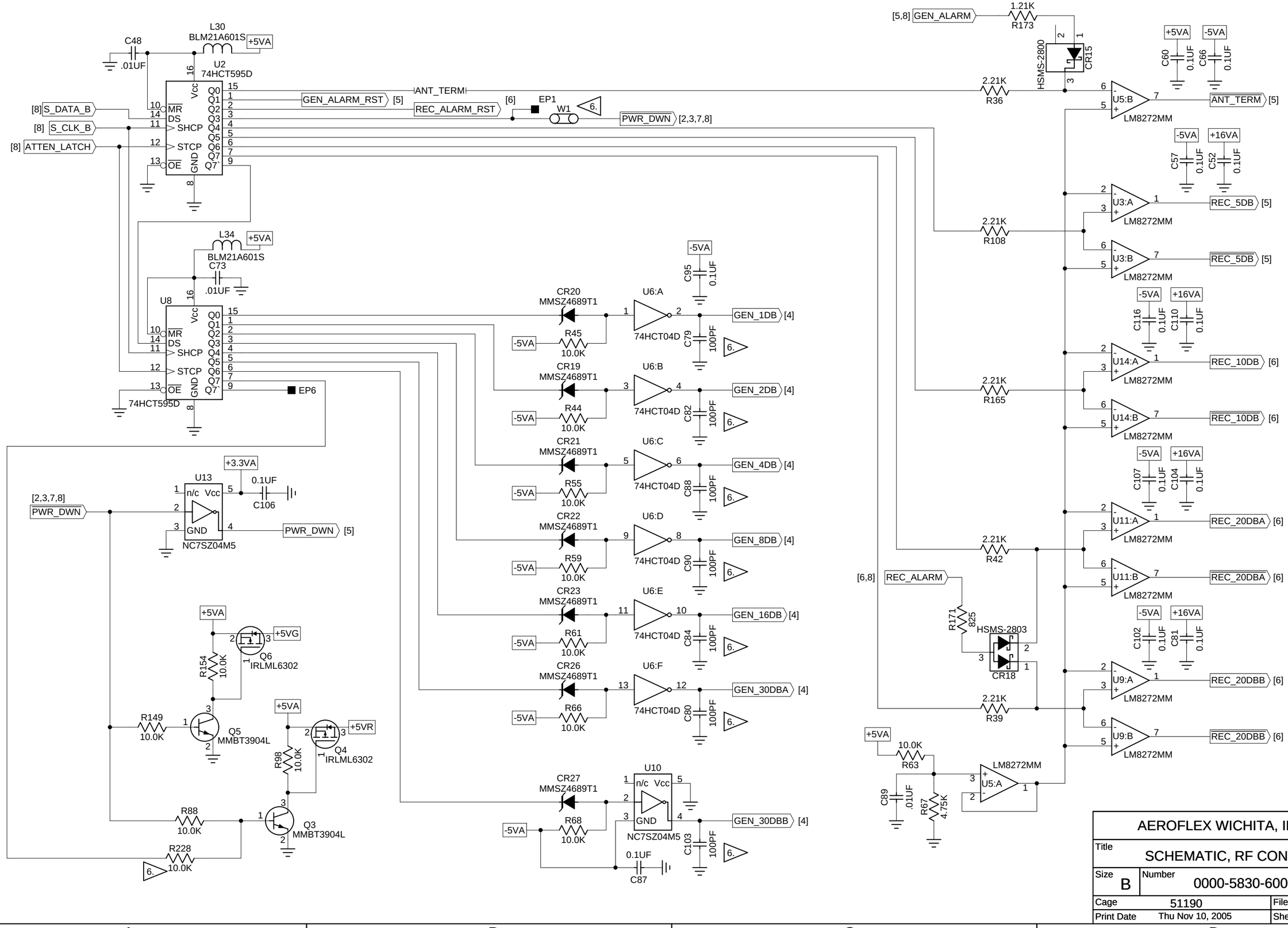
AEROFLEX WICHITA, INC
10200 WEST YORK STREET
WICHITA, KANSAS 67215-8935

Drawn	Date	Title	SCHEMATIC, RF CONVERTER	
R. Crawford	21 Jun 04			
Checked	Date	Size	Number	Rev
R. Crawford	22 Jun 04	B	0000-5830-600	C
Approved	Date	Cage	51190	Filename 058306C0.SCH
G. Hill	22 Jun 04	Print Date	Thu Nov 10, 2005	Sheet 1 of 8

1 2 3 4

A B C D



AEROFLEX WICHITA, INC.	
Title	SCHEMATIC, RF CONVERTER
Size B	Number 0000-5830-600 Rev C
Cage 51190	Filename 058306C0.SCH
Print Date Thu Nov 10, 2005	Sheet 2 of 8

1 2 3 4

A B C D

0.25VDC, 0.5Vpk-pk (-2dBm) with
50 ohm term on opposite end of cable.

45MHz LPF
0.75dB Loss

MXR1
ADE-5

-10dBm

-18dBm

133MHz BPF
18MHz BW
3.5dB loss

20_MHZ_IF

C6 270PF

L3 .27UH

L7 .33UH

L11 .27UH

C5 100PF

C13 180PF

C10 180PF

C24 100PF

R13 130

43.2 R16

R20 130

7dB

R31 301

18.2 R30

R29 301

3dB

C37 12PF

L24 .047UH

C43 18PF

C46 3PF

L28 .047UH

C47 22PF

C54 3PF

C55 3PF

L32 .047UH

C69 22PF

C56 2.2PF

C72 12PF

C76 18PF

L35 .1UH

C86 18PF

113MHZ_LO

L20 .082UH

L17 .082UH

C38 27PF

C33 56PF

C21 27PF

R11 301

18.2 R14

R18 301

150MHz LPF
0.75dB Loss @113MHz
45dB Loss @339MHz

BLM21A601S L74

+5VG

115 R174

C189 .01UF

L63 .1UH

C191 220PF

U30

SGA-2463

C183 470PF

C193 470PF

GEN_RF [4]

19.8dB gain
20mA, 2.7V

TP3
MMCX

R65 1.0K

R64 1.0K

+5VA

C229 47UF 10V

C113 0.1UF

R70 56.2

R69 56.2

C97 .01UF

.01UF C94

U12 THS7530PWP

Vin+ Vocm Vin- Vg+ Vg- PD

Vout+ Vout- n/c n/c BOTT

VS+ Vcl+ VS- Vcl-

C96 .01UF

C114 0.1UF

C118 22PF

R92 56.2

C121 .01UF

R97 475

R95 301

3dB

18.2 R96

R100 301

MXR3
ADE-5

R102 301

18.2 R103

3dB

R104 301

495MHz Filter
40MHz BW
3.5dB Loss

L46 .033UH

L47 8.80NH

C144 12PF

C134 1.2PF

L50 .082UH

L53 8.80NH

C160 10PF

C152 1.8PF

L55 .082UH

L56 8.80NH

C162 1.2PF

C175 12PF

L59 .033UH

[8] GEN_LEV

R76 15K

R225 10.0K

C109 0.1UF

18dB Gain Nominal @ 0.47 VDC
38.8 dB/V

[2,7,8] PWR_DWN

+3.3VA

C111 220PF

BLM21A601S L73

R81 100

C123 .01UF

R77 5.11K

C108 68PF

18.2 R84

R83 301

3dB

R85 301

1628MHZ_LO

C99 470PF

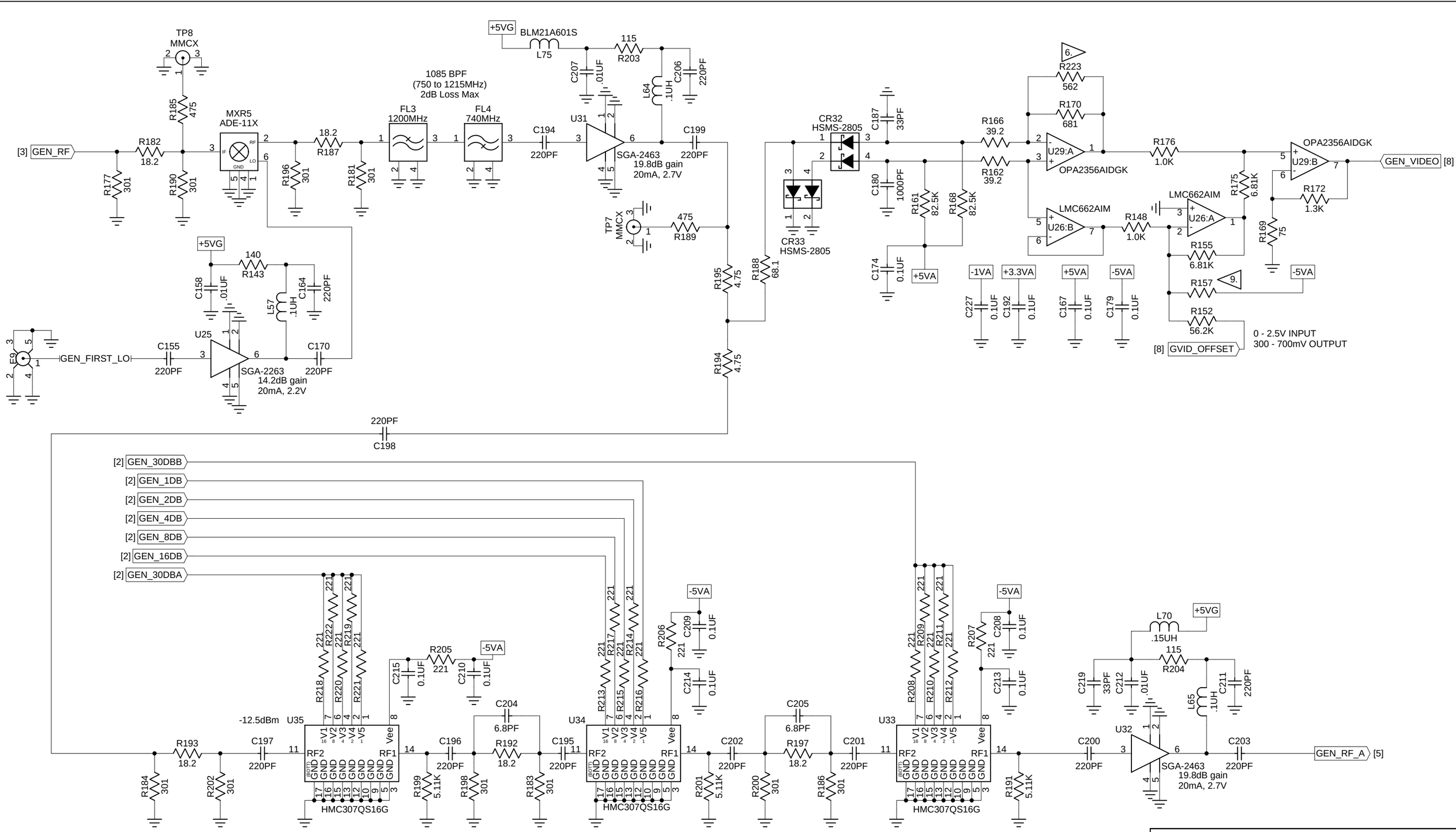
S21 = 24
ICC = 0.015
P1dB = +5dBm

Q1 BFR520

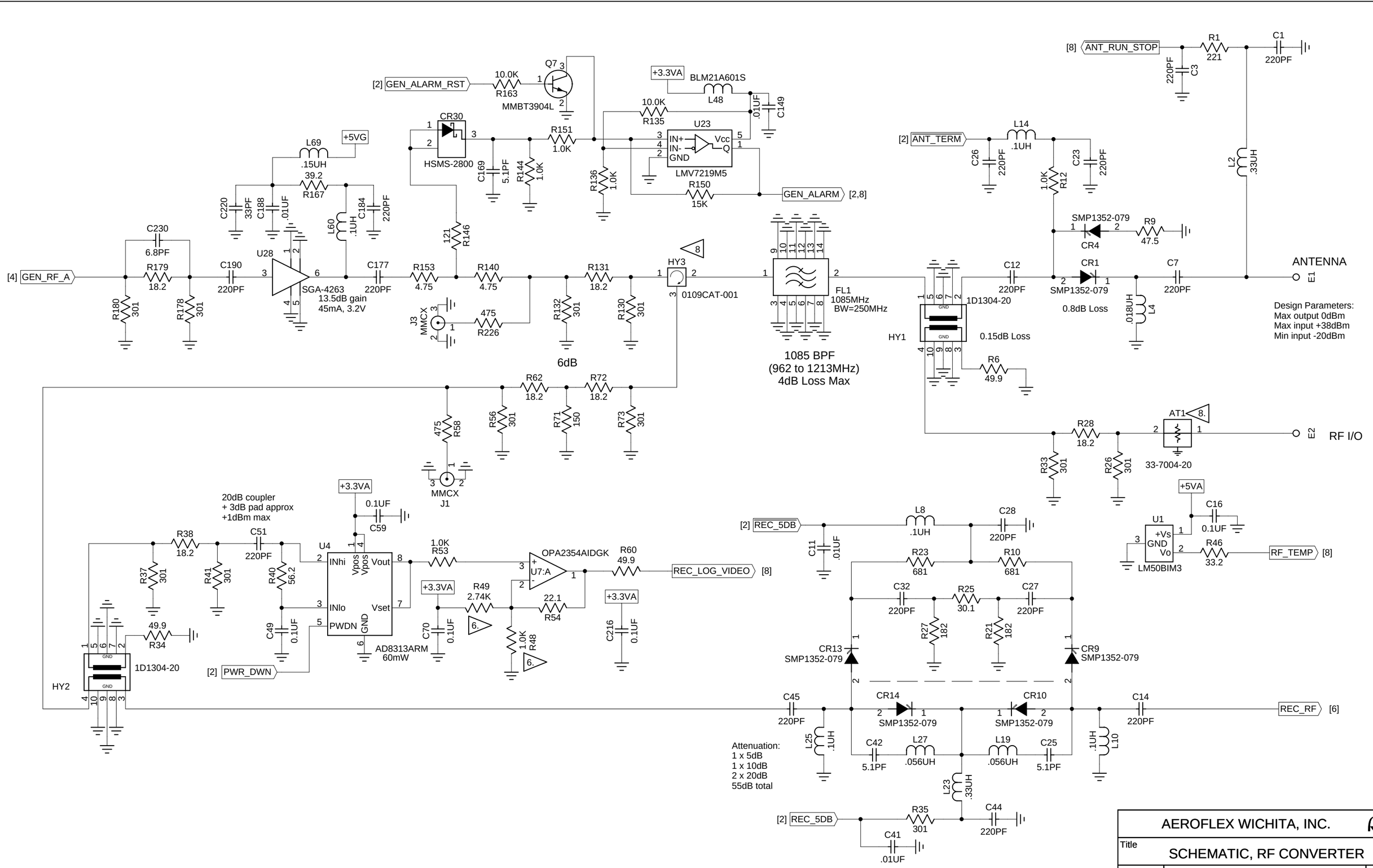
AEROFLEX WICHITA, INC.			
Title: SCHEMATIC, RF CONVERTER			
Size: B	Number: 0000-5830-600		Rev: C
Cage: 51190		Filename: 058306C0.SCH	
Print Date: Thu Nov 10, 2005		Sheet 3 of 8	

A B C D

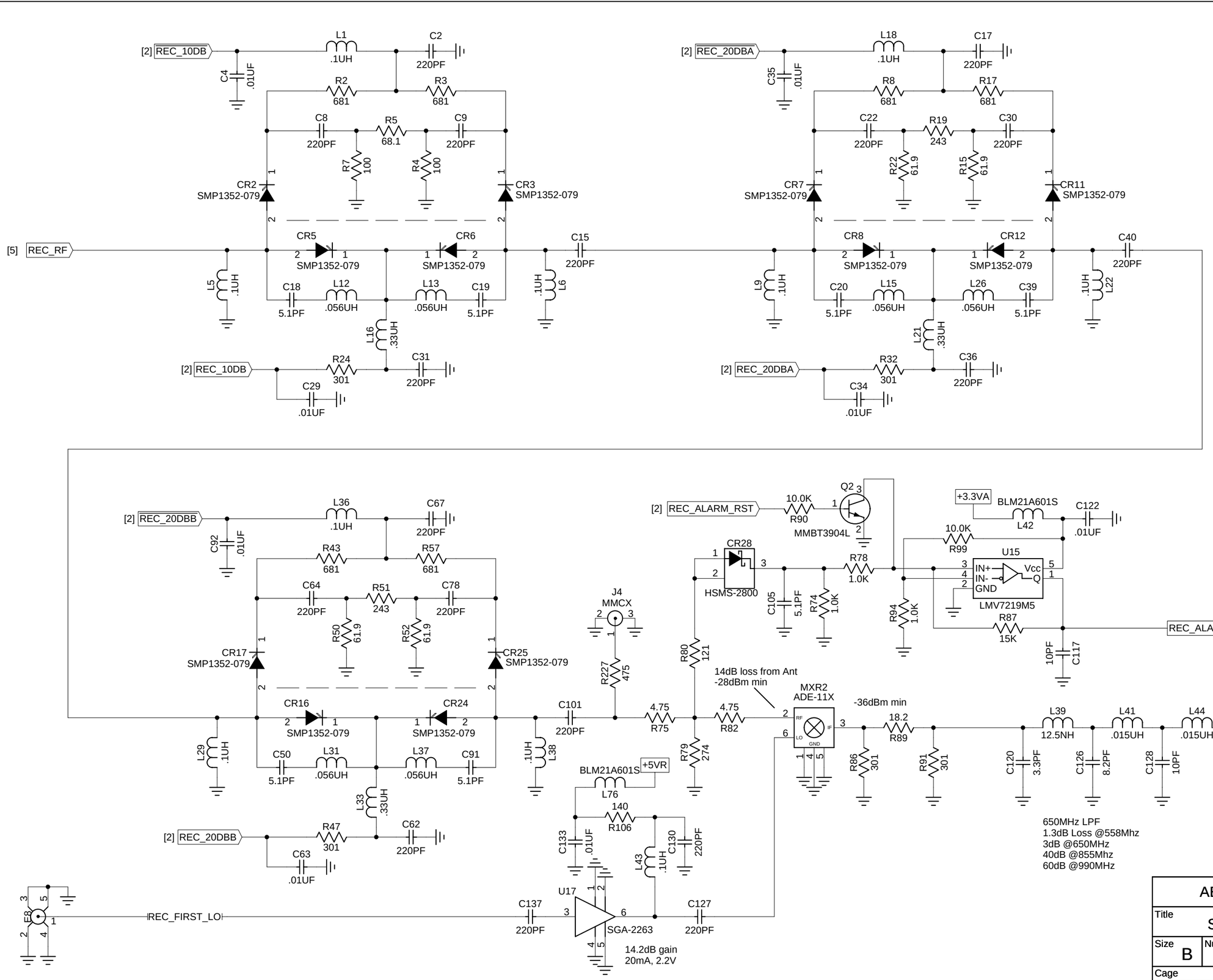
1 2 3 4



AEROFLEX WICHITA, INC.	
Title	SCHEMATIC, RF CONVERTER
Size B	Number 0000-5830-600 Rev C
Cage 51190	Filename 058306C0.SCH
Print Date Thu Nov 10, 2005	Sheet 4 of 8



AEROFLEX WICHITA, INC.	
Title	SCHEMATIC, RF CONVERTER
Size B	Number 0000-5830-600 Rev C
Cage 51190	Filename 058306C0.SCH
Print Date Thu Nov 10, 2005	Sheet 5 of 8



AEROFLEX WICHITA, INC.	
Title	SCHEMATIC, RF CONVERTER
Size B	Number 0000-5830-600 Rev C
Cage 51190	Filename 058306C0.SCH
Print Date Thu Nov 10, 2005	Sheet 6 of 8

1 2 3 4

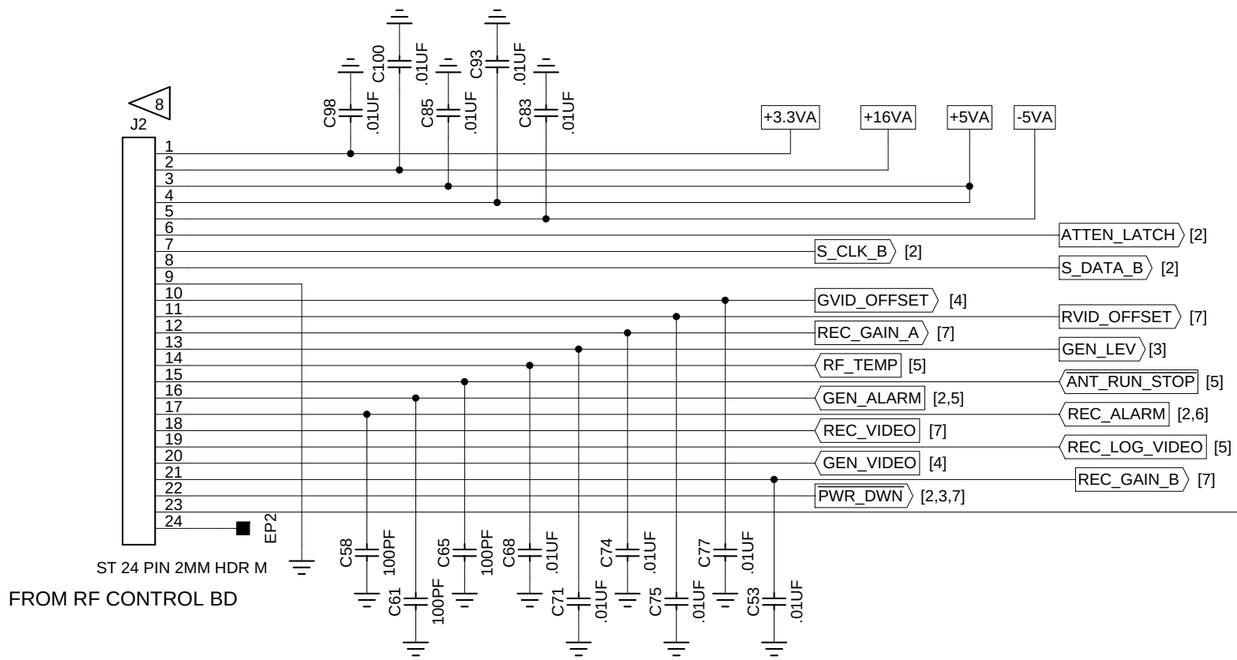
A B C D

BLM21A601S
+5VR
L77
R134
115
140
R138
C143 .01UF
L49 .1UH
C142 470PF
C148 .01UF
L51 .1UH
C147 470PF
U19
U20
[6] REC_IF
C132 470PF
SGA-2463
20dB gain
20mA 2.7V
C136 470PF
18.2
R113
C135 470PF
SGA-2263
14.2dB gain
20mA, 2.2V
C139 470PF
18.2
R115
-13dBm Typ
-20dBm Min
MXR4
ADE-5
RF
LO
IF
GND
60 MHz IF
100MHz LPF,
30MHz HPF
18.2
R121
C151 68PF
C157 39PF
C163 68PF
L58 .1UH
L61 .15UH
L62 .1UH
R116 301
R107 301
R123 301
R111 301
R120 301
R122 301
L52 .15UH
L54 .15UH
C172 15PF
C171 56PF
56PF C186
15PF C185
+5VR
140
R93
C115 .01UF
L40 .1UH
C119 220PF
U16
SGA-2263
14.2dB gain
20mA, 2.2V
E6
REC_SECOND_LO
C112 220PF
C124 220PF
TP6
MMCX
R164 475
C217 15PF
R147 1.0K
R159 56.2
T1
TC1-1T
CR31
HSMS-2803
CR29
HSMS-2803
C166 100PF
C153 1000PF
R127 47.5K
R145 47.5K
C156 0.1UF
+5VA
R141 221
R142 221
R139 562
U21:A
OPA2354AIDGK
U21:B
OPA2354AIDGK
R129 1.0K
R109 1.0K
REC_VIDEO [8]
LMC662AIM
U22:B
LMC662AIM
U22:A
R133 1.0K
R114 10.0K
R110 562
R124 10.0K
R125 18.2K
R126 22.1K
0 - 2.5V INPUT
300 - 500Mv OUTPUT
RVID_OFFSET
[8]
-1VA
+3.3VA
-5VA
C226 0.1UF
C150 0.1UF
C140 0.1UF
C141 0.1UF
-25dBm typical
C181 .01UF
R158 56.2
C173 0.1UF
C176 0.1UF
10
R156
R119 4.75
0.1UF
C145
C165 0.1UF
U24
INHI
INLO
VPSI
VPSO
VPOS
OPLO
OPHI
ENBL
MODE
VDBS
CMGN
VMAG
COMM
CMOP
CNTR
OFST
AD8330ARQ
[2,3,8] PWR_DWN
[8] REC_GAIN_A
R160 10.0K
R224 15K
C178 0.1UF
C159 3300PF
R137 182
C154 0.1UF
30dB Gain Nominal @ 1.0 VDC
33.3 dB/V
[8] REC_GAIN_B
R128 1.0K
C161 0.1UF
1.4V for VMAG gives
30dB harmonic performance
C146 0.1UF
R117 1.0K
C218 15PF
-5VA
0.1UF
C129
U18
AD8001AR
+5VA
0.1UF
C125
681
R105
332
R112
R101 49.9
C168 47PF
C222 22PF
C225 47PF
80MHz LPF,
35MHz HPF
L68 .12UH
L72 .18UH
L71 .12UH
L66 .15UH
L67 .15UH
C182 10PF
C223 82PF
82PF C221
10PF C224
2.25V pk-pk min
(+11dBm)
REC_IF_OUT
E7
8

AEROFLEX WICHITA, INC.		
Title	SCHEMATIC, RF CONVERTER	
Size B	Number 0000-5830-600	Rev C
Cage 51190	Filename 058306C0.SCH	
Print Date Thu Nov 10, 2005	Sheet 7 of 8	

1 2 3 4

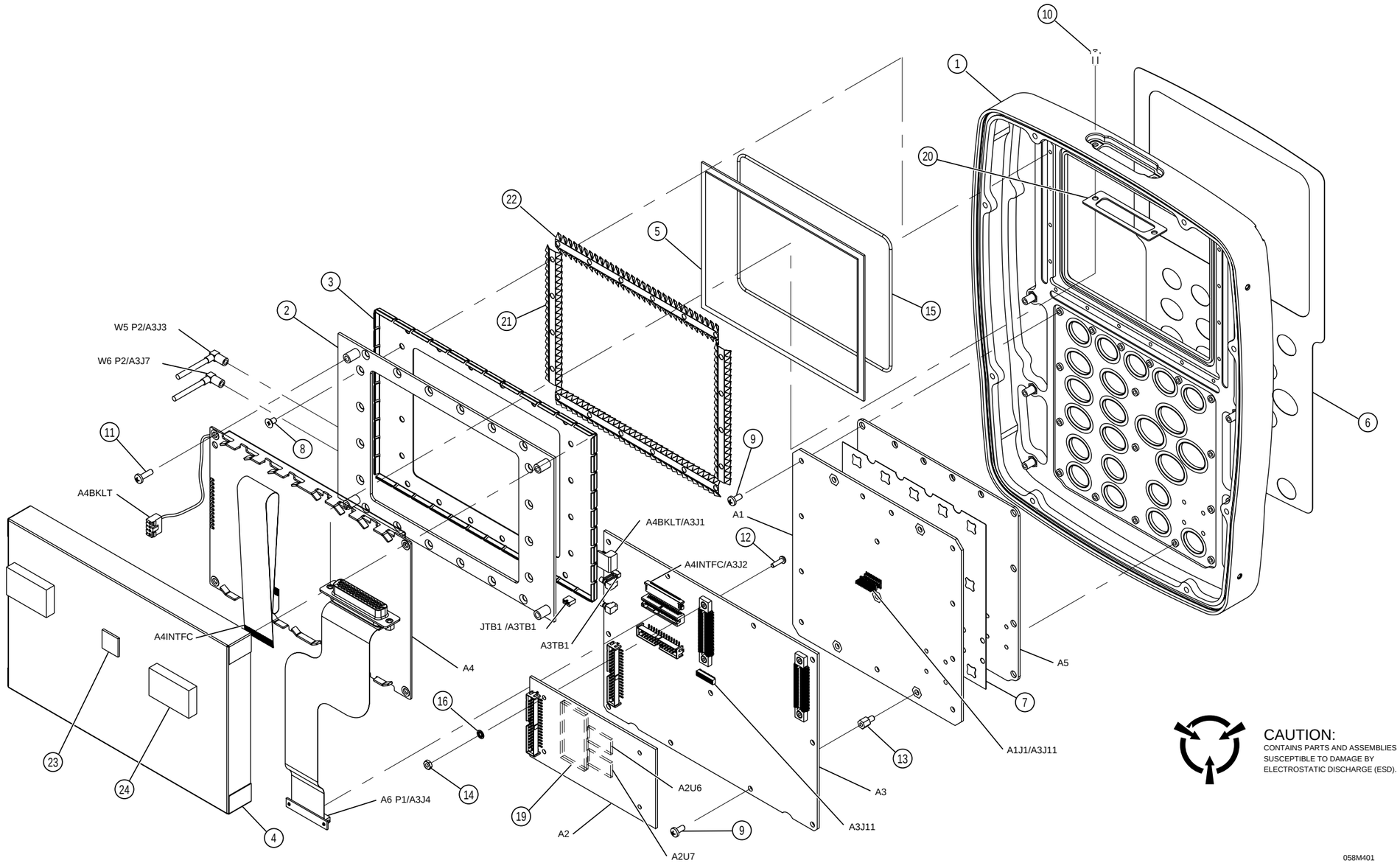
A B C D



AEROFLEX WICHITA, INC.	
Title	SCHEMATIC, RF CONVERTER
Size B	Number 0000-5830-600 / Rev C
Cage 51190	Filename 058306C0.SCH
Print Date Thu Nov 10, 2005	Sheet 8 of 8

1 2 3 4

A B C D

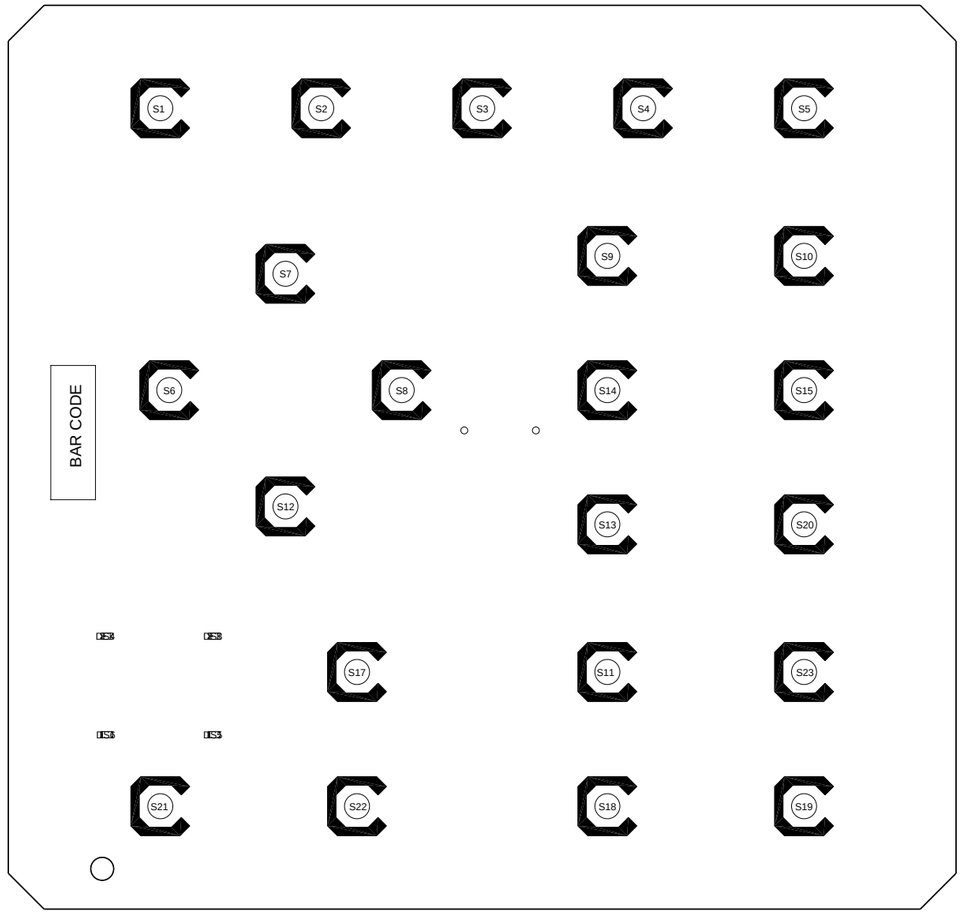


CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

058M401

(7005-5840-100-A)

Chassis Assembly (58A1A2)
Figure 31



058M007

(7010-5830-700-A)

Keypad PCB Assembly (58A1A2A1)
Figure 32

DATE	REV	CHANGE	APPRVD
2-4-04	A	REL 20321 RLA	GH

NOTES:
(UNLESS OTHERWISE SPECIFIED)

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE AND SYSTEM INTERCONNECT.
2. ALL RESISTORS ARE 1%, 1/8W.
3. ALL RESISTANCE IS EXPRESSED IN OHMS
   ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
   ALL INDUCTANCE IS EXPRESSED IN MICROHENRIES.
4. HIGHEST REFERENCE DESIGNATIONS:
   SEE SPARE GATE TABLE.
5. REFERENCE DESIGNATIONS NOT USED:
   SEE SPARE GATE TABLE.
6. COMPONENT(S) NOT INSTALLED.
7. IC FUNCTIONS NOT USED:

Spare Gate Table		
Last Used	Not Used	Spare Gates
DS6		
ESD1		
FL16		
J1		
MTG17		
R1		
S23	S16	

CAUTION:

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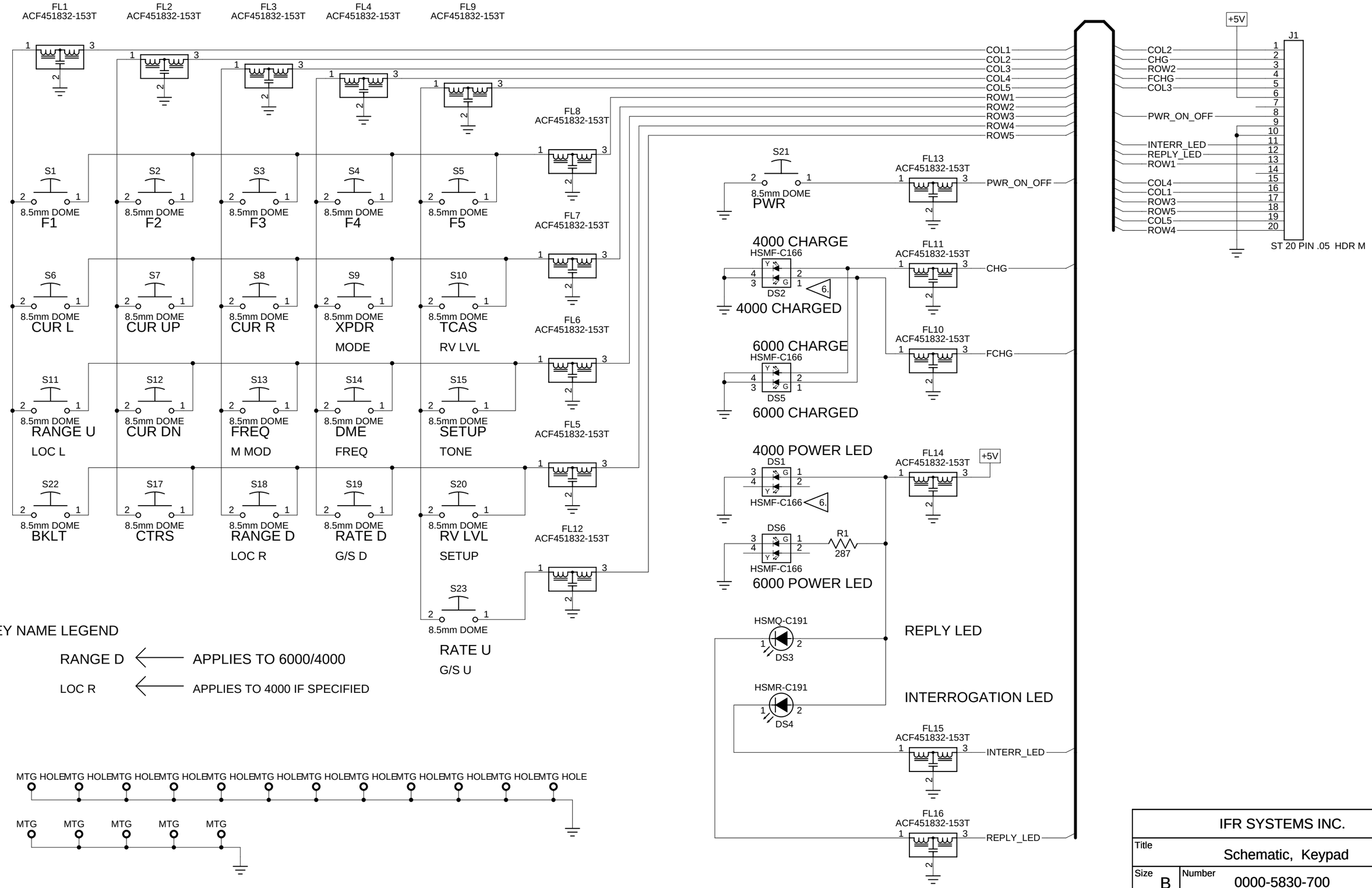
IFR SYSTEMS INC.
10200 WEST YORK STREET
WICHITA, KANSAS 67215-8935

Drawn Guy Hill	Date 20 Jan 04	Title Schematic, Keypad		
Checked G. HILL	Date 1-21-04	Size B	Number 0000-5830-700	Rev A
Approved G.Hill	Date 1-21-04	Cage 51190	Filename 058307A0.SCH	
		Print Date Mon Nov 01, 2004	Sheet 1 of 2	

1 2 3 4

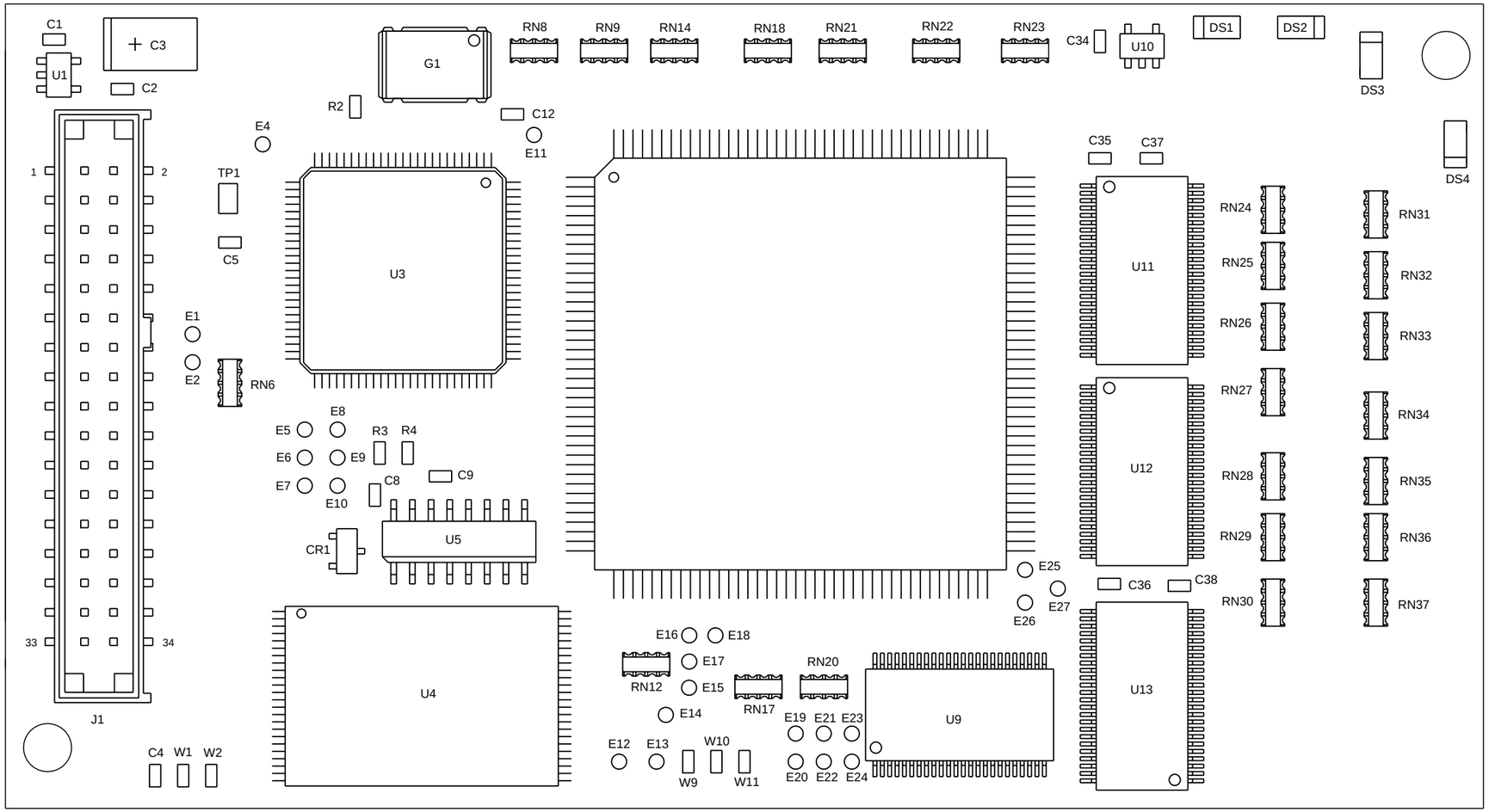
A B C D



Title	Schematic, Keypad
Size	B
Number	0000-5830-700
Rev	A
Cage	51190
Filename	058307A0.SCH
Print Date	Mon Nov 01, 2004
Sheet	2 of 2

IFR SYSTEMS INC.

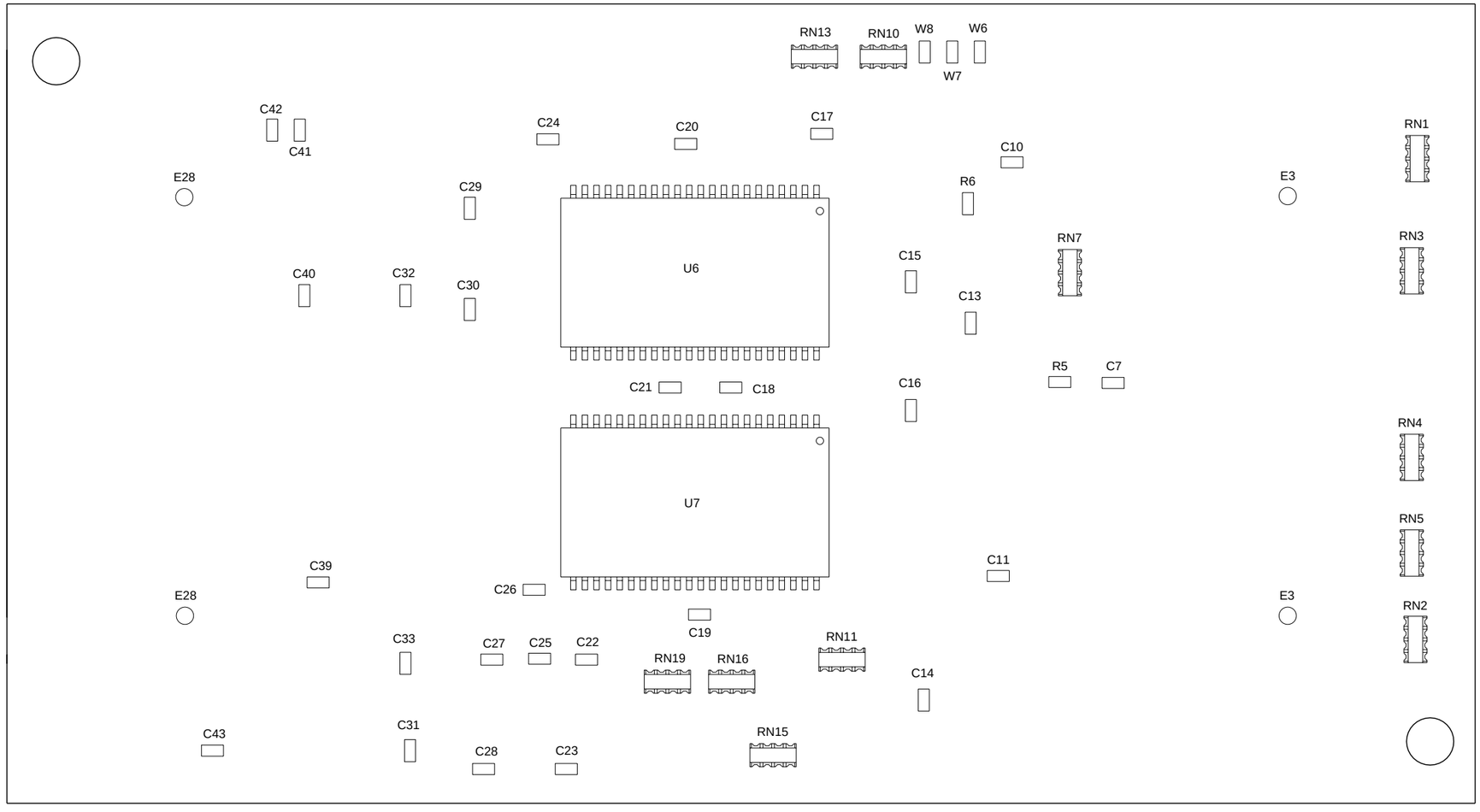
CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).



(TOP VIEW)

056M30A

CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).



(BOTTOM VIEW)

056M30B

(7010-5830-200-A)

Processor PCB Assembly (58A1A2A2)
(Sheet 2 of 2)
Figure 33

DATE	REV	CHANGE	APPRVD
10-26-04	A	RELEASE PER 20317 RLA	GMH

Spare Gate Table		
Last Used	Not Used	Spare Gates
C43		
CR1		
DS4		
E28		
ESD1		
G1		
J1		
R6		
RN37		
TP1		
U13		
W11		

NOTES:
(UNLESS OTHERWISE SPECIFIED)

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE AND SYSTEM INTERCONNECT.
2. ALL RESISTORS ARE 1%, 1/16W.
3. ALL RESISTANCE IS EXPRESSED IN OHMS
   ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
   ALL INDUCTANCE IS EXPRESSED IN MICROHENRIES.
4. HIGHEST REFERENCE DESIGNATIONS:
   SEE SPARE GATE TABLE.
5. REFERENCE DESIGNATIONS NOT USED:
   SEE SPARE GATE TABLE.
6. COMPONENT(S) NOT INSTALLED.
7. IC FUNCTIONS NOT USED:
   SEE SPARE GATE TABLE.

CAUTION:

CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

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IFR SYSTEMS INC.
10200 WEST YORK STREET
WICHITA, KANSAS 67215-8935

Drawn G. Hill	Date 17 Jun 02	Title Schematic, Processor		
Checked T. DeSmit	Date 10-26-04	Size B	Number 0000-5830-200	Rev A
Approved G. Hill	Date 10-26-04	Cage 51190	Filename 058302A0.SCH	
		Print Date Tue Oct 26, 2004	Sheet 1 of 8	

1 2 3 4

A B C D

IRQ1, IRQ4 = 1; 16-BIT BOOT PORT
IRQ7 = 1; AA ENABLE W/15 WAIT STATES

U8
MCF5206E

RN19 RN10 RN13 RN16 RN23 RN22 RN20 RN17 RN18 RN14 RN21 RN2 RN11 RN12
10K
33

+3.3V

[3,4,5,6] RESET
[4,6] CPU_CLK
[7] IRQ1
[7] IRQ4
[7] IRQ7
[6] BKPT
[6] DSI
[6] DSCLK
[6] DSO
DDATA
PST
[3,4,5] R/W
[7] TS
[4,7] TA
[6,7] TEA
[7] ATA
[7] DREQ0
[7] TIN1
[7] DREQ1
[7] TOUT1
[7] SCL
[7] SDA
[7] CTS1
[7] RTS1
[7] RXD1
[7] TXD1
[6] CTS2
[6] RTS2
[6] RXD2
[6] TXD2

E19 66 BR
E20 67 BD
68 BG
129 MTMOD
59 RSTI
135 CLK
64 IRQ1/IPL0
63 IRQ4/IPL1
62 IRQ7/IPL2
127 TMS/BKPT
126 TDI/DSI
125 HIZ
121 DSCLK
124 TDO/DSO
122 TCK
159 PP0/DDATA0
158 PP1/DDATA1
157 PP2/DDATA2
156 PP3/DDATA3
154 PP4/PST0
153 PP5/PST1
152 PP6/PST2
151 PP7/PST3
E14 47 TT0
E16 49 TT1
E18 50 ATM
E17 51 SIZ0
E15 53 SIZ1
54 R/W
58 TS
55 TA
57 TEA
61 ATA
143 DREQ0/TIN0
144 TIN1
146 DREQ1/TOUT0
147 TOUT1
149 SCL
148 SDA
138 CTS1
139 RTS1
141 RXD1
142 TXD1
132 CTS2
133 RTS2/RST0
136 RXD2
137 TXD2

Vdd 6 12 18 24 30 36 44 52 60 69 77 86 94 102 110 118 128 140 150 160
GND 3 9 15 21 27 33 39 48 56 65 73 82 90 98 106 114 123 130 131 134 145 155

A0 1 A0 … A23 35 A23
D0 120 D0 … D31 79 D31
CS0 42 CS0
CS1 43 CS1
CS2 45 CS2
CS3 46 CS3
A24/CS4/WE3 37 WE3
A25/CS5/WE2 38 WE2
A26/CS6/WE1 40 WE1
A27/CS7/WE0 41 WE0
RAS0 70 E21
RAS1 71 E22
CAS0 72 E23
CAS1 74 E24
CAS2 75 E27
CAS3 76 E26
DRAMW 78 E25

ADDR
DATA
CS
WE

0.1UF C24 C17 C15 C16 C22 C26 C30 C29

IFR SYSTEMS INC.			
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1 2 3 4

A B C D

DATA
ADDR
CS

[4] CS_NV
[4] W/$\overline{R}$
[2,4,5] R/$\overline{W}$
[4] $\overline{WR\_RAM2}$
[4] $\overline{WR\_RAM3}$
[4] $\overline{WR\_RAM0}$
[4] $\overline{WR\_RAM1}$

U4
AT49BV322A-70TI

+3.3V
37 Vcc

A1 25 A0
A2 24 A1
A3 23 A2
A4 22 A3
A5 21 A4
A6 20 A5
A7 19 A6
A8 18 A7
A9 8 A8
A10 7 A9
A11 6 A10
A12 5 A11
A13 4 A12
A14 3 A13
A15 2 A14
A16 1 A15
A17 48 A16
A18 17 A17
A19 16 A18
A20 9 A19
A21 10 A20

$\overline{CS0}$ 26 $\overline{CE}$
28 $\overline{OE}$
11 $\overline{WE}$
12 $\overline{RP}$
47 BYTE

I/O0 29 D16
I/O1 31 D17
I/O2 33 D18
I/O3 35 D19
I/O4 38 D20
I/O5 40 D21
I/O6 42 D22
I/O7 44 D23
I/O8 30 D24
I/O9 32 D25
I/O10 34 D26
I/O11 36 D27
I/O12 39 D28
I/O13 41 D29
I/O14 43 D30
I/O15/A-1 45 D31

n/c 13 W1 +3.3V [3,4,5,6,7]
Vpp 14 W4 W2 +3.3V [3,4,5,6,7]
RY/$\overline{BY}$ 15

[2,4,5,6] RESET
[3,4,5,6,7] +3.3V

GND 27
GND 46

+3.3V +3.3V
0.1UF C4
0.1UF C14

+VOUT
U6
HM62V16256CLTT-5SL
11 Vcc
33 Vcc

A2 5 A0
A3 4 A1
A4 3 A2
A5 2 A3
A6 1 A4
A7 44 A5
A8 43 A6
A9 42 A7
A10 27 A8
A11 26 A9
A12 25 A10
A13 24 A11
A14 23 A12
A15 22 A13
A16 21 A14
A17 20 A15
A18 19 A16
A19 18 A17

[3,4,5,6,7] +3.3V
28 $\overline{CS2}$
6 $\overline{CS1}$
41 $\overline{OE}$
17 $\overline{WE}$
40 $\overline{UB}$
39 $\overline{LB}$

I/O0 7 D0
I/O1 8 D1
I/O2 9 D2
I/O3 10 D3
I/O4 13 D4
I/O5 14 D5
I/O6 15 D6
I/O7 16 D7
I/O8 29 D8
I/O9 30 D9
I/O10 31 D10
I/O11 32 D11
I/O12 35 D12
I/O13 36 D13
I/O14 37 D14
I/O15 38 D15

12 GND
34 GND

+VOUT +VOUT
0.1UF C20
0.1UF C19

+VOUT
U7
HM62V16256CLTT-5SL
11 Vcc
33 Vcc

A2 5 A0
A3 4 A1
A4 3 A2
A5 2 A3
A6 1 A4
A7 44 A5
A8 43 A6
A9 42 A7
A10 27 A8
A11 26 A9
A12 25 A10
A13 24 A11
A14 23 A12
A15 22 A13
A16 21 A14
A17 20 A15
A18 19 A16
A19 18 A17

[3,4,5,6,7] +3.3V
28 $\overline{CS2}$
6 $\overline{CS1}$
41 $\overline{OE}$
17 $\overline{WE}$
40 $\overline{UB}$
39 $\overline{LB}$

I/O0 7 D16
I/O1 8 D17
I/O2 9 D18
I/O3 10 D19
I/O4 13 D20
I/O5 14 D21
I/O6 15 D22
I/O7 16 D23
I/O8 29 D24
I/O9 30 D25
I/O10 31 D26
I/O11 32 D27
I/O12 35 D28
I/O13 36 D29
I/O14 37 D30
I/O15 38 D31

12 GND
34 GND

+VOUT +VOUT
0.1UF C18
0.1UF C21

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1 2 3 4

A B C D

ADDR
DATA
CS
WE
[2,7] TA
[2,3,5] R/W

U10
NC7SZ04M5
+3.3V
0.1UF C34
W/R [3]

CR1
HSMS-2800
C8 0.1UF
+VBAT
C11 0.1UF
R6 2.21K
+VOUT

U5
M40SZ100WMQ6
CS2
[3,4,5,6,7] +3.3V
E12
E13
PFI
RSTIN
do_not_use
n/c
n/c
Vcc
Vbat
Vout
BL
Econ
PFO
RST
GND GND GND
C9 0.1UF
CS_NV [3]
RESET [2,3,5,6]

U3
XC2C64-7VQ100I
+1.8V +3.3V
Vccint Vccint
Vccio Vccio Vccio Vccio
Vaux
A0 A1 A2 A3 A16 A17 A18 A19 A20 A21 A22
A23 D24 D25 D26 D27 D28 D29 D30 D31
CS1 CS3 WE0 WE1 WE2 WE3
E11 E4
I/O-GTS0 I/O-GTS1 I/O-GTS2 I/O-GTS3 I/O-GSR I/O-GCK0 I/O-GCK1 I/O-GCK2
n/c
GND
TCK TDI TDO TMS

WR_RAM0 [3]
WR_RAM1 [3]
WR_RAM2 [3]
WR_RAM3 [3]
BUF_EN [5]
R5 27.4 CPU_CLK [2,6]
R4 27.4 CPU_CLKB [7]

RN6
PROG [7]
CCLK [7]
DONE [7]
INIT [7]
RN7
BUSY [7]
WR_FPGA [7]
CS_FPGA [7]
CPLD1 [7]
RN5
CPLD2 [7]
CPLD3 [7]
CPLD4 [7]
CPLD5 [7]
RN4
CPLD6 [7]
CPLD7 [7]
CPLD8 [7]
MFB_BD_WR [7]
R3 27.4 MFB_EN [7]

RN15
10K
[3,4,5,6,7] +3.3V
RN8
10K
W6 W7 W8 W9 W10 W11

TCK [6]
TDI [6]
TDO [6]
TMS [6]
BUF_WR [5]

G1
ENBL Vcc
GND OUT
36.864MHz
0.1UF C12
R2 27.4
R1 27.4
6.

U2
P2041A-08TT
XIN/CLK
XOUT
SR0
SR1
SSON
Vdd
MODOUT
Vss
W3 W5
0.1UF C6

+1.8V +3.3V +3.3V +3.3V
0.1UF C7 0.1UF C13 0.1UF C5 0.1UF C10

+3.3V
U1
TPS78918DBV
IN
EN
BYP
OUT
GND
TP1
+1.8V
0.1UF C1 0.1UF C2
16V 10UF C3

DATA
[4] BUF_WR
[4] BUF_EN
ADDR
CS
WE
[3,4,5,6,7]
BADDR
BCS
BWE
BR/W [7]
BRESET [7]
BDATA

U9 SN74LVC16245ADGG
U11 SN74LVC16245ADGG
U13 SN74LVC16245ADGG
U12 SN74LVC16245ADGG

RN28 33
RN29 33
RN30 33
RN37 33
RN24 33
RN25 33
RN26 33
RN27 33
RN35 33
RN36 33
RN3 33
RN1 33
RN31 33
RN32 33
RN33 33
RN34 33

+3.3V
0.1UF
C28 C23 C27 C25
C41 C32 C40 C42
C43 C38 C33 C31
C35 C36 C39 C37

[2,3,4,5] R/W
[2,3,4,6] RESET

IFR SYSTEMS INC.

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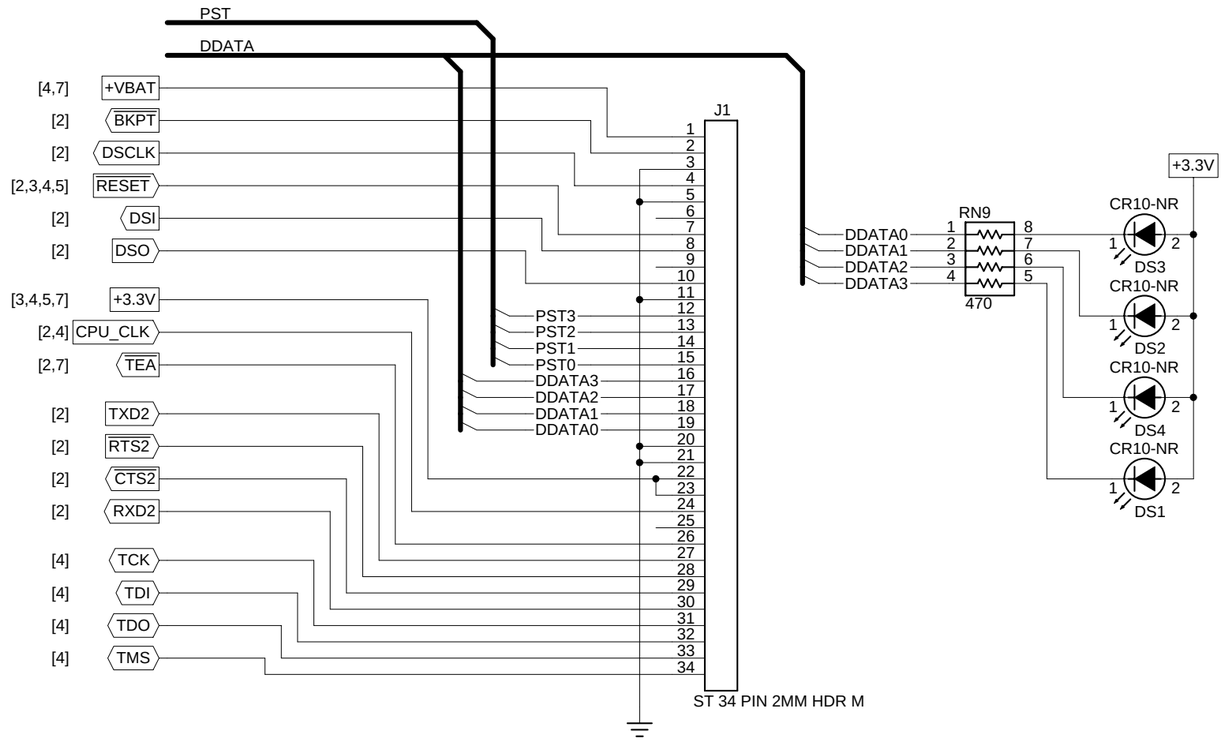
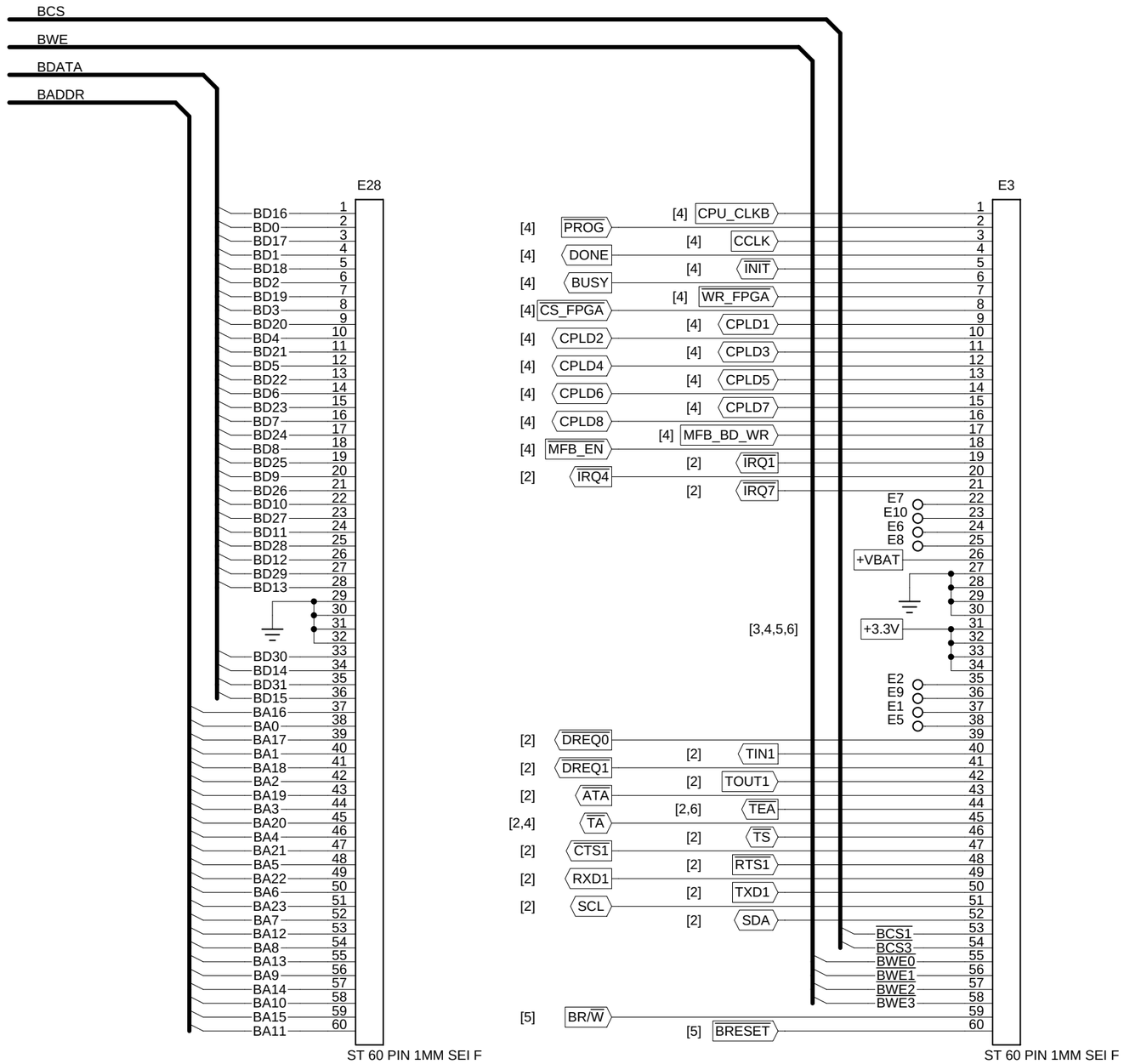


IFR SYSTEMS INC.		
Title: Schematic, Processor		
Size: B	Number: 0000-5830-200	Rev: A
Cage: 51190	Filename: 058302A0.SCH	
Print Date: Tue Oct 26, 2004	Sheet 6 of 8	

1 2 3 4

A B C D



IFR SYSTEMS INC.			
Title: Schematic, Processor			
Size: B	Number: 0000-5830-200		Rev: A
Cage: 51190		Filename: 058302A0.SCH	
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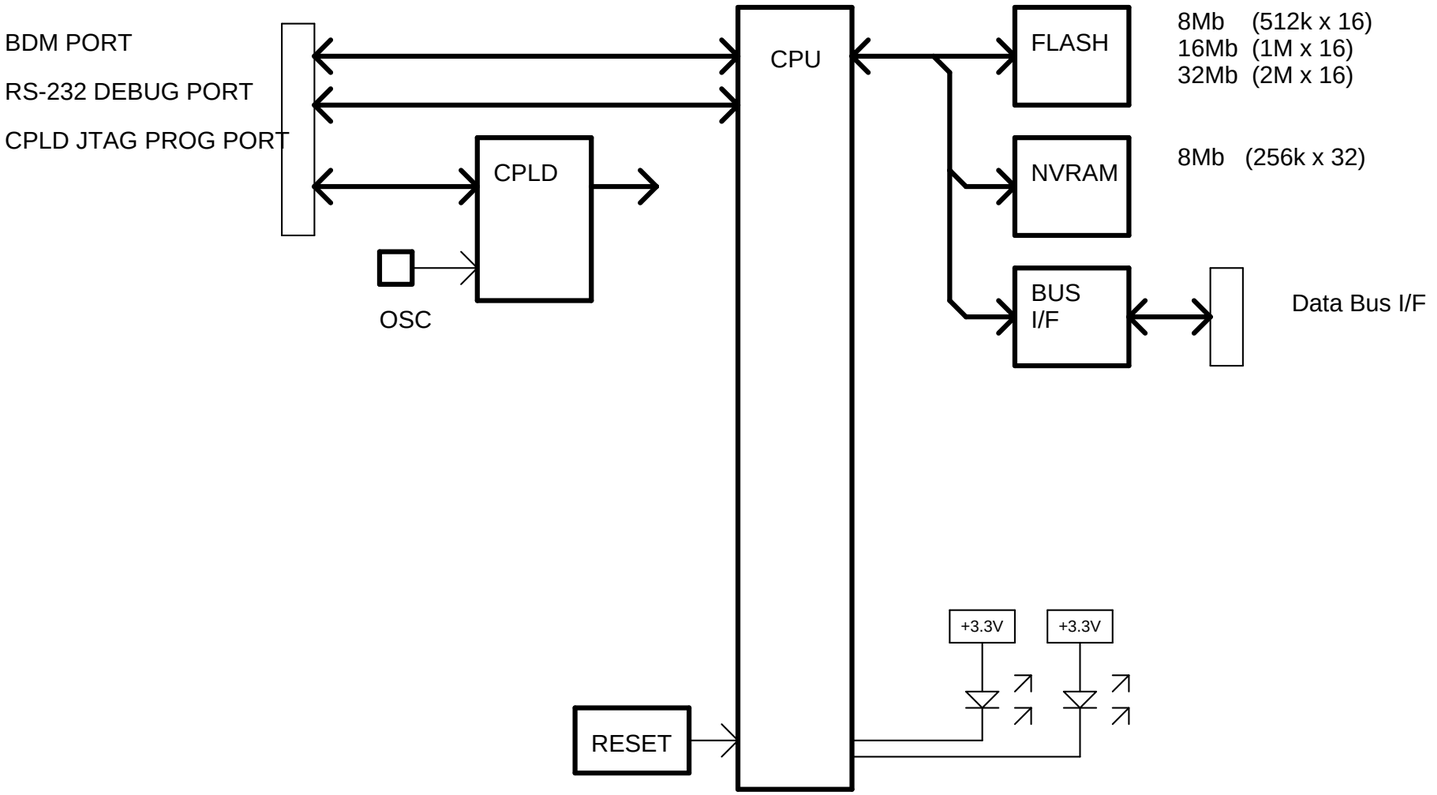
1 2 3 4

A B C D



IFR SYSTEMS INC.	
Title	Schematic, Processor
Size B / Number	0000-5830-200 / Rev A
Cage 51190	Filename 058302A0.SCH
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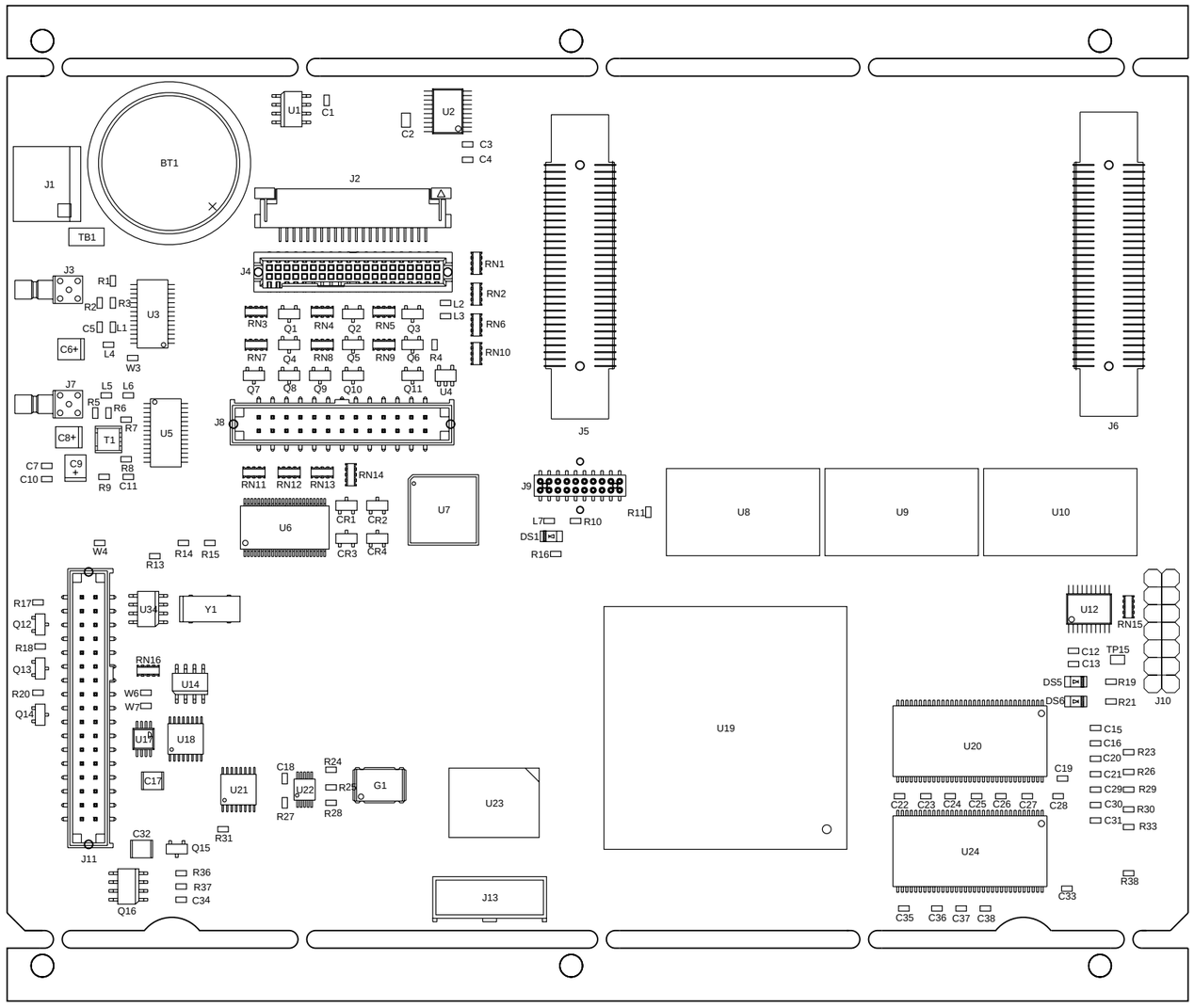
1 2 3 4

A B C D


U1
C1
U2
C2
C3
C4
BT1
J1
J2
TB1
J3
R1
R2
R3
U3
C5
L1
C6+
L4
W3
RN1
RN2
L2
L3
RN6
RN10
J4
RN3
Q1
RN4
Q2
RN5
Q3
RN7
Q4
RN8
Q5
RN9
Q6
R4
Q7
Q8
Q9
Q10
Q11
U4
J5
J6
J7
L5
L6
R5
R6
C8+
T1
R7
U5
J8
C7
C10
C9
+
R8
R9
C11
RN11
RN12
RN13
RN14
U6
CR1
CR2
CR3
CR4
U7
J9
L7
R10
R11
DS1
R16
U8
U9
U10
W4
R13
R14
R15
R17
Q12
R18
Q13
R20
Q14
U34
Y1
RN16
W6
W7
U14
U17
U18
C17
U21
C18
U22
R24
R25
R27
R28
G1
U23
R31
C32
Q15
J11
R36
R37
C34
Q16
J13
U19
U12
RN15
C12
C13
TP15
DS5
DS6
R19
R21
J10
U20
C19
C22
C23
C24
C25
C26
C27
C28
C15
C16
C20
C21
C29
C30
C31
R23
R26
R29
R30
R33
U24
C33
R38
C35
C36
C37
C38

058M003

DATE	REV	CHANGE	APPRVD
	A	NOT RELEASED	
11-19-04	B	REL PER 20338 RLA	GH

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE AND SYSTEM INTERCONNECT.

2. ALL RESISTORS ARE 1%, 1/8W.

3. ALL RESISTANCE IS EXPRESSED IN OHMS
ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
ALL INDUCTANCE IS EXPRESSED IN MICROHENERIES.

4. HIGHEST REFERENCE DESIGNATIONS:
BT1, CR4, C256, DS6, E153, G1, J16, L9, Q25
RN101, R160, TP30, T1, U34, W39, Y1

5. REFERENCE DESIGNATIONS NOT USED:

6. COMPONENT(S) NOT INSTALLED:
DOTTED OUTLINES ALSO INDICATE COMPONENTS NOT INSTALLED.

7 . IC FUNCTIONS NOT USED:

CAUTION:

CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

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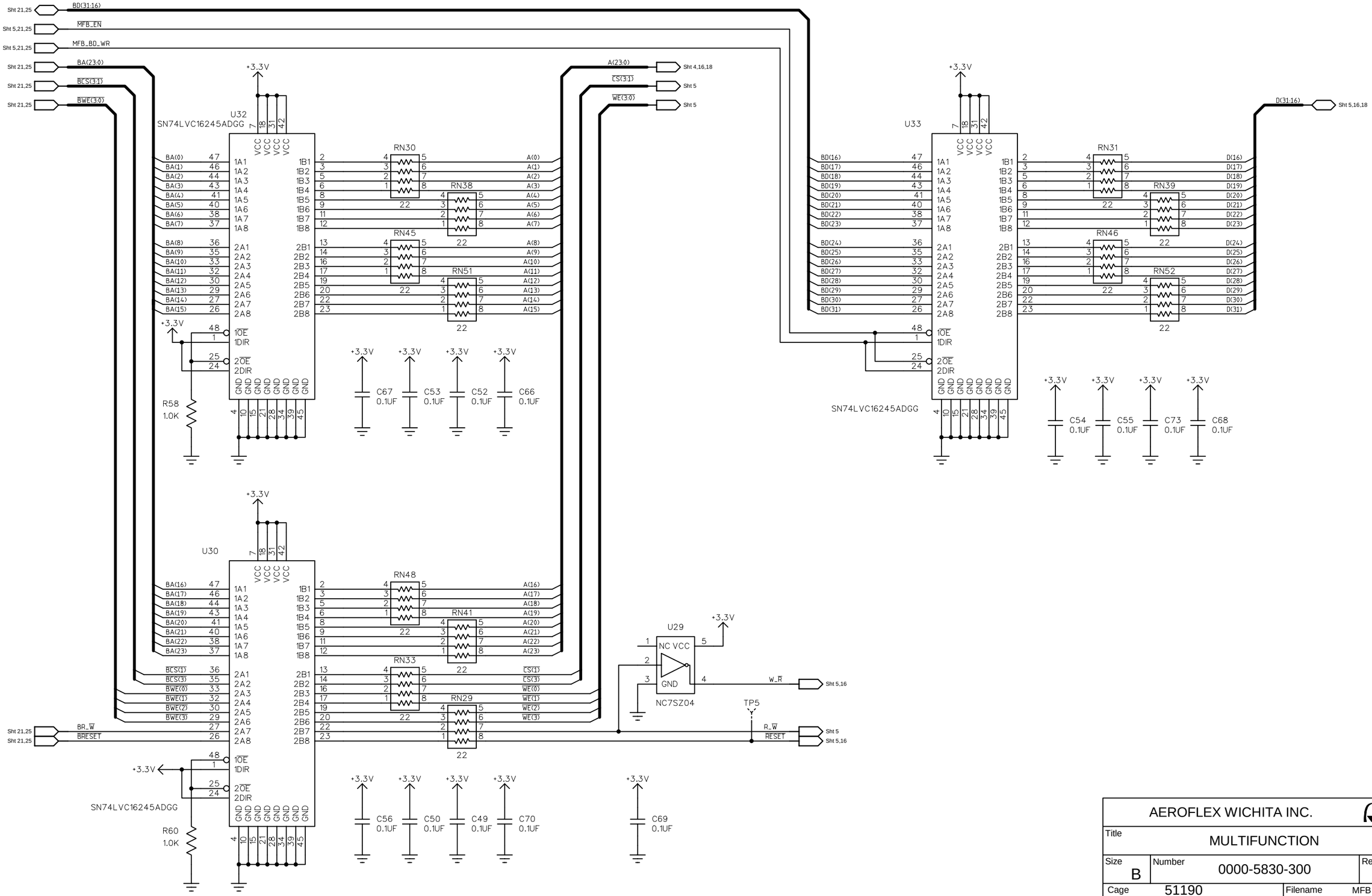
AEROFLEX WICHITA, INC.
10200 WEST YORK STREET
WICHITA, KANSAS 67215-8935

Drawn GUY HILL	Date 4-10-04	Title MULTIFUNCTION		
Checked GUY HILL	Date 9-17-04	Size B	Number 0000-5830-300	Rev B
Approved GUY HILL	Date 9-17-04	Cage 51190	Filename MFB	
		Modify Date 11/19/2004	Sheet 01 of 29	

1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
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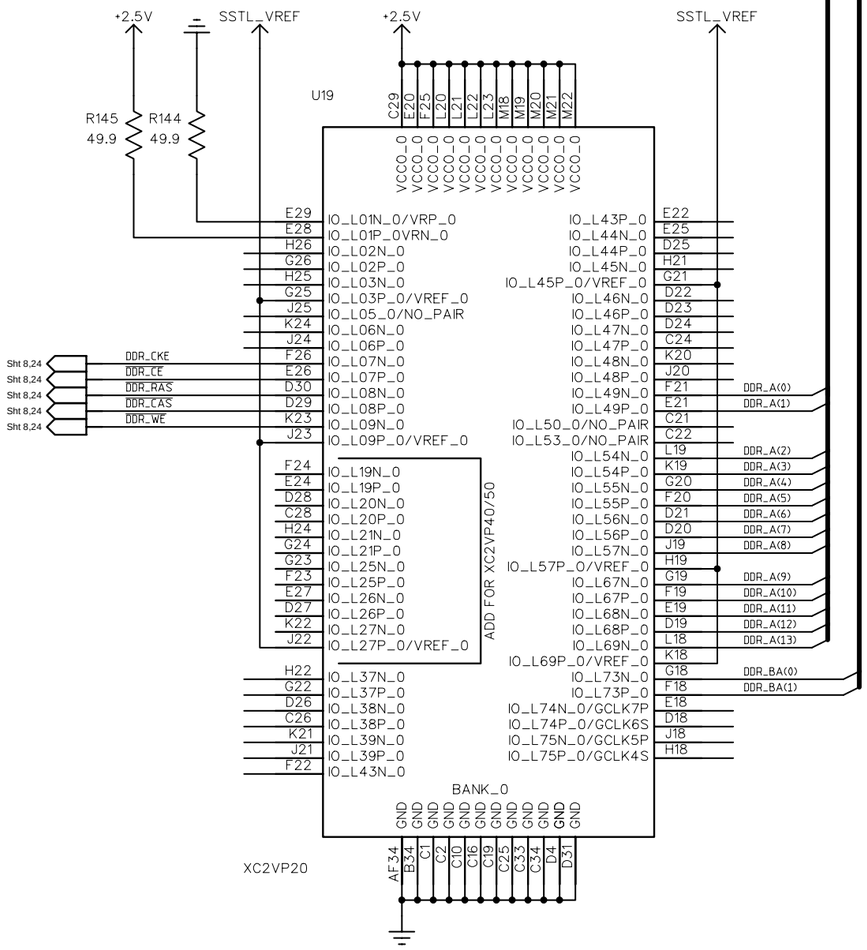

AEROFLEX WICHITA INC.	
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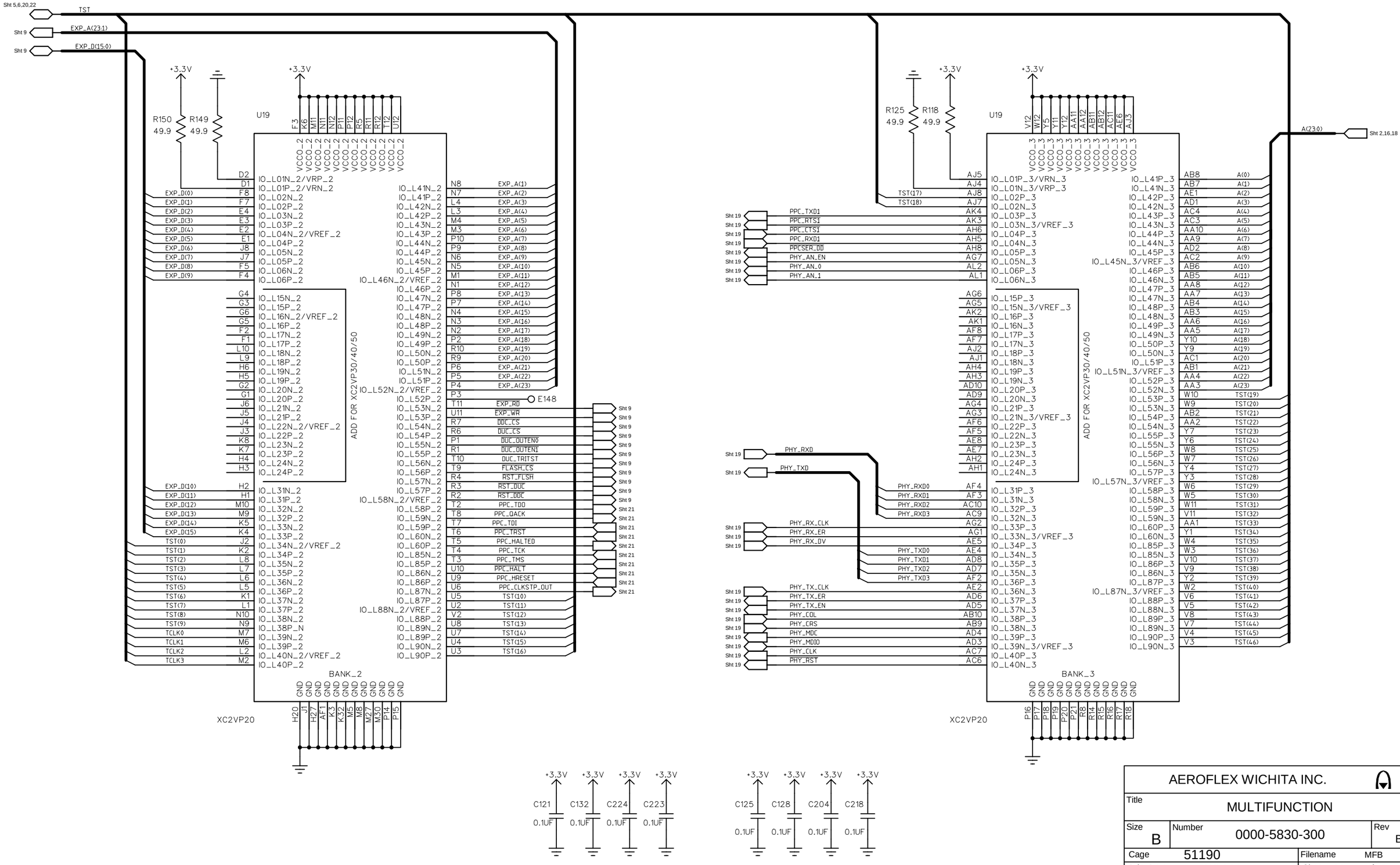
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
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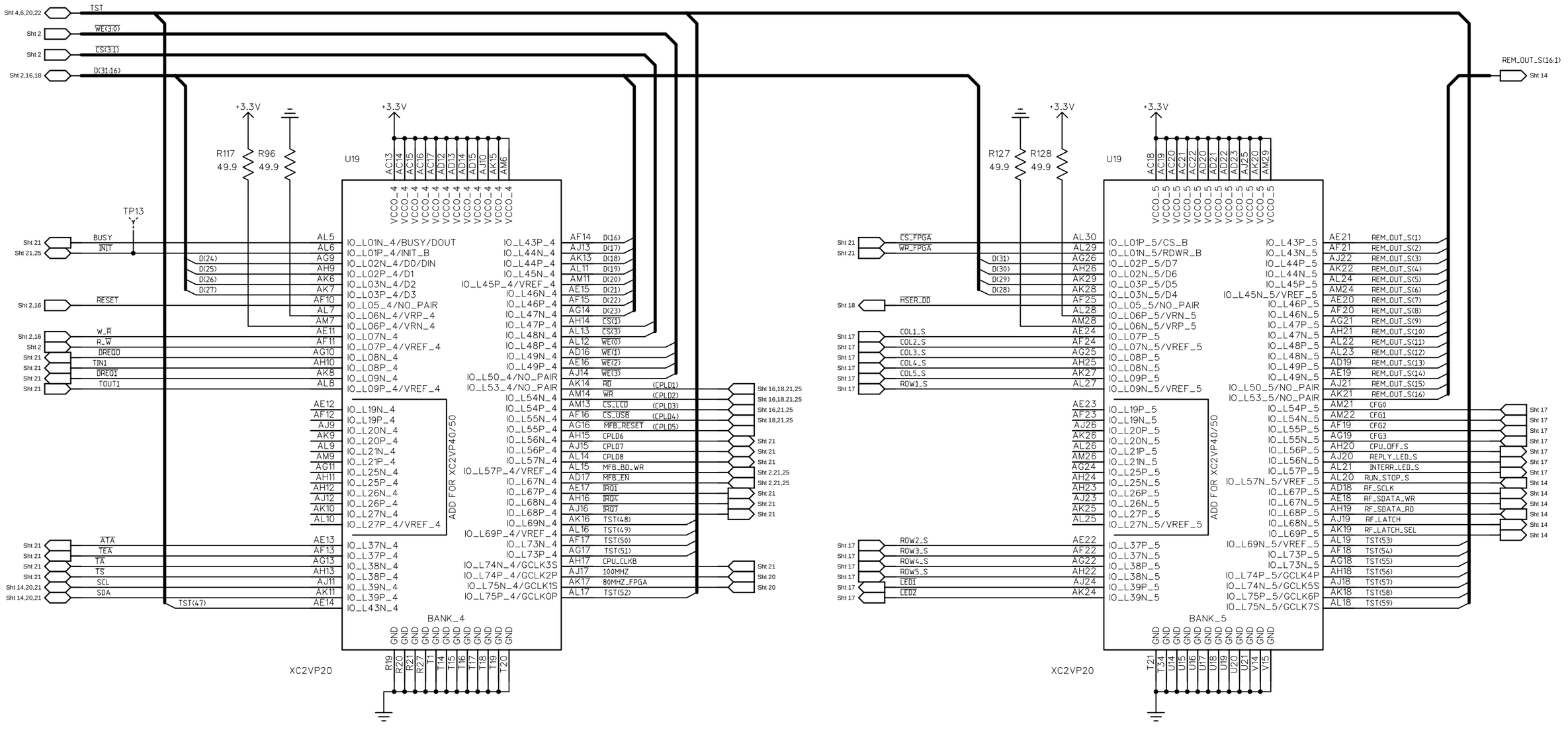
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
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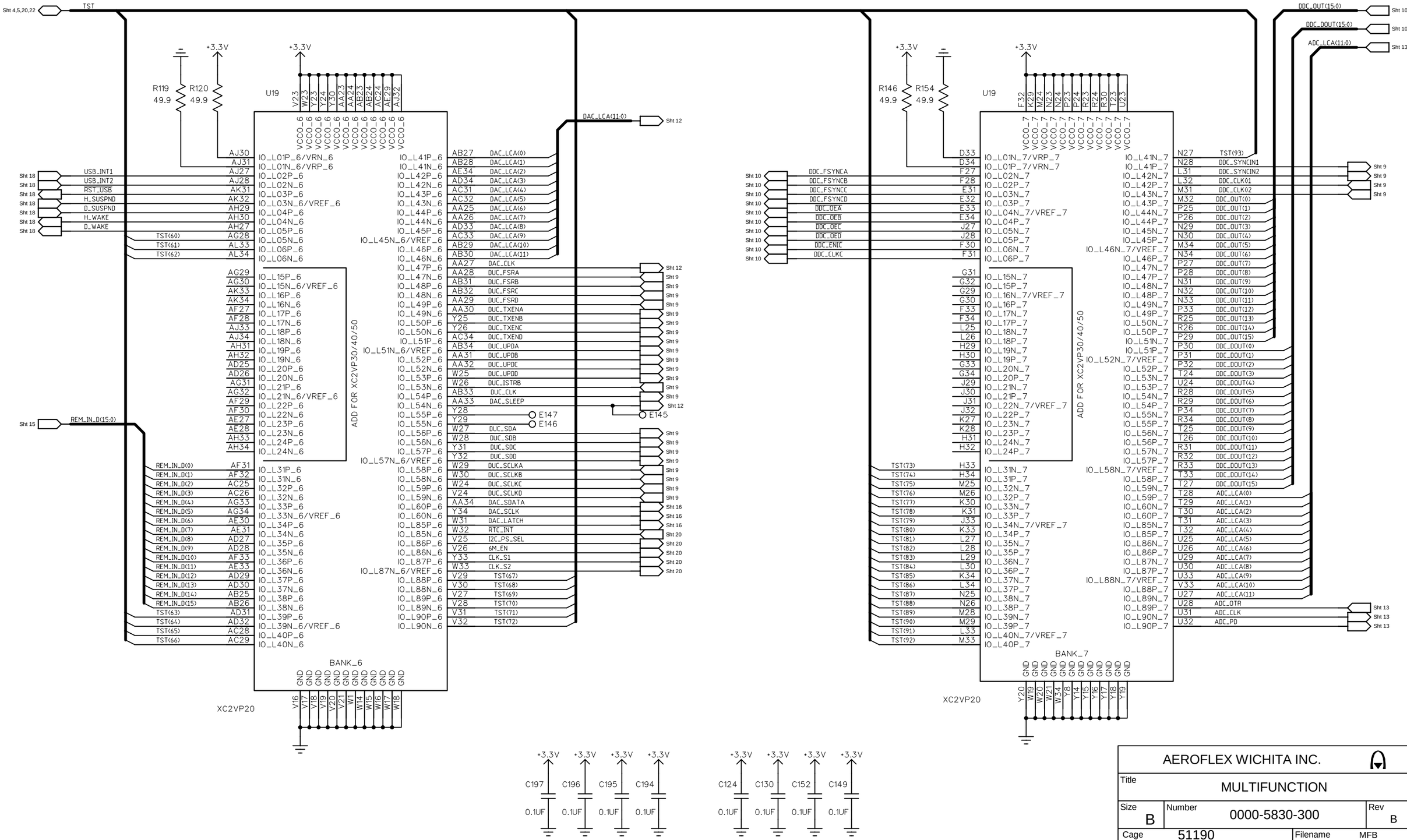
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
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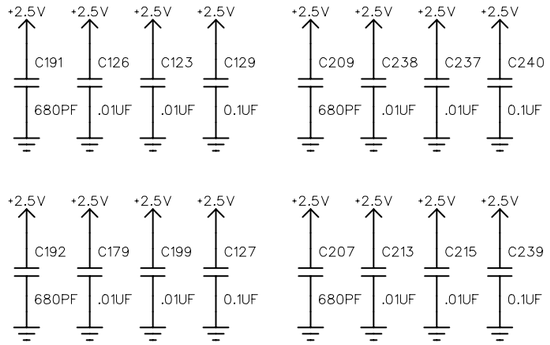
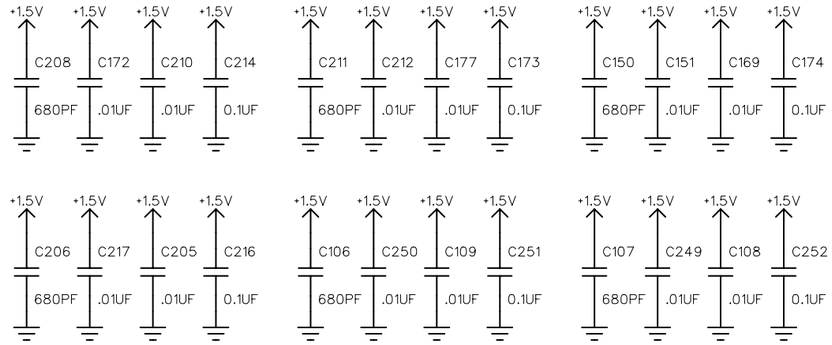
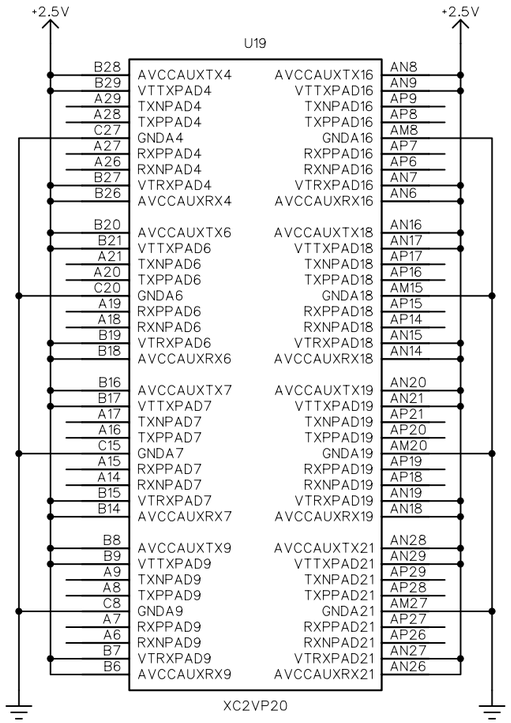
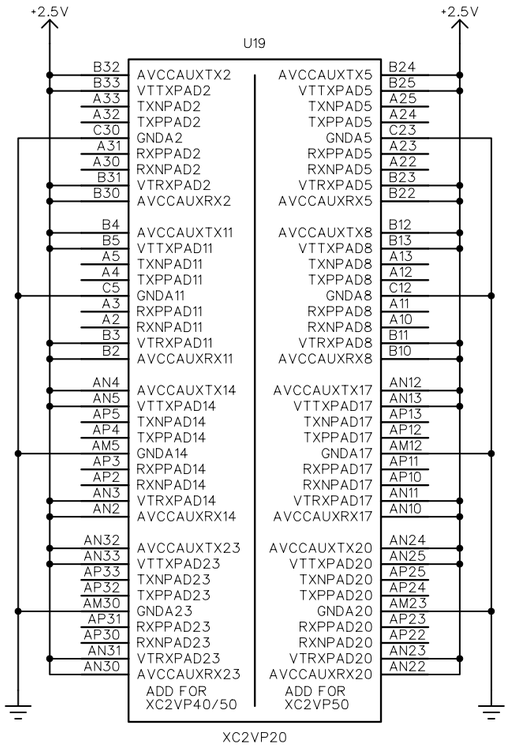
VCCAUX

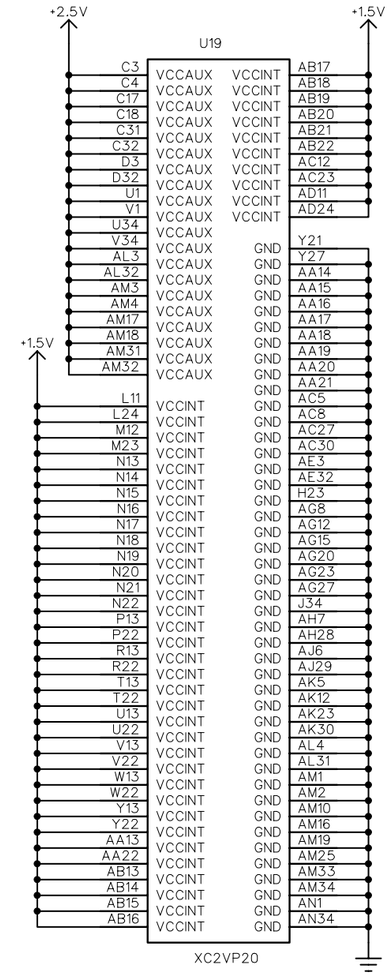


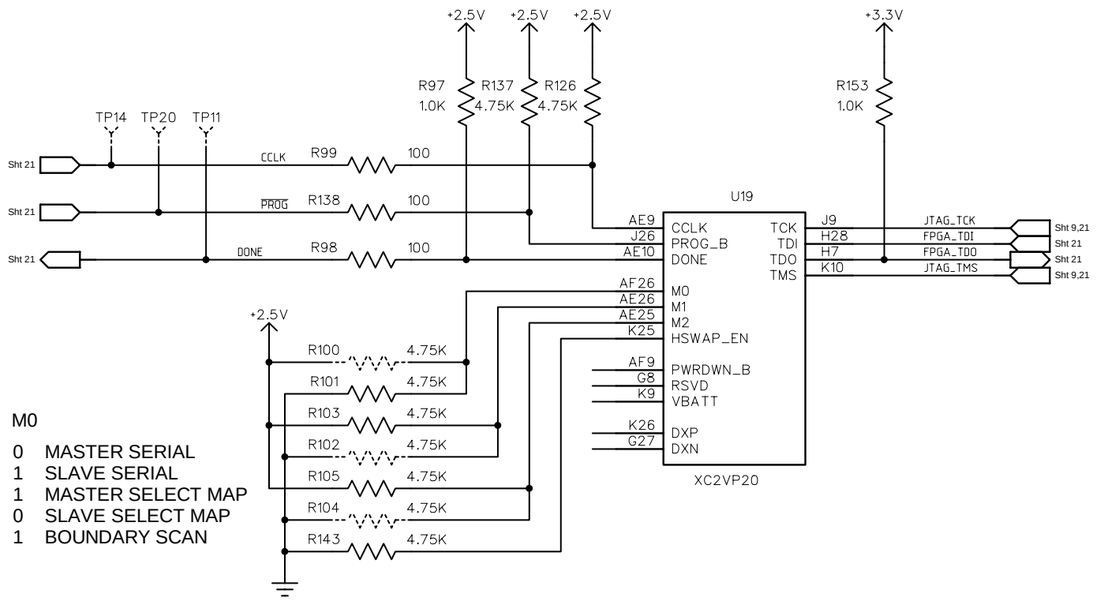
VCCINT











M2	M1	M0	
0	0	0	MASTER SERIAL
1	1	1	SLAVE SERIAL
0	1	1	MASTER SELECT MAP
1	1	0	SLAVE SELECT MAP
1	0	1	BOUNDARY SCAN

AEROFLEX WICHITA INC.			
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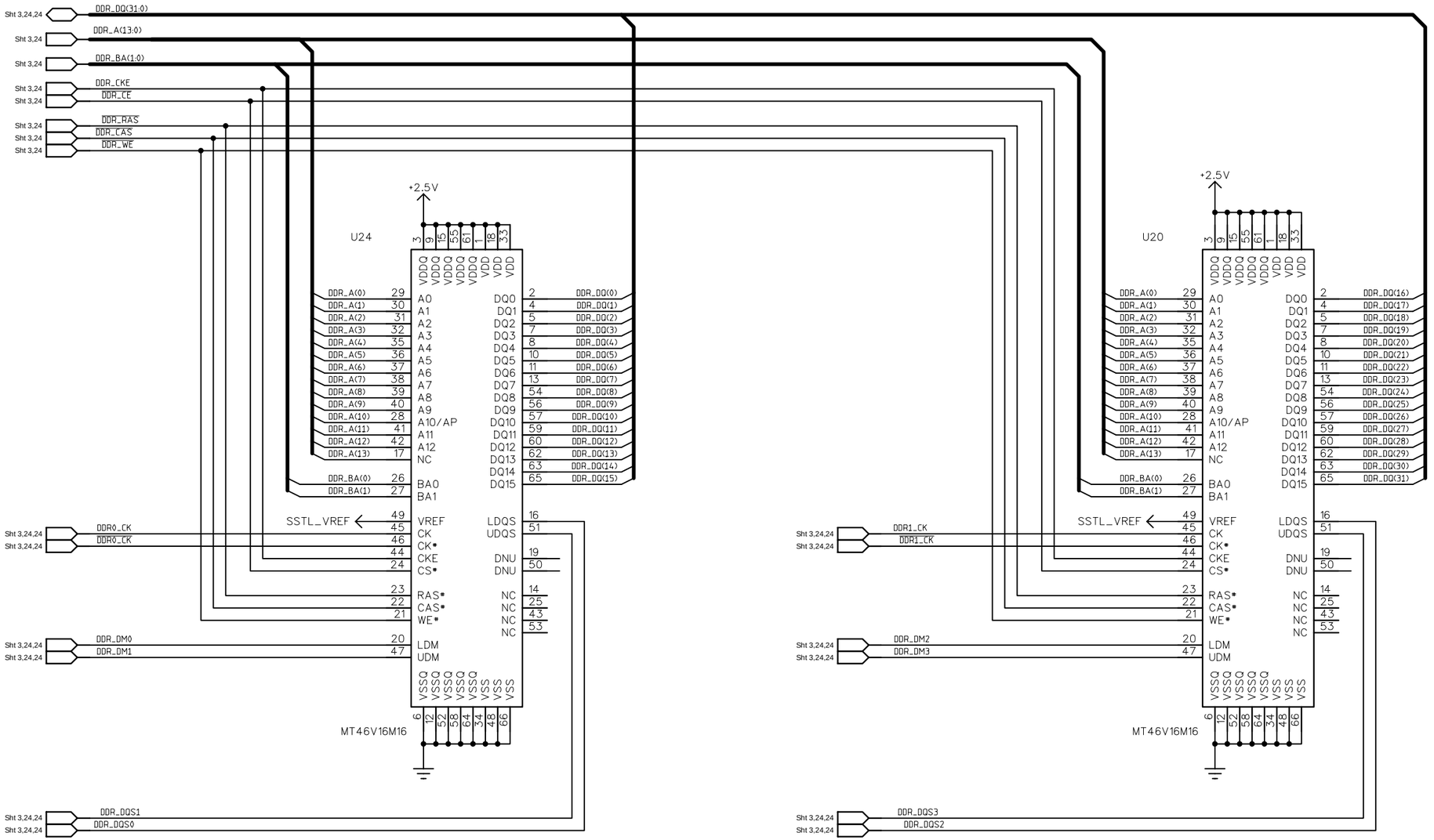
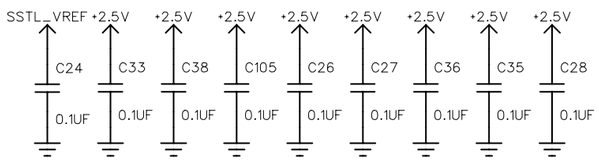
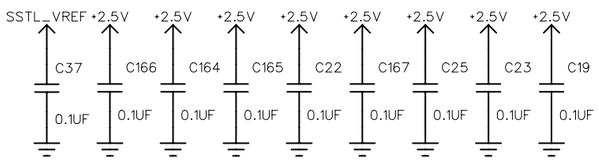
1 2 3 4

A B C D







DDR SDRAM

AEROFLEX WICHITA INC.			
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Cage: 51190		Filename: MFB	
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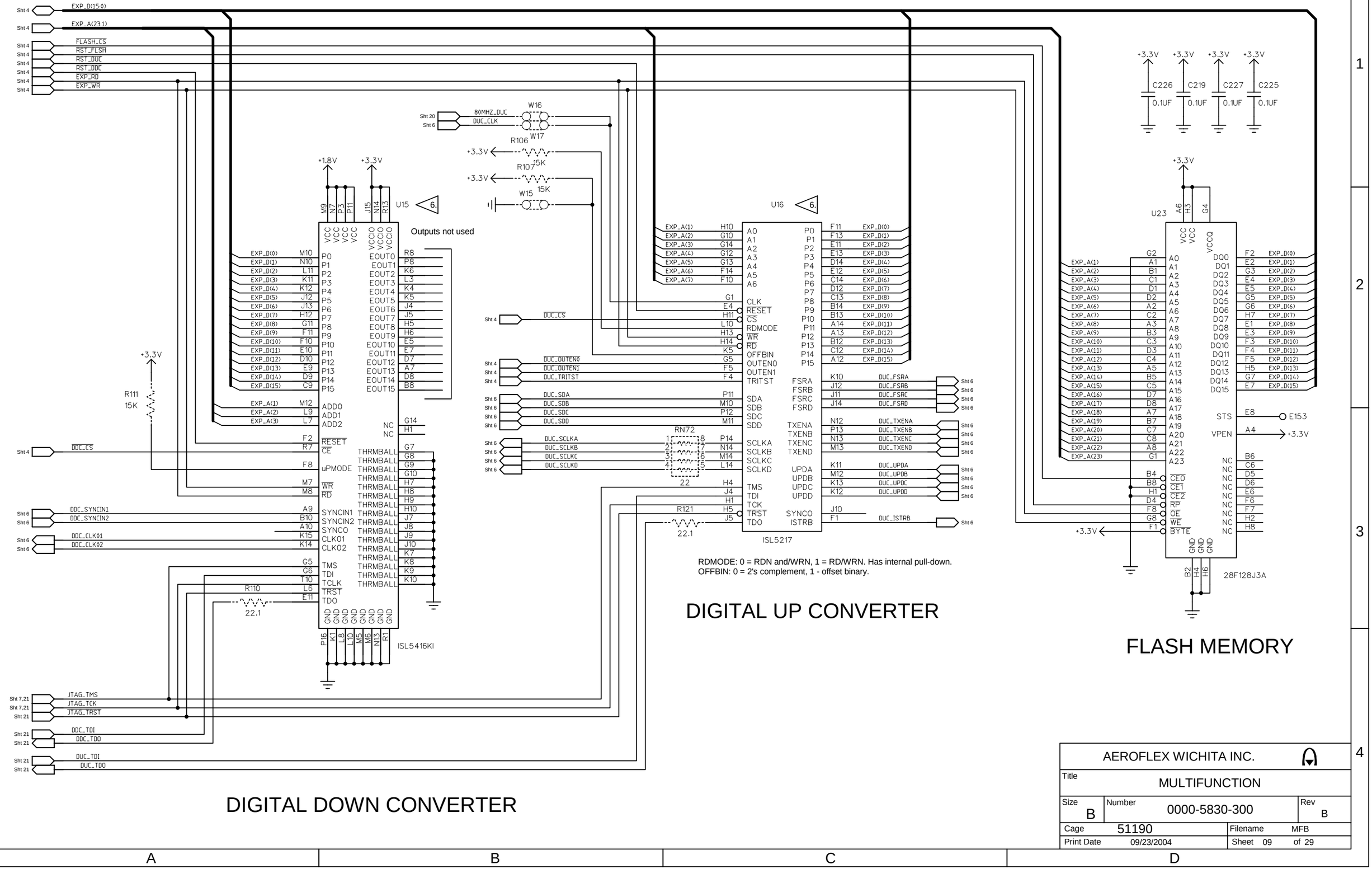
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
Cage 51190	Filename MFB
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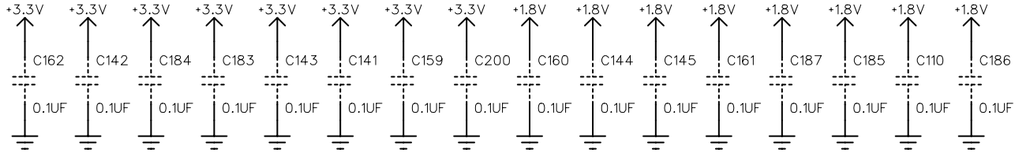

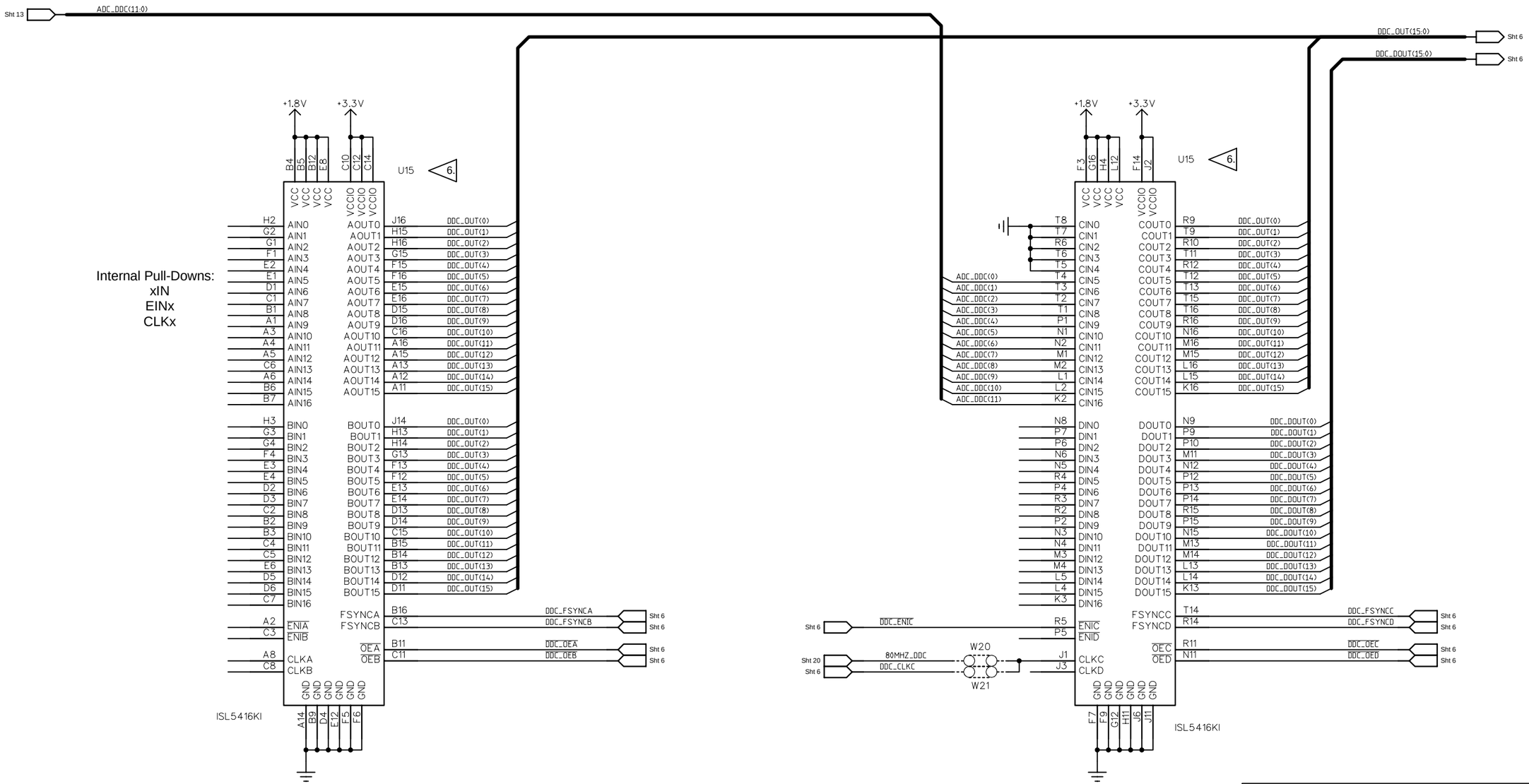

DIGITAL DOWN CONVERTER

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
Cage 51190	Filename MFB
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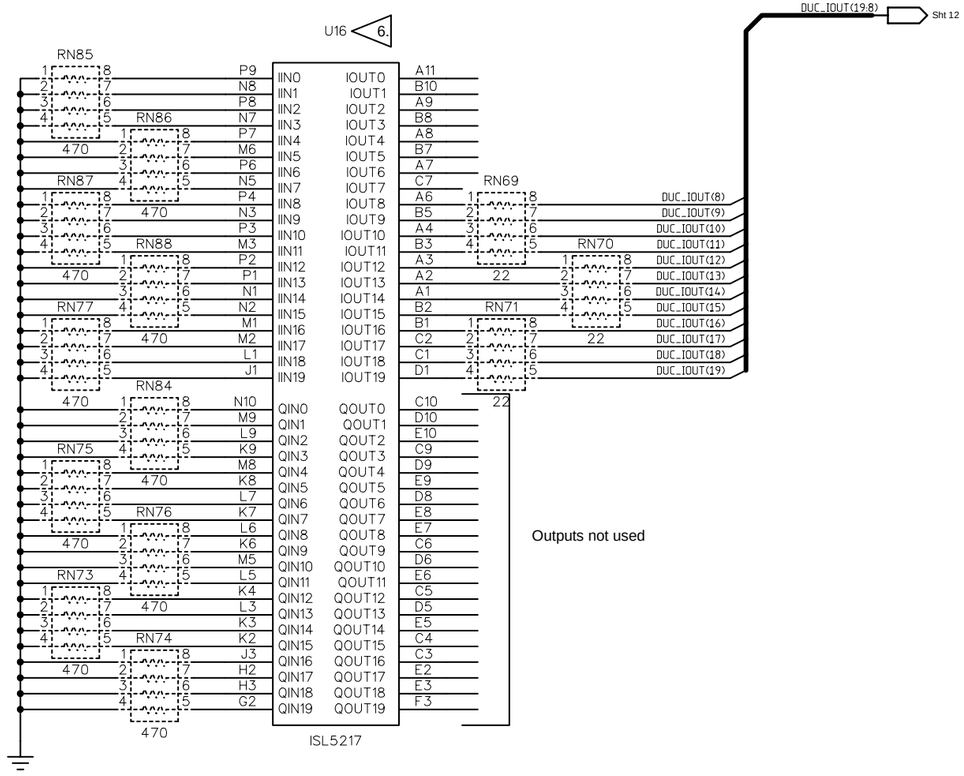
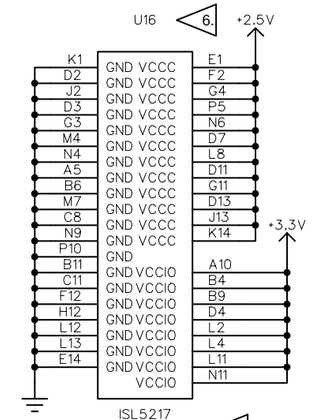
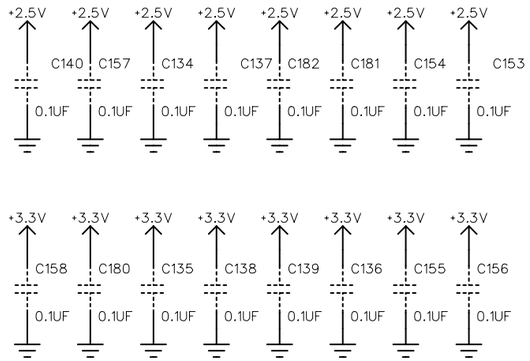


Outputs not used





DIGITAL UP CONVERTER

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
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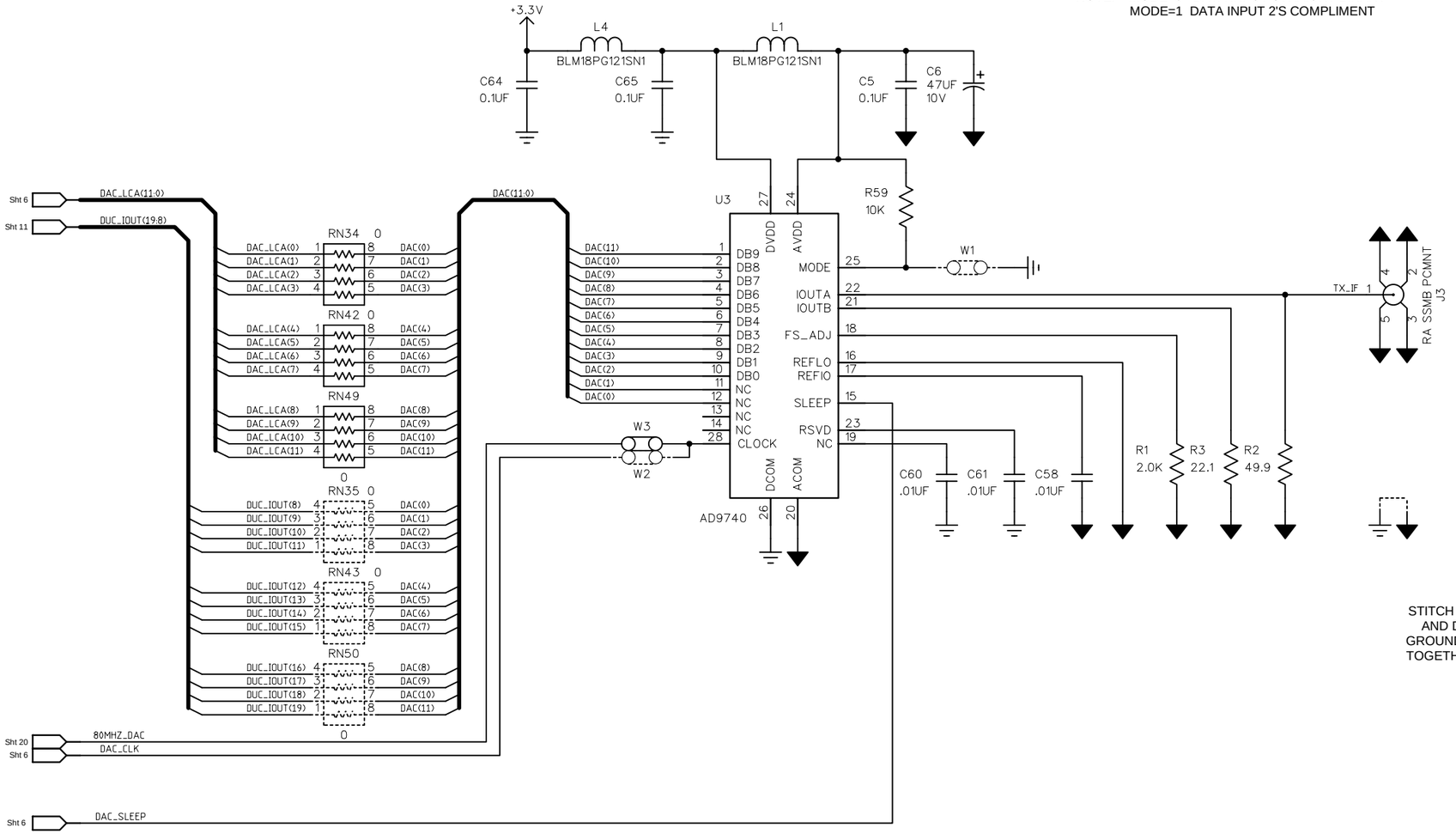
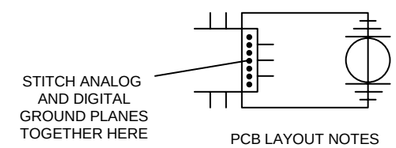
1 2 3 4

A B C D

NOTE: MODE=0 DATA INPUT STRAIGHT BINARY
MODE=1 DATA INPUT 2'S COMPLIMENT





10-BIT DAC, 23 MHZ IF

AEROFLEX WICHITA INC.			
Title: MULTIFUNCTION			
Size: B	Number: 0000-5830-300		Rev: B
Cage: 51190		Filename: MFB	
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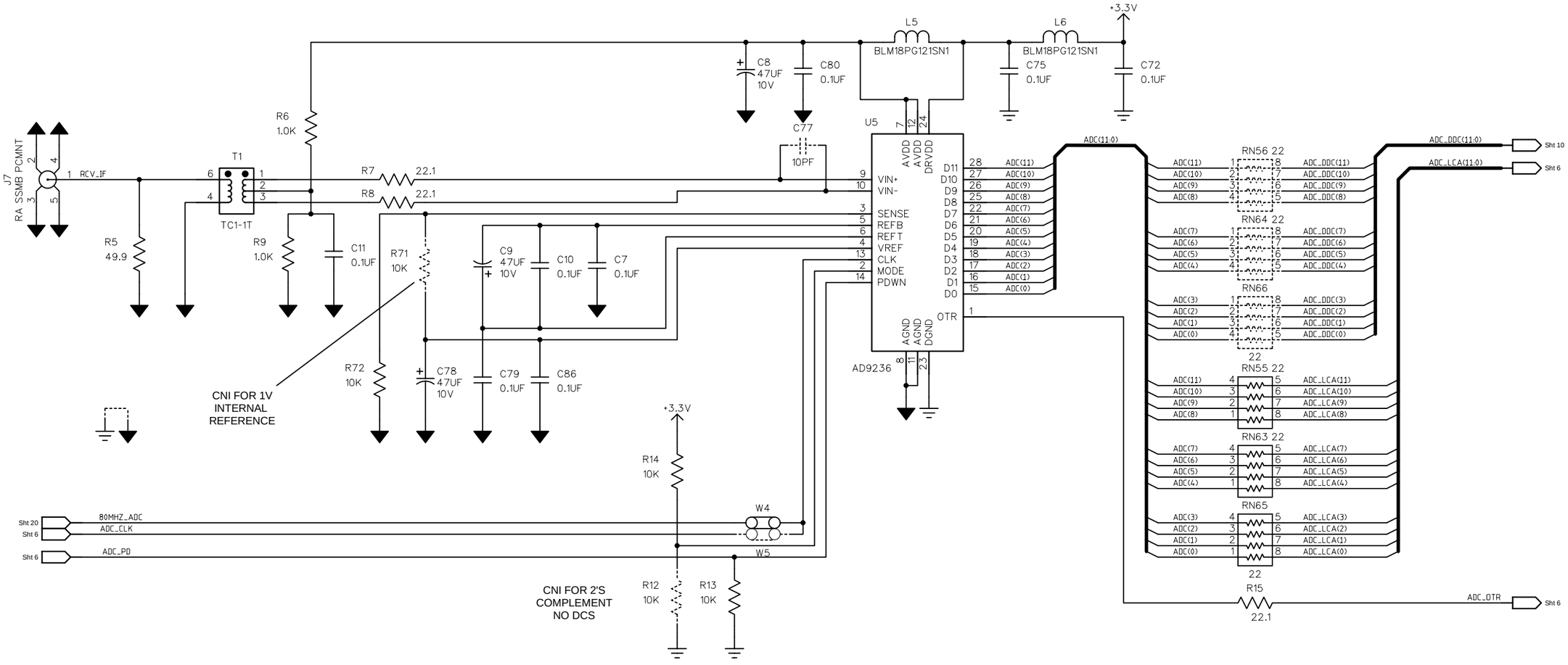
1 2 3 4

A B C D



PCB LAYOUT NOTES

12-BIT ADC, 60 MHZ IF

AEROFLEX WICHITA INC.			
Title	MULTIFUNCTION		
Size B	Number 0000-5830-300		Rev B
Cage 51190		Filename MFB	
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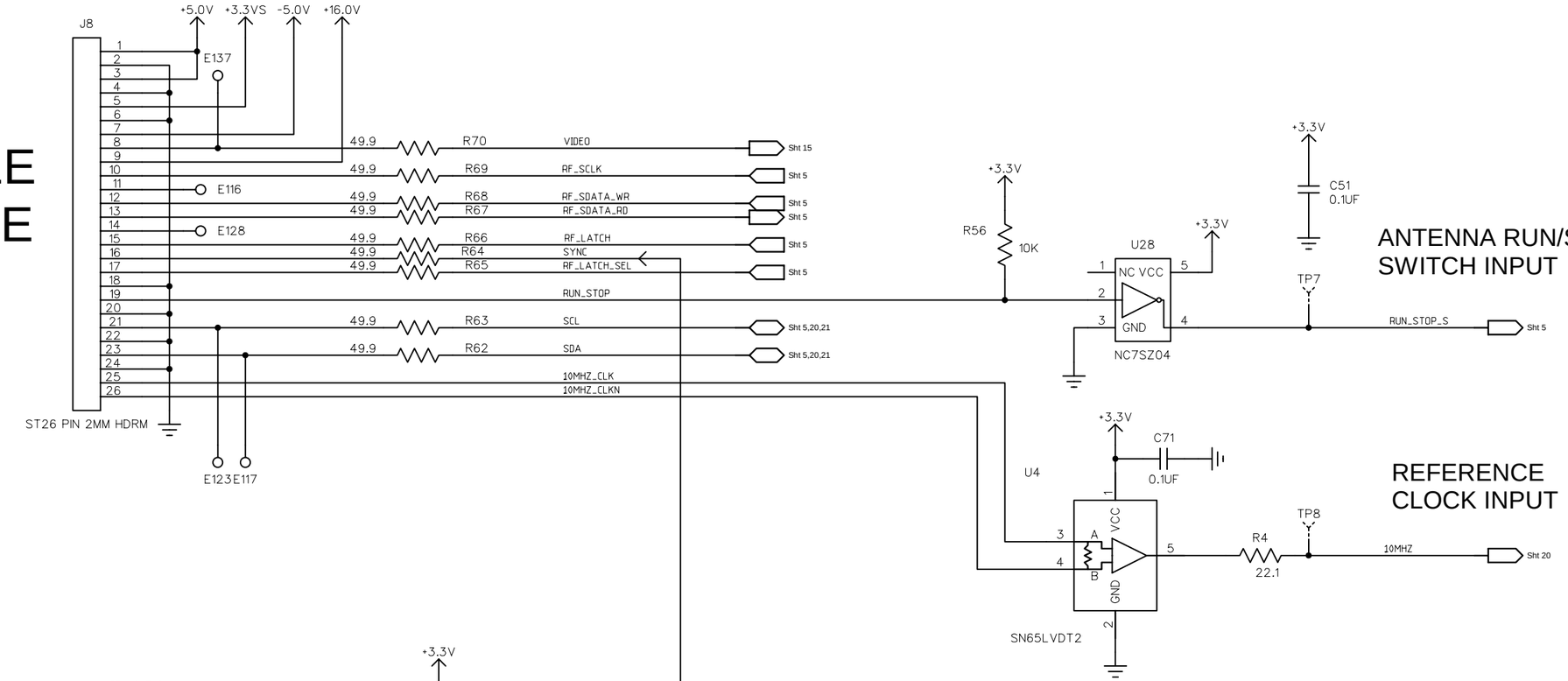
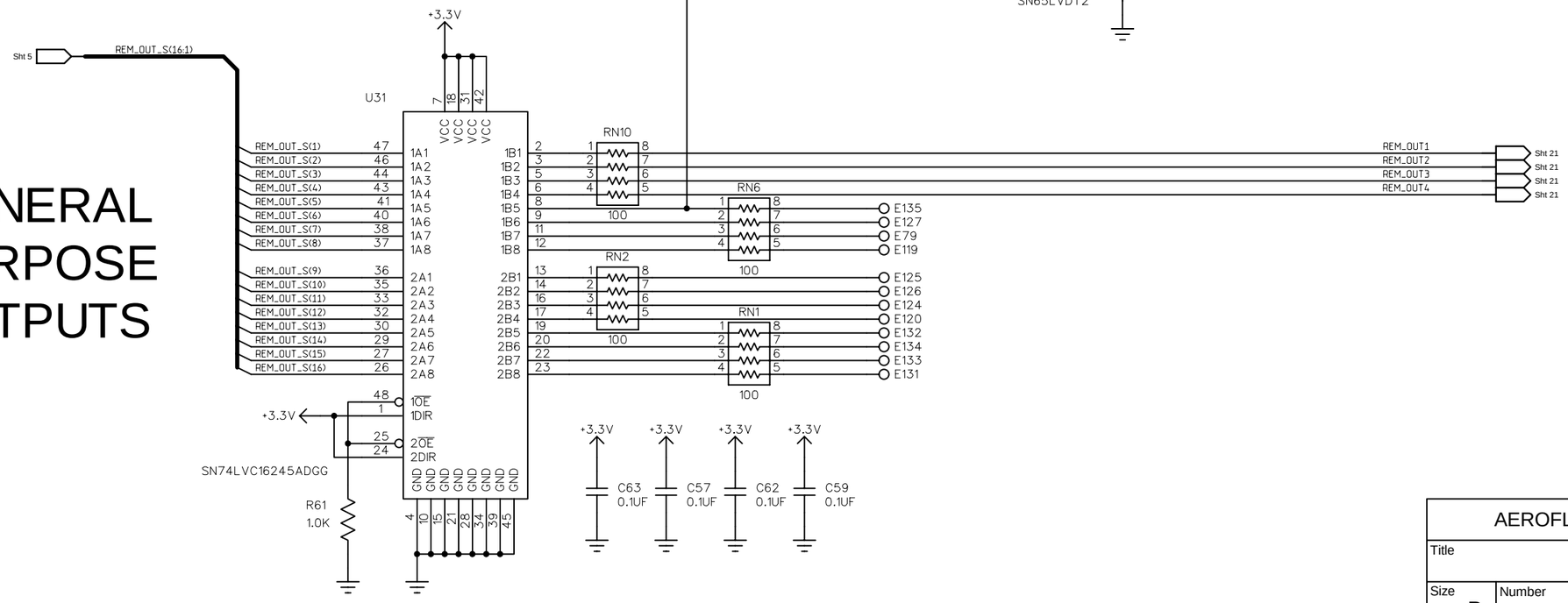
1 2 3 4

A B C D

RF MODULE INTERFACE



GENERAL PURPOSE OUTPUTS



AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
Cage 51190	Filename MFB
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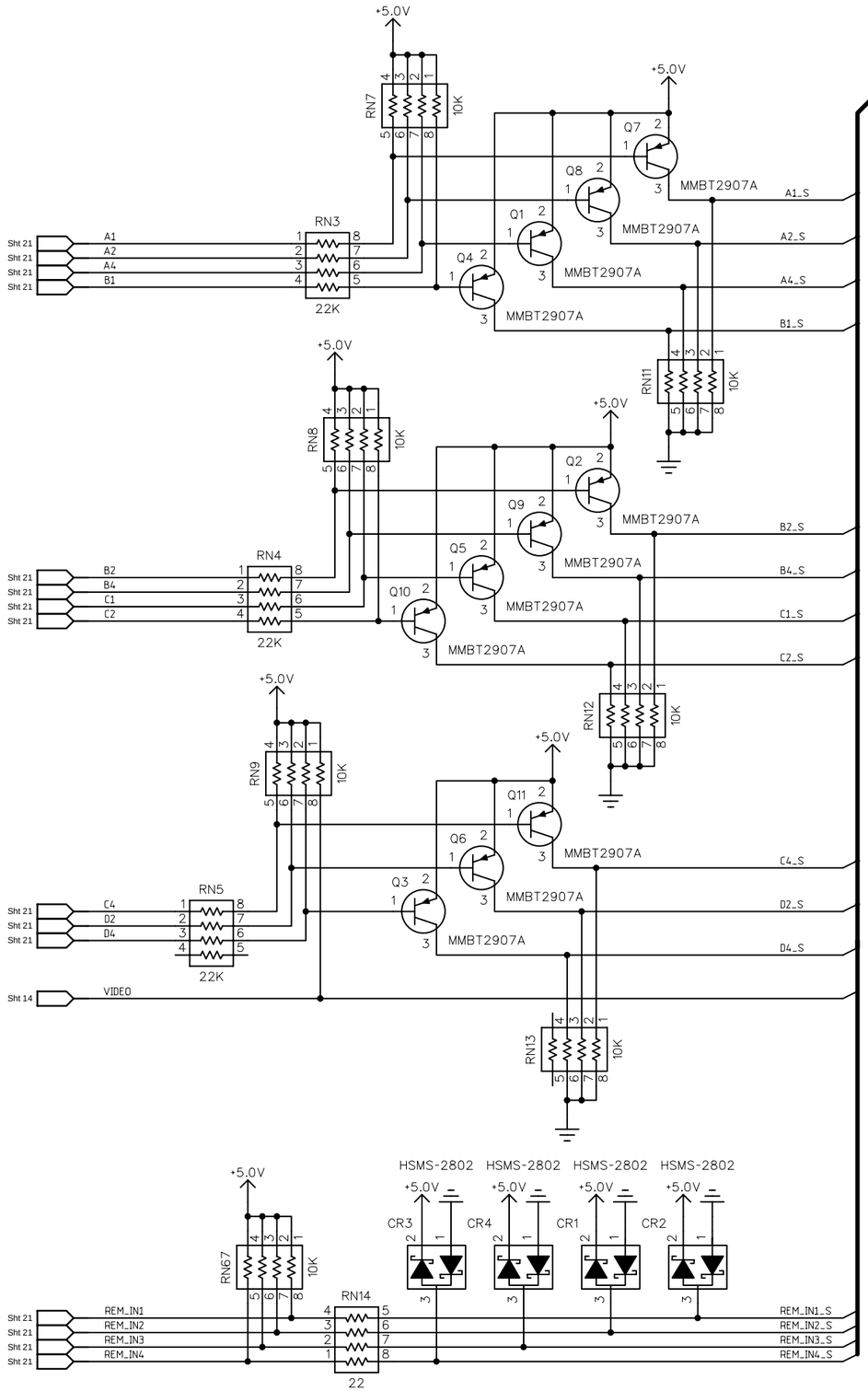

ALTITUDE ENCODER INPUTS, GENERAL PURPOSE INPUTS and VIDEO INPUT

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
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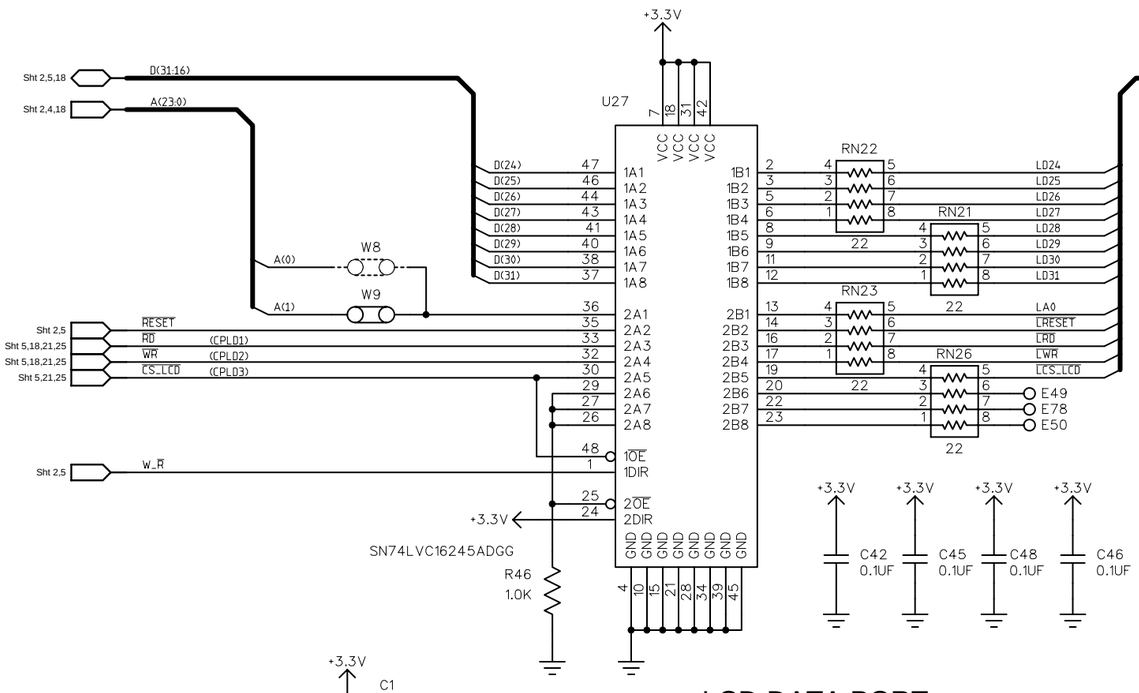
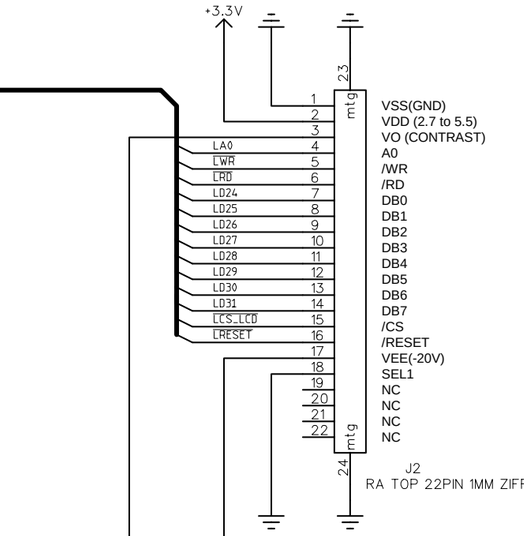
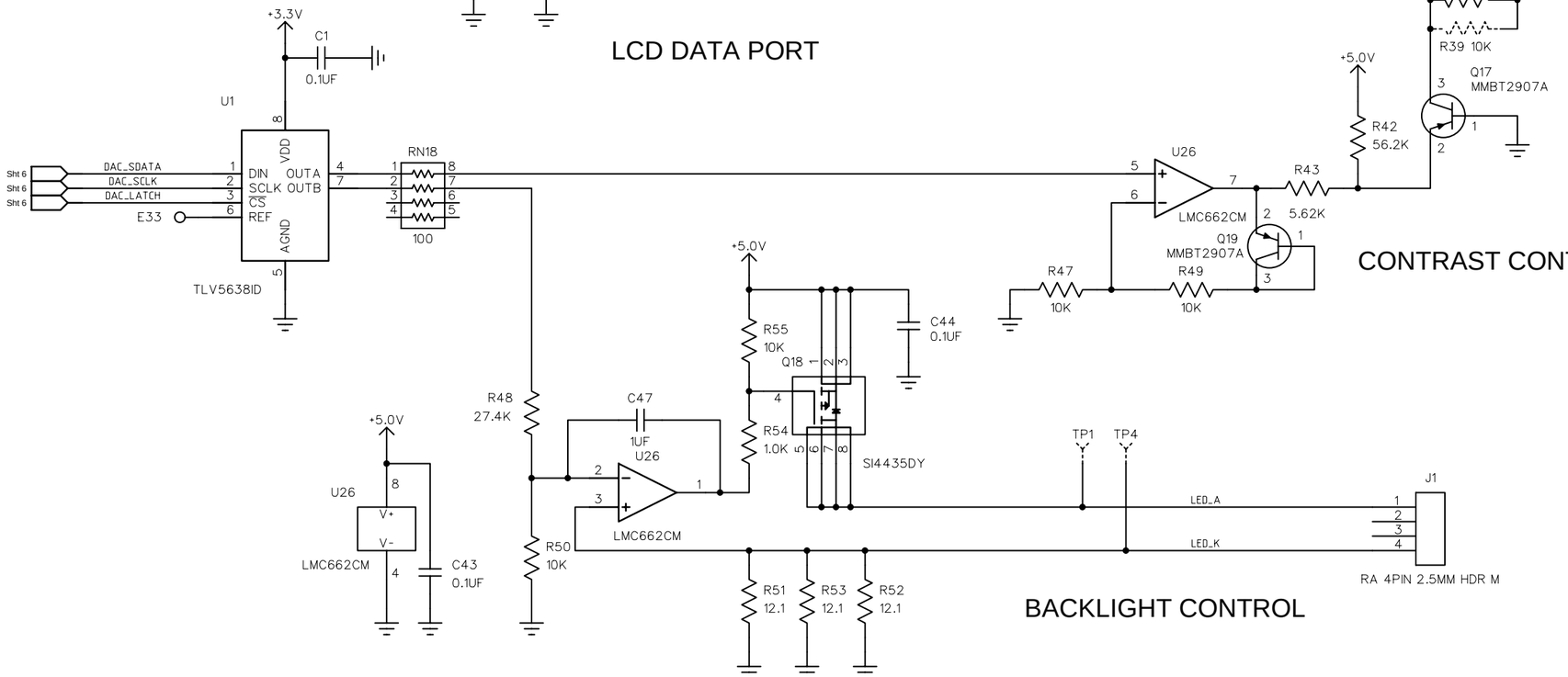


LCD DATA PORT



MICROTIPS TECHNOLOGY INC. DISPLAY



CONTRAST CONTROL

BACKLIGHT CONTROL

LCD INTERFACE

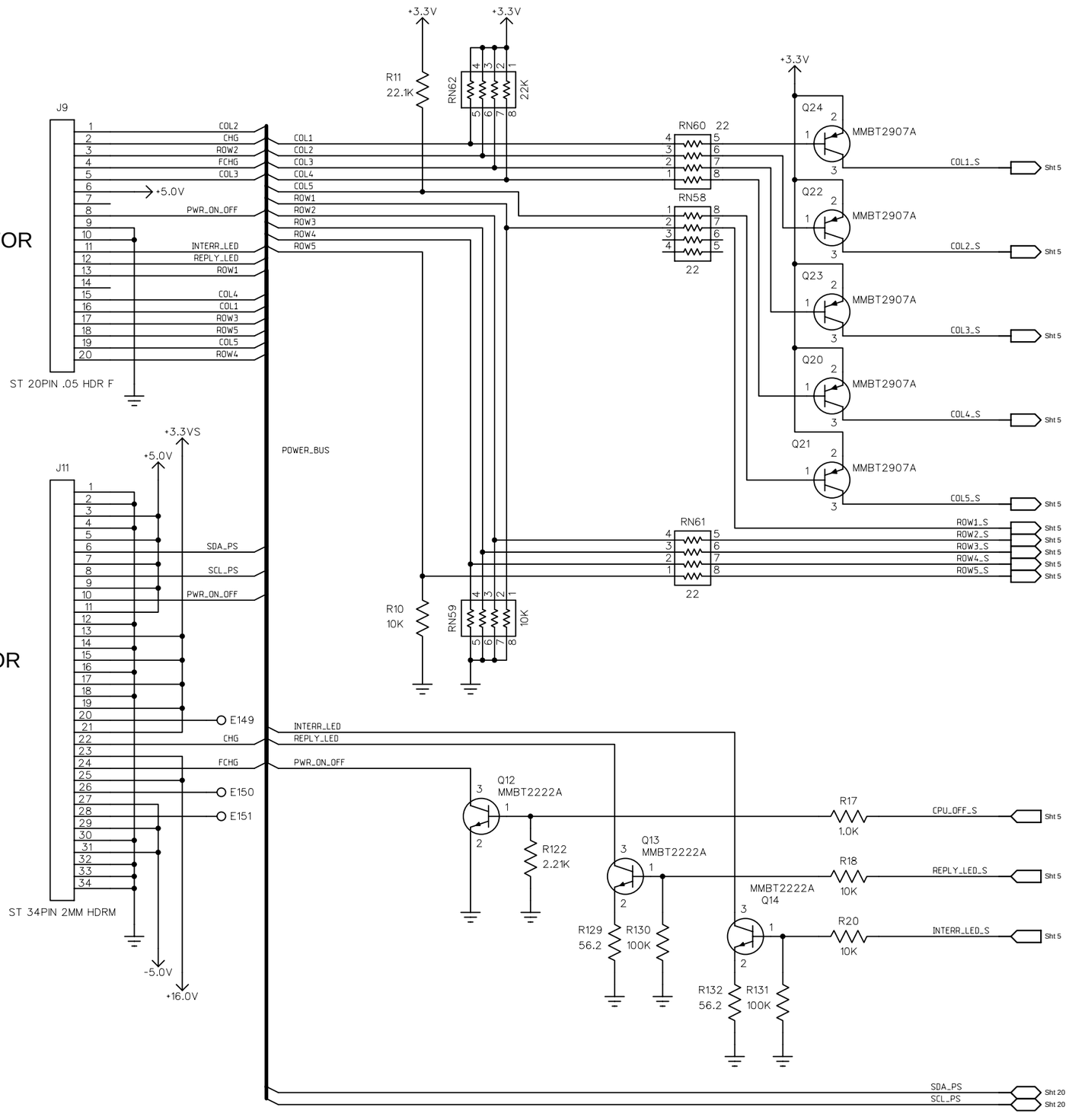
AEROFLEX WICHITA INC.			
Title: MULTIFUNCTION			
Size: B	Number: 0000-5830-300		Rev: B
Cage: 51190		Filename: MFB	
Print Date: 09/28/2004		Sheet 16 of 29	

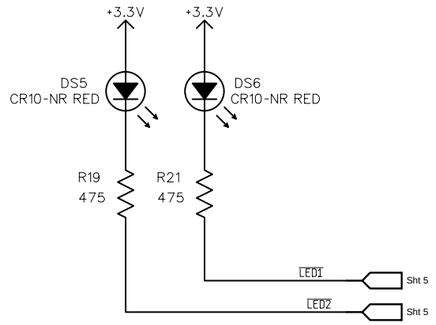
1 2 3 4

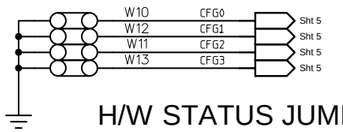
A B C D

KEYPAD CONNECTOR

POWER SUPPLY CONNECTOR







H/W STATUS JUMPERS

0000	INITIAL CONFIGURATION, REV A

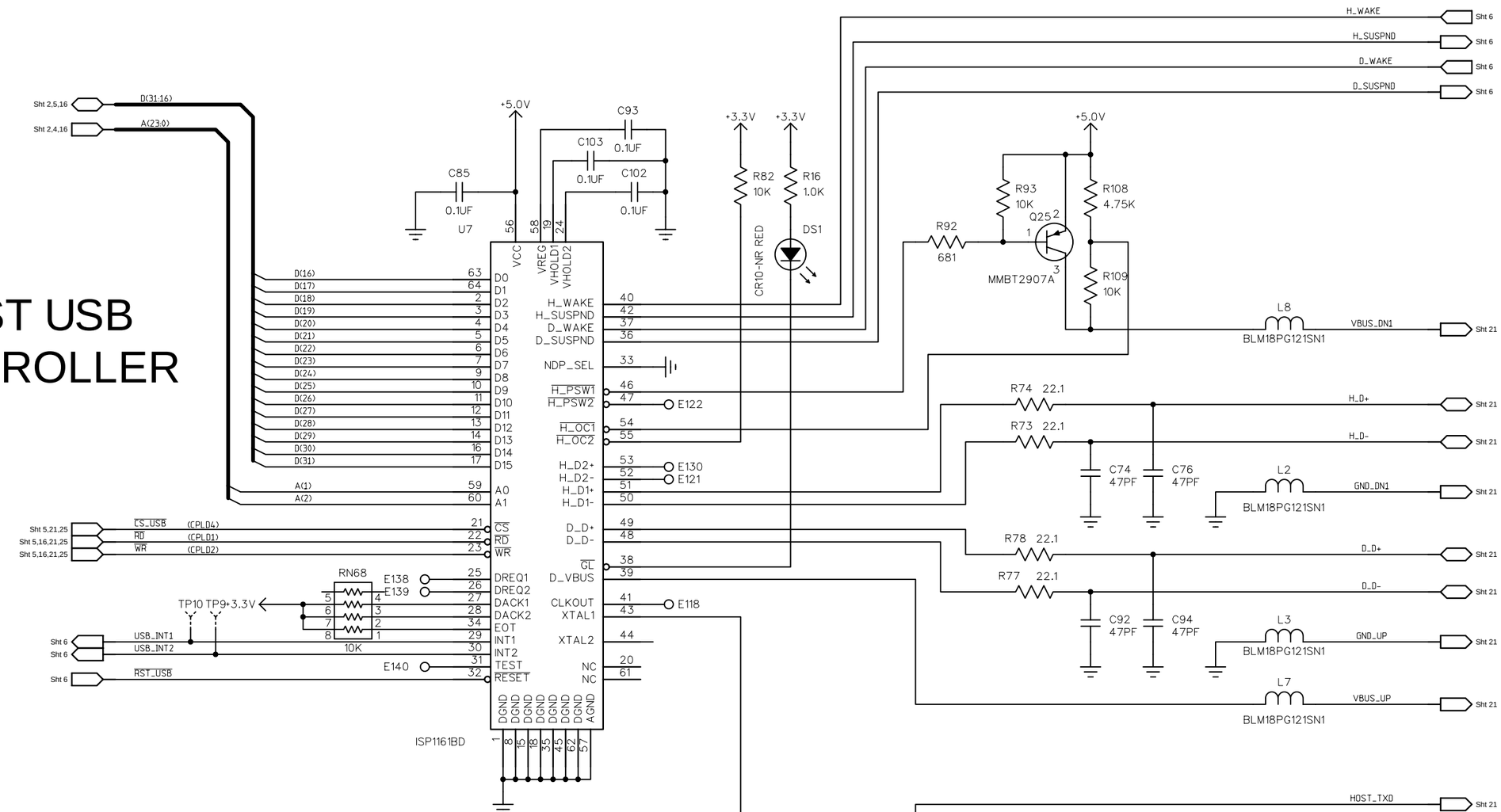
KEYPAD, POWER SUPPLY and RTC I/F

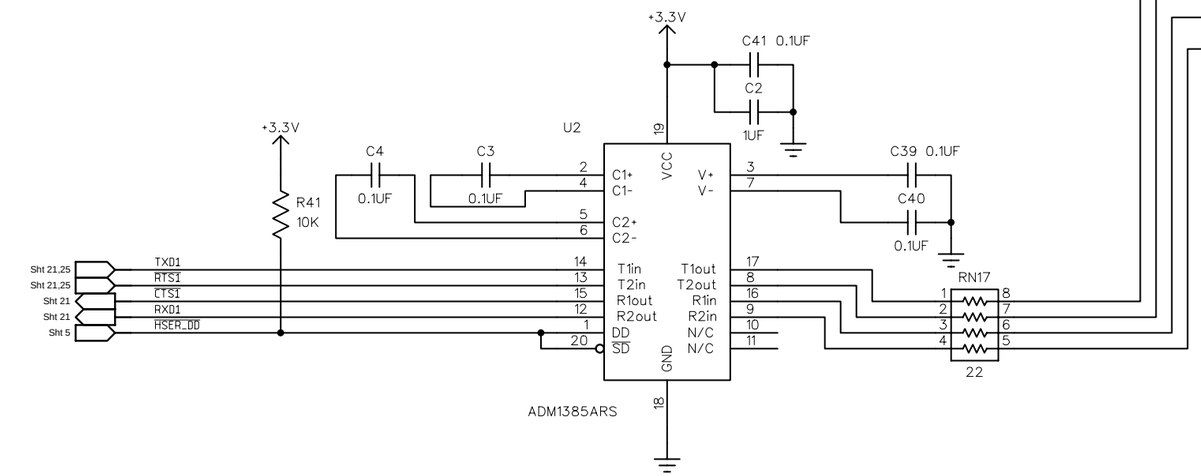
AEROFLEX WICHITA INC.			
Title: MULTIFUNCTION			
Size: B	Number: 0000-5830-300		Rev: B
Cage: 51190		Filename: MFB	
Print Date: 09/28/2004		Sheet 17 of 29	

1 2 3 4

A B C D

HOST USB CONTROLLER





HOST RS-232 TRANSLATOR

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
Cage 51190	Filename MFB
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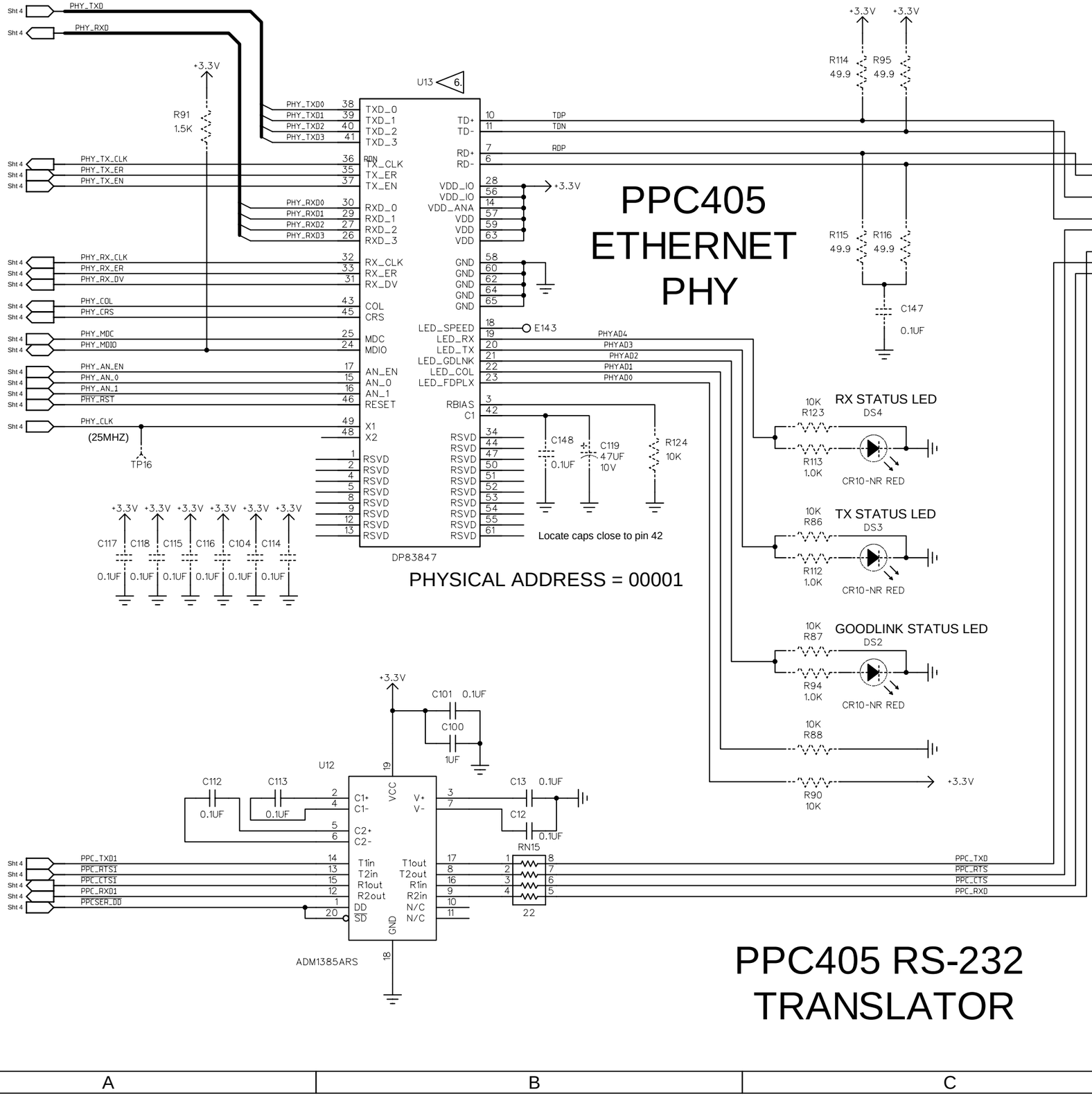
1 2 3 4

A B C D

PPC405 ETHERNET PHY



PPC405 RS-232 TRANSLATOR

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
Cage 51190	Filename MFB
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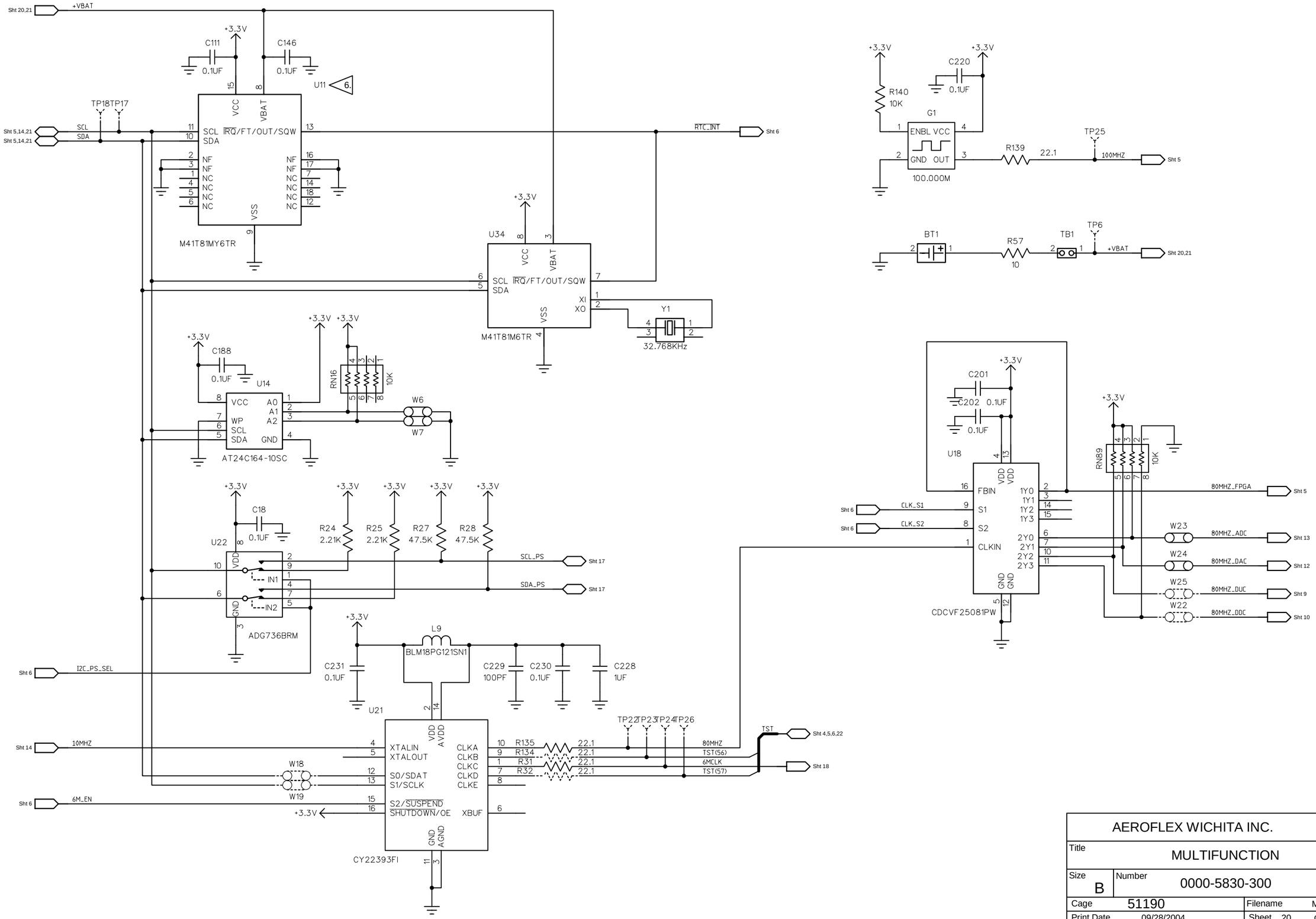
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B	Number 0000-5830-300 Rev B
Cage 51190	Filename MFB
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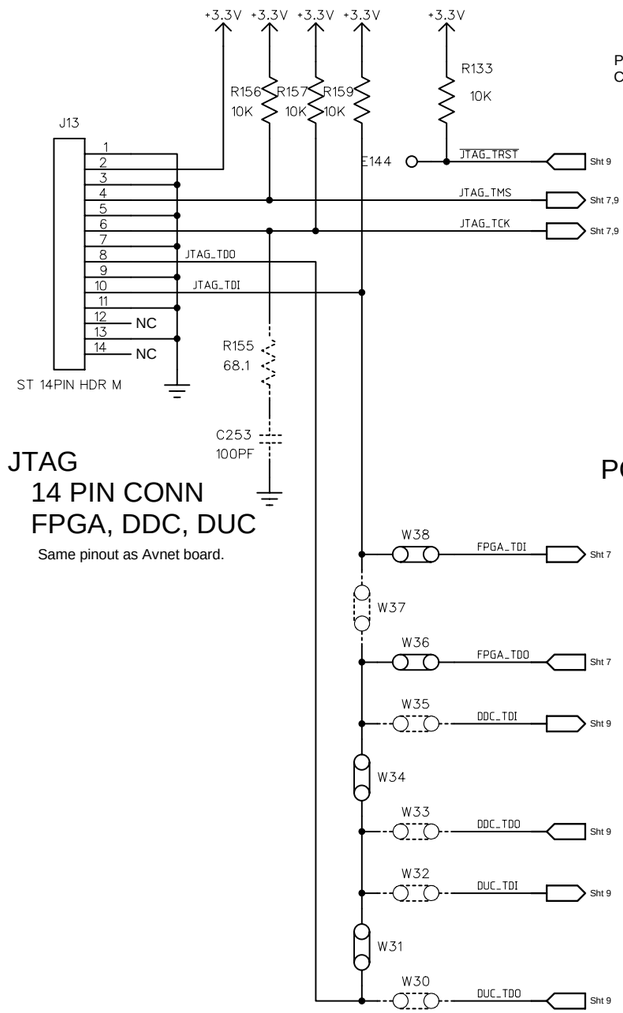
1 2 3 4

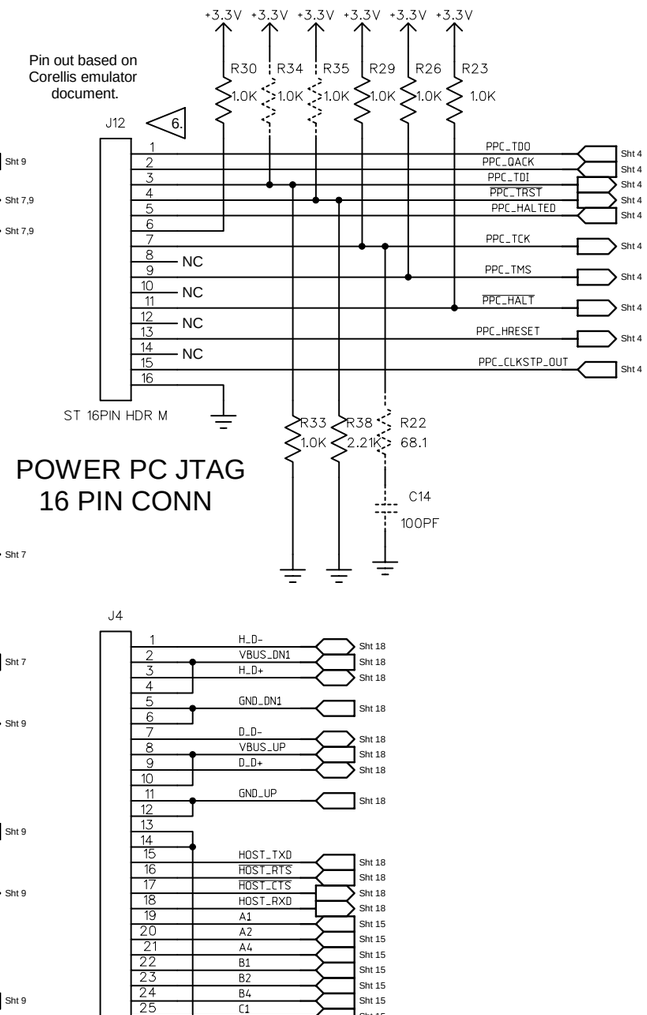
A B C D



JTAG
14 PIN CONN
FPGA, DDC, DUC

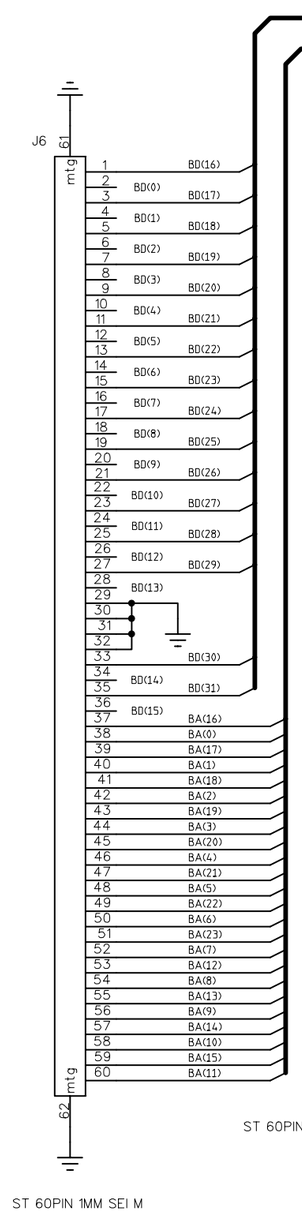
Same pinout as Avnet board.

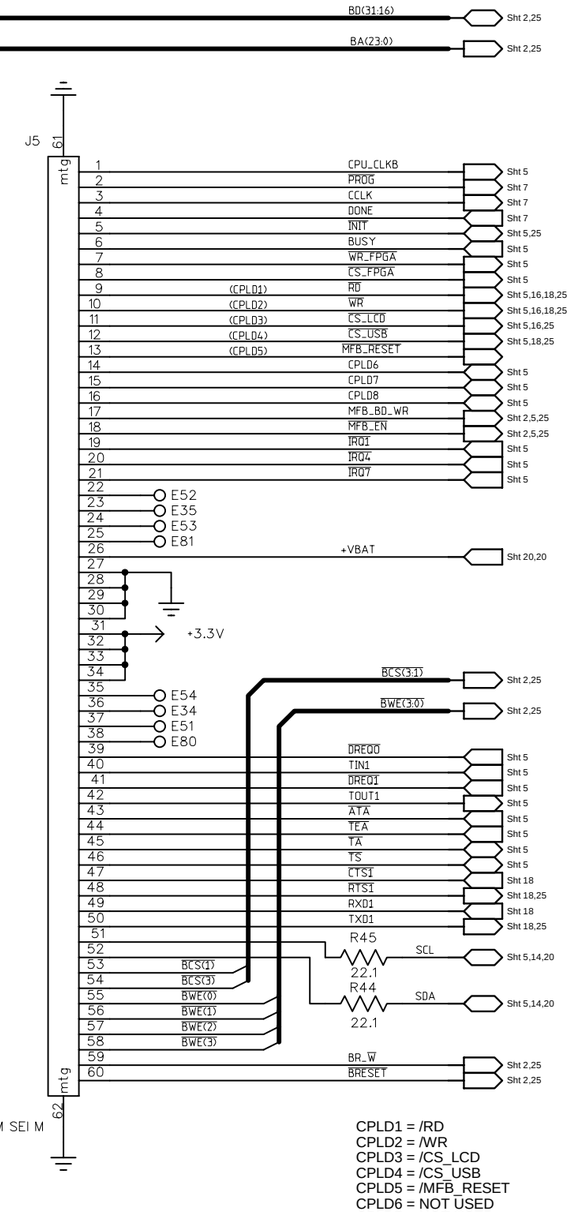
Pin out based on Corellis emulator document.



POWER PC JTAG
16 PIN CONN

REMOTE
40 PIN CONN
USB, RS-232
GP I/O, ALT ENCODER





CPLD1 = /RD
CPLD2 = /WR
CPLD3 = /CS_LCD
CPLD4 = /CS_USB
CPLD5 = /MFB_RESET
CPLD6 = NOT USED
CPLD7 = NOT USED
CPLD8 = NOT USED

CONNECTORS

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B / Number	0000-5830-300 / Rev B
Cage 51190	Filename MFB
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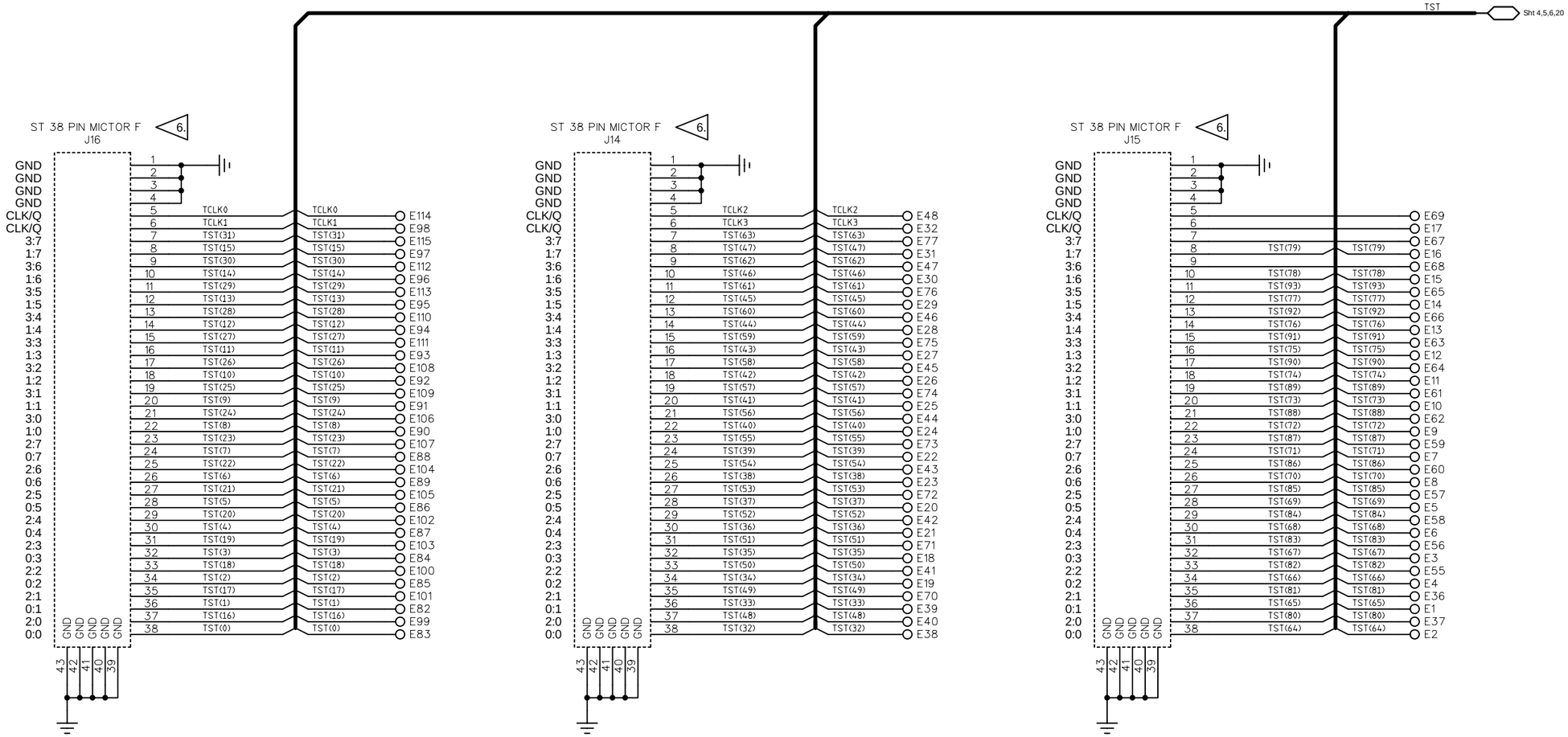
1 2 3 4

A B C D

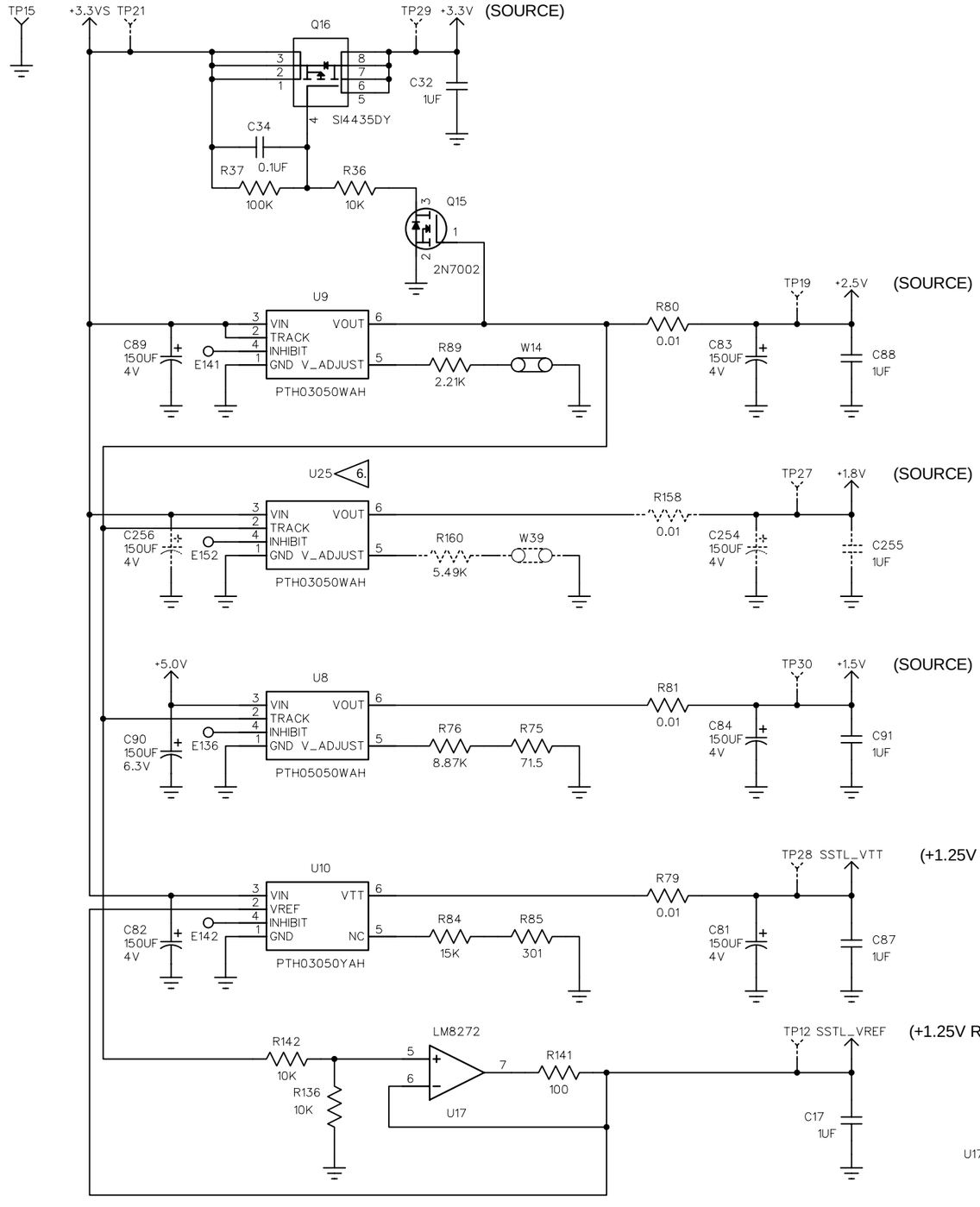


MICTOR TEST CONNECTORS

AEROFLEX WICHITA INC.			
Title	MULTIFUNCTION		
Size B	Number 0000-5830-300		Rev B
Cage 51190		Filename MFB	
Print Date 09/23/2004		Sheet 22 of 29	

1 2 3 4

A B C D



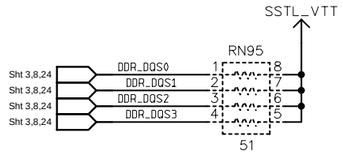
POWER SUPPLIES

AEROFLEX WICHITA INC.			
Title: MULTIFUNCTION			
Size: B	Number: 0000-5830-300		Rev: B
Cage: 51190		Filename: MFB	
Print Date: 02/25/2005		Sheet 23 of 29	

1 2 3 4

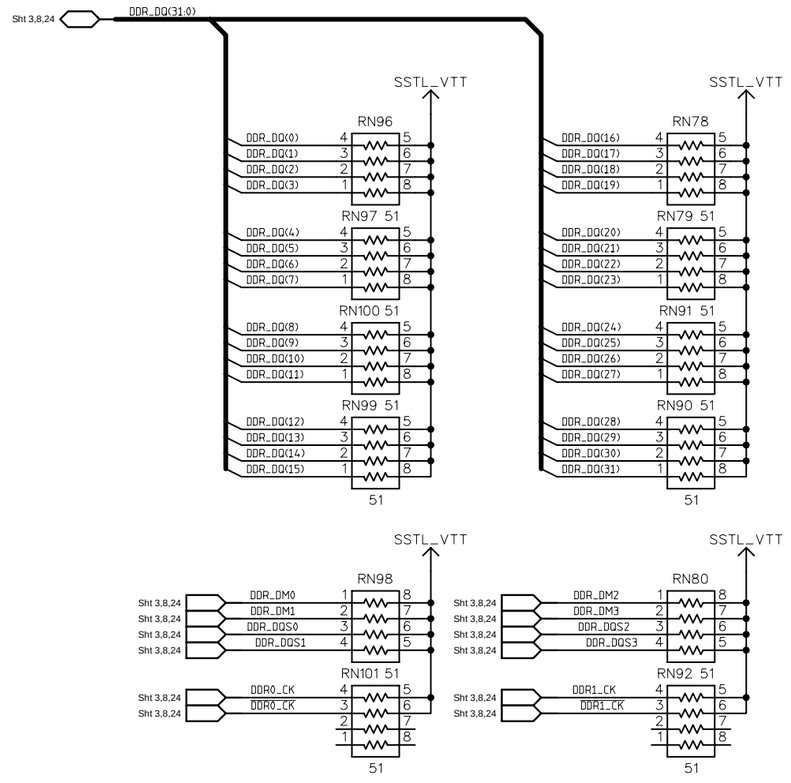
A B C D

DQ, DM, DQS, CK, CKn



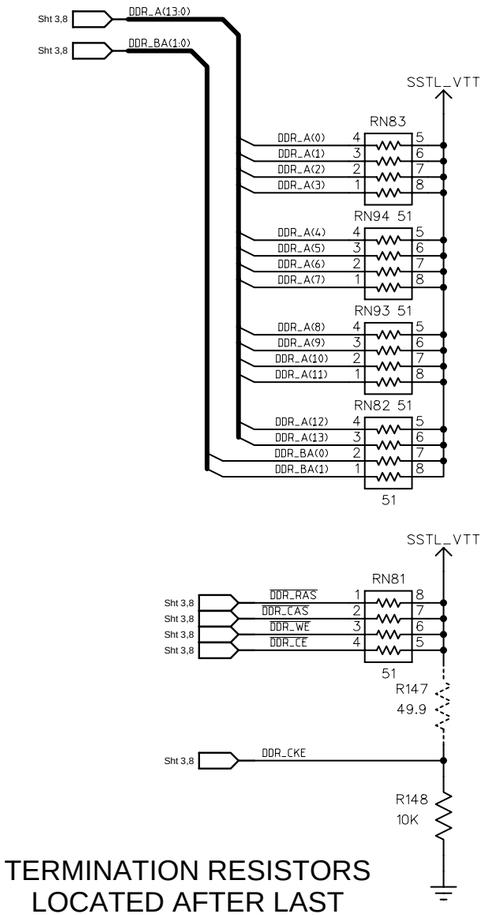
TERMINATION RESISTORS
LOCATED CLOSE TO FPGA

DQ, DM, DQS, CK, CKn



TERMINATION RESISTORS
LOCATED CLOSE TO MEMORY

A, BA,, RASn, CASn, WEn, CEn, CKE



TERMINATION RESISTORS
LOCATED AFTER LAST
SDRAM IN DAISY CHAIN

DDR SDRAM TERMINATION RESISTORS

AEROFLEX WICHITA INC.			
Title: MULTIFUNCTION			
Size: B	Number: 0000-5830-300		Rev: B
Cage: 51190		Filename: MFB	
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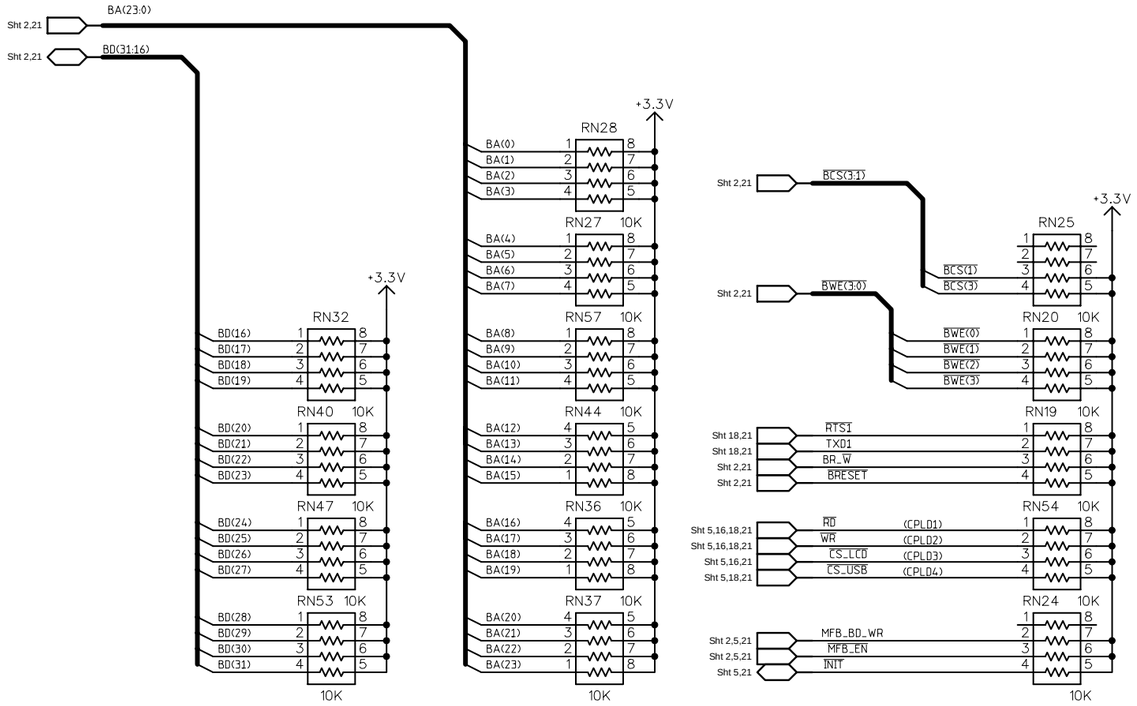
A B C D

1 2 3 4



HOST BUS TERMINATION RESISTORS

AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
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Cage 51190	Filename MFB
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1 2 3 4

A B C D

MODULE BLOCK DIAGRAM

PROCESSOR BUS
+3.3V
+3.3V
HOST BUS I/F
+3.3V
RTC
+3.3V
EEPROM
+3.3V
+3.3V
+3.3V
FPGA
+1.25V
+1.5V
+2.5V
+3.3V
+3.3V
RF CONTROL, STATUS AND 10MHZ CLOCK
+2.5V
+3.3V
DUC
+3.3V
+3.3V
+3.3V
+1.8V
+3.3V
DDC
+3.3V
+3.3V
+3.3V
FLASH
+3.3V
+3.3V
+1.25V
+1.5V
+1.8V
+2.5V
+3.3V
+5V
-5V
+16V
POWER SUPPLY
CHARGE/STATUS
+1.25V
+1.25VREF
+2.5V
DDR SDRAM
+2.5V
+1.25
+3.3V
TX DAC
TX IF
+3.3V
RCV ADC
RCV IF
+3.3V
KEYPAD I/F
KEYPAD, REPLY/INTERR LEDs
+3.3V
+1.25V (ref)
BKLT
LCD BACKLIGHT
+3.3V
JTAG DEV PORT
JTAG
+3.3V
CNTRST
LCD
RS-232 PORT
+3.3V
RS-232 XCVR
+3.3V
+3.3V
???
ALT ENCODE
ETHERNET PORT
+3.3V
PHY
+3.3V
+3.3V
???
GP I/O
+3.3V
+3.3V
LCD I/F
+3.3V
+3.3V
+5V
USB CNTLR
HOST
PERIPHERIAL
REMOTE CONNECTOR
+3.3V
+3.3V
RS-232 XCVR

AEROFLEX WICHITA INC.	
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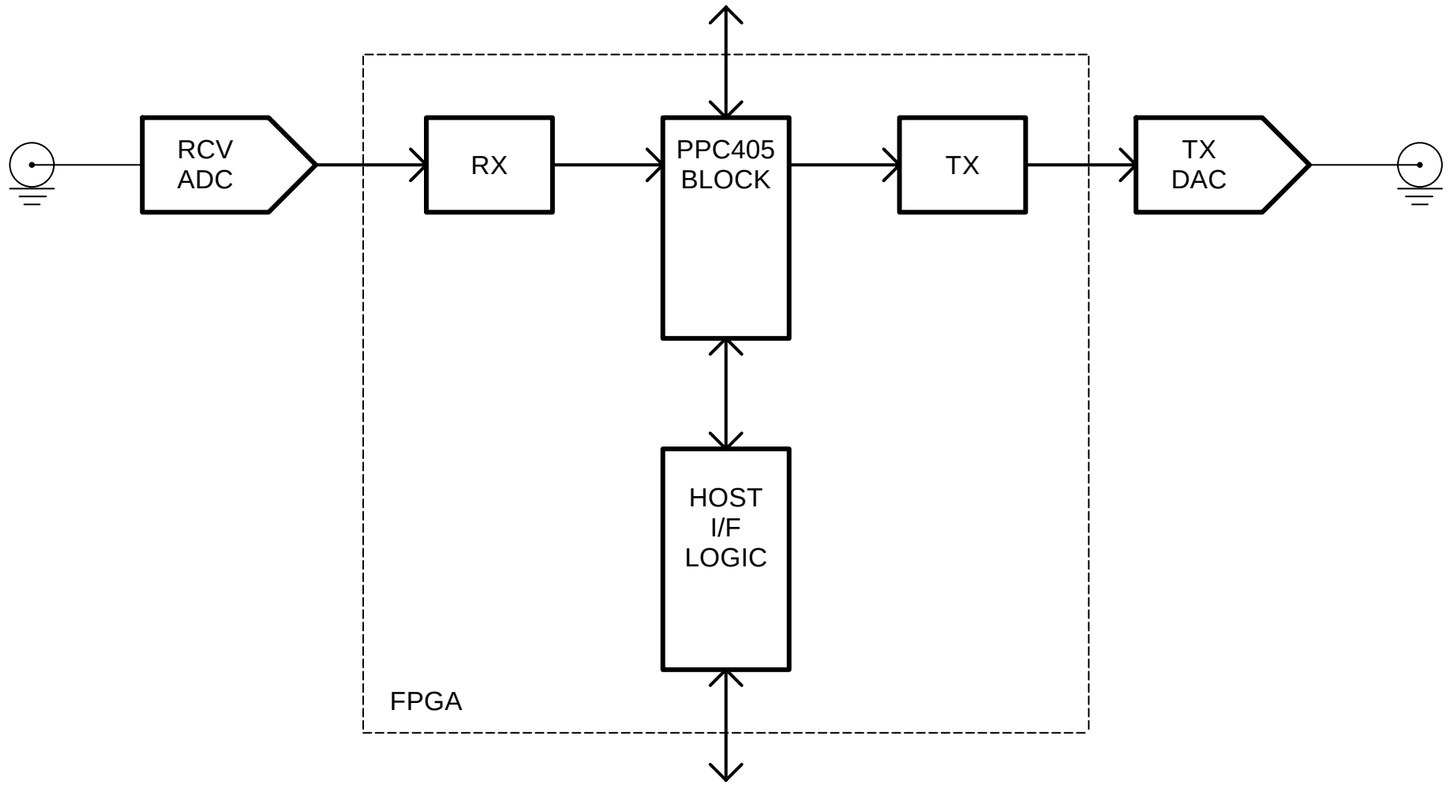
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B / Number 0000-5830-300 / Rev B	
Cage 51190	Filename MFB
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1 2 3 4

A B C D

AEROFLEX WICHITA INC.	
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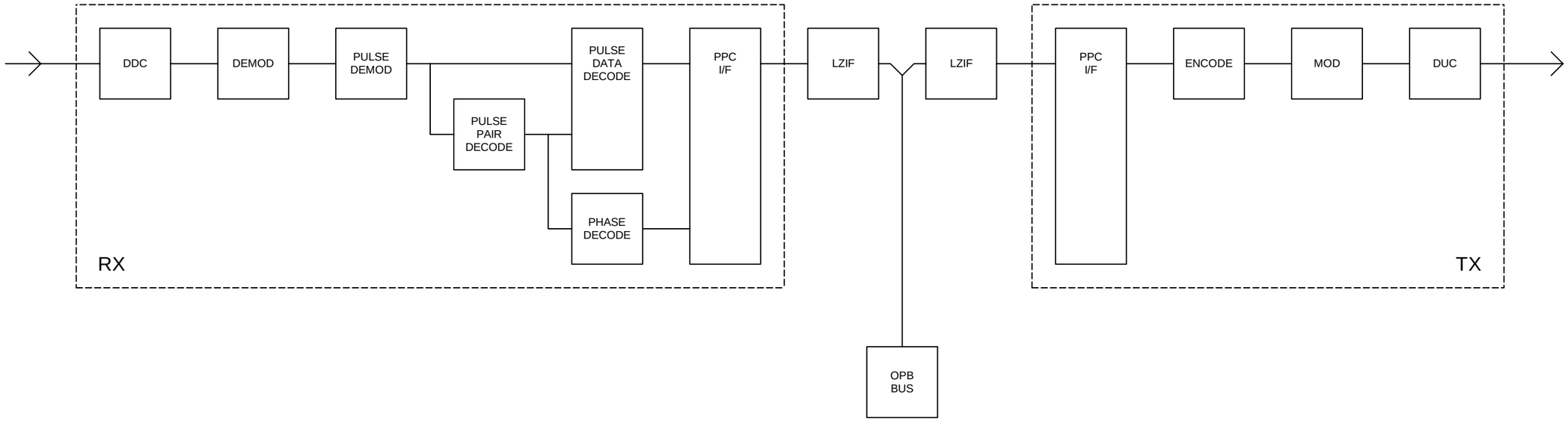
1 2 3 4

A B C D



AEROFLEX WICHITA INC.	
Title	MULTIFUNCTION
Size B / Number 0000-5830-300 / Rev B	
Cage 51190	Filename MFB
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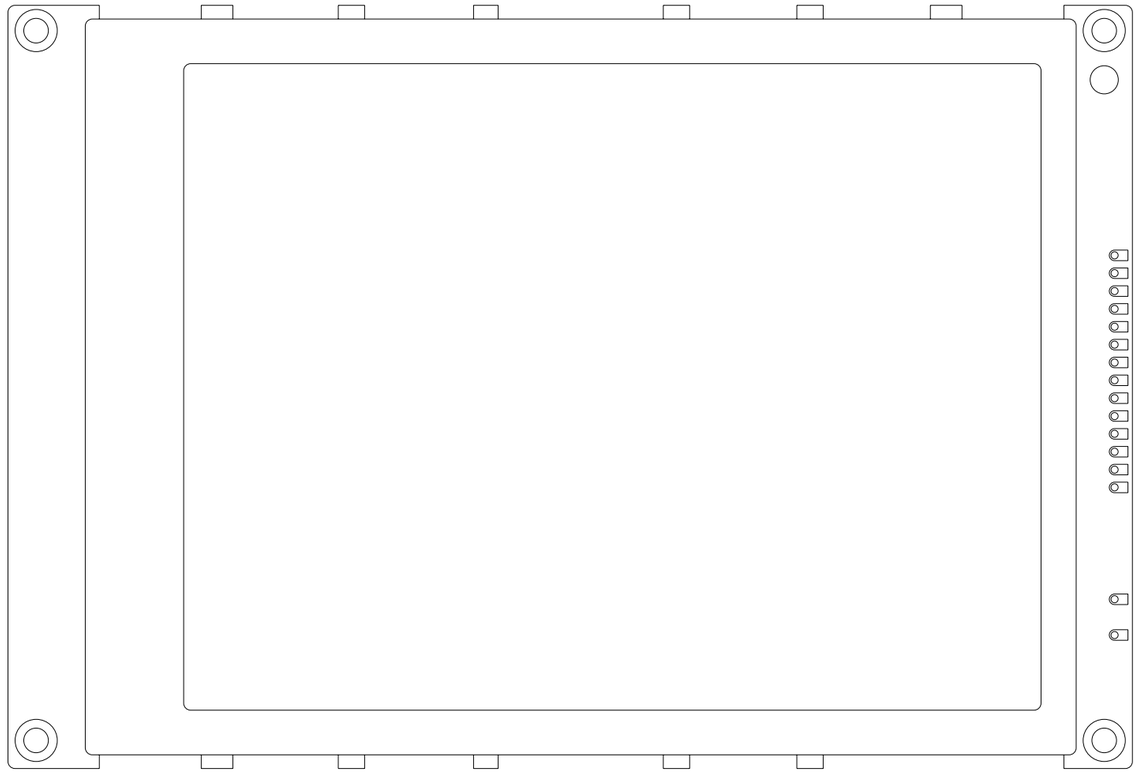
1 2 3 4

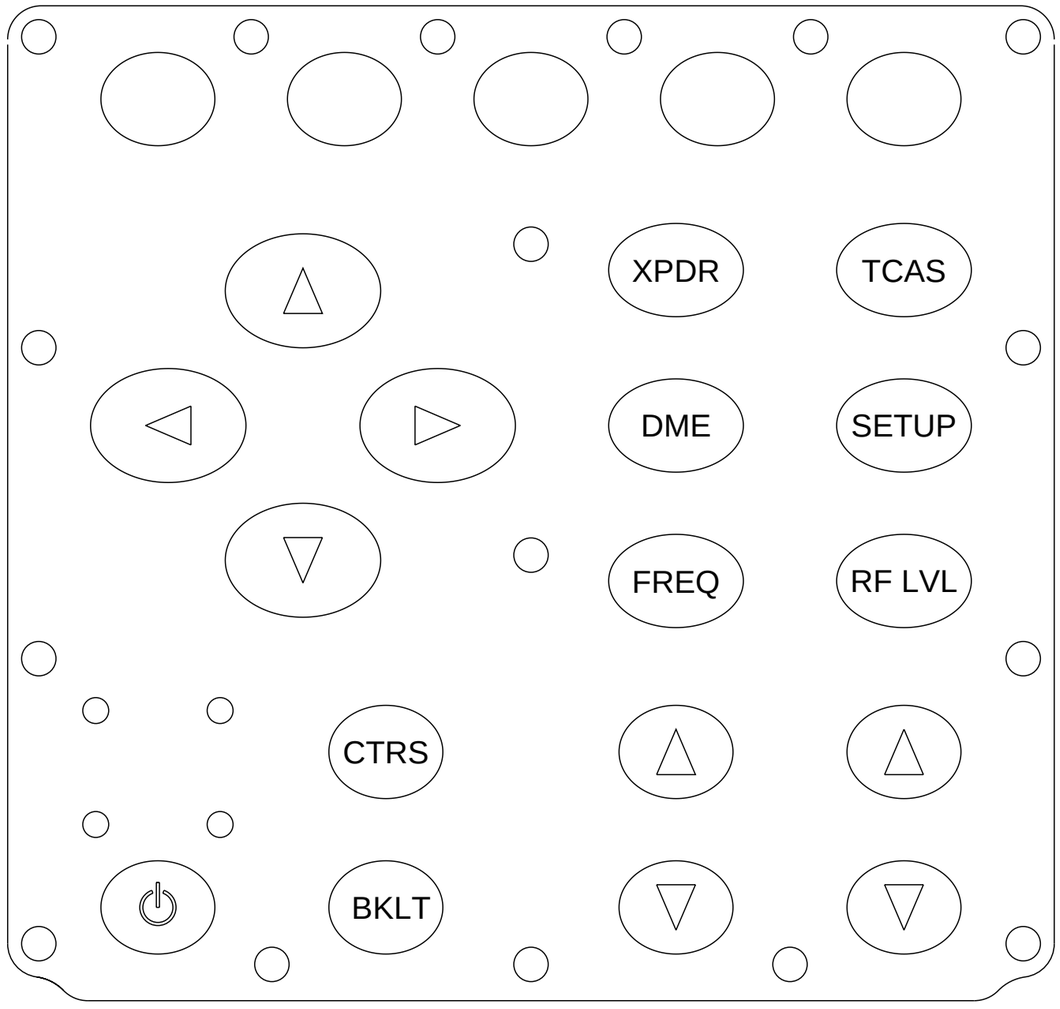
A B C D



(7110-5600-000-A)

056M009

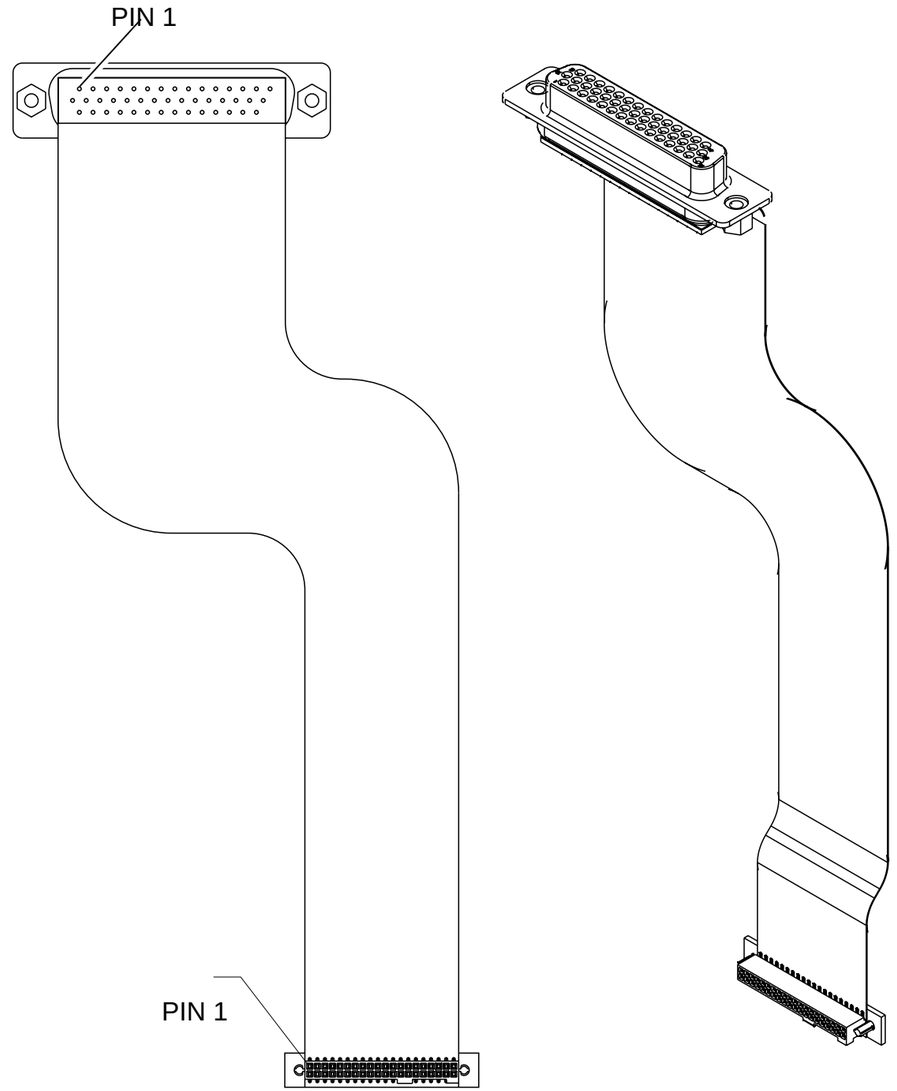
LCD Assembly (58A1A2A4)
Figure 35



056M001

(7110-5800-100-A)

Keypad (58A1A2A5)
Figure 36



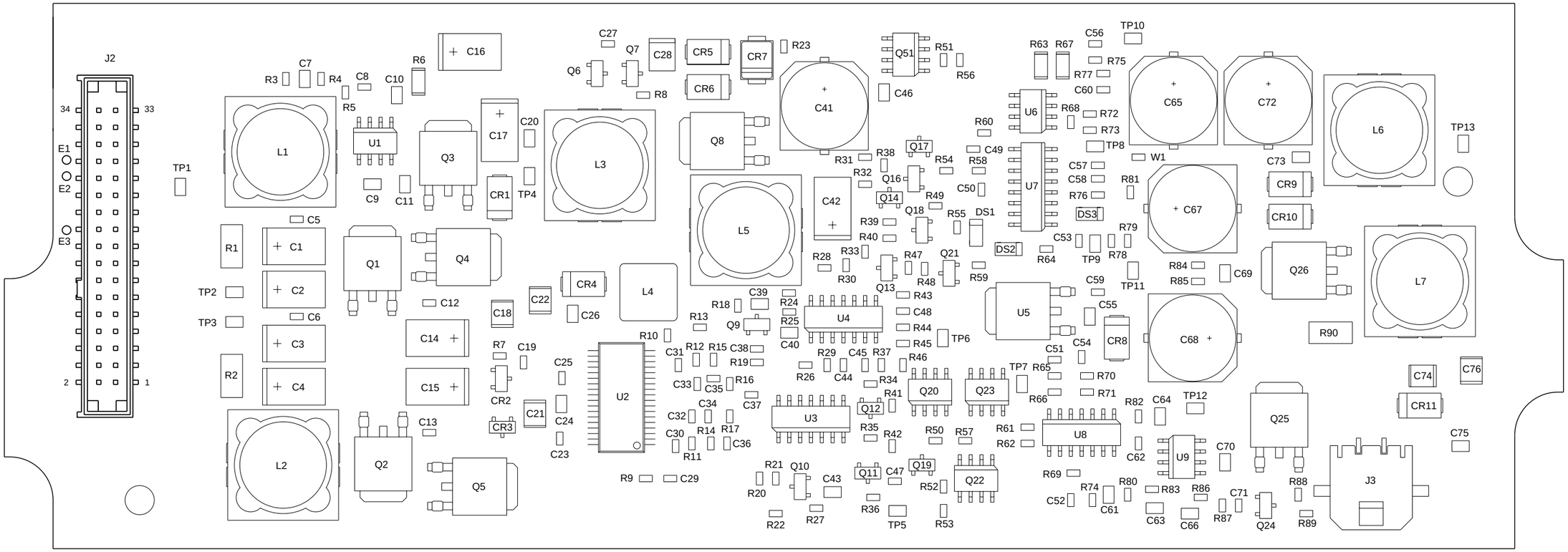
FLAT VIEW

INSTALLED VIEW

(7110-5830-800-A)

Flex Cable (58A1A2A6)
Figure 37

CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).



(TOP VIEW)

056M-05A

CAUTION:
CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).

(BOTTOM VIEW)

056M-05B

(7010-5630-500-C)

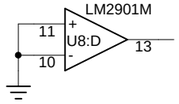
Power Supply PCB Assembly (58A1A4)
(Sheet 2 of 2)
Figure 38

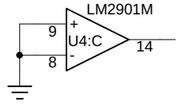
DATE	REV	CHANGE		APPRVD
	A	Not Released		
10 Dec 02	B1	Released per 19857	RRW	GH
4-30-03	C	INC 19983	RLA	GH

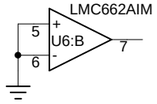
Spare Gate Table		
Last Used	Not Used	Spare Gates
C76		
CR11		
DS3		
E3		
ESD1		
J3		
L7		
MTG8		
Q26		
R91		
TP13		
U9		
W1		
XF1		

NOTES:
(UNLESS OTHERWISE SPECIFIED)

1. BASIC REFERENCE DESIGNATORS SHOWN, FOR COMPLETE DESIGNATOR PREFIXES REFER TO PRODUCT STRUCTURE AND SYSTEM INTERCONNECT.
2. ALL RESISTORS ARE 1%, 1/8W.
3. ALL RESISTANCE IS EXPRESSED IN OHMS
   ALL CAPACITANCE IS EXPRESSED IN MICROFARADS.
   ALL INDUCTANCE IS EXPRESSED IN MICROHENRIES.
4. HIGHEST REFERENCE DESIGNATIONS:
   SEE SPARE GATE TABLE
5. REFERENCE DESIGNATIONS NOT USED:
   SEE SPARE GATE TABLE
6. COMPONENT(S) NOT INSTALLED.
7. IC FUNCTIONS NOT USED:

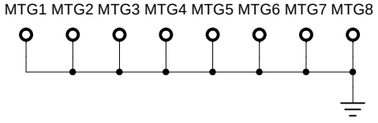






CAUTION:

CONTAINS PARTS AND ASSEMBLIES SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD).



Power Table							
Ref Des	Device(Type)	Package	GND	+VEXT	VBAT+	+5VREG	+VS
U3	3214-4013-200T	SO14	7		14		
U4	3221-0015-000T	SO14	12				3
U6	3221-0013-001T	SO8	4			8	
U8	3221-0015-000T	SO14	12	3			

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IFR SYSTEMS INC.
10200 WEST YORK STREET
WICHITA, KANSAS 67215-8935

Drawn	Date	Title	Schematic, Power Supply		
R. Crawford	15 May 2002				
Checked	Date	Size	Number	Rev	
R. Crawford	12-10-02	B	0000-5630-500	C	
Approved	Date	Cage	51190	Filename	056305C0.SCH
Guy Hill	12-10-02	Print Date	Wed Apr 30, 2003	Sheet	1 of 5

1 2 3 4

A B C D

DC INPUT
11 - 32VDC
+VIN
J3
MTG
0.1UF
C75
7.5A 32V
XF1
FUSE HOLDER
50V
1.0UF
C76
L7
10UH
+VEXT
50V
1.0UF
C74
RA 2 PIN 3MM HDR M
TP12
C69
0.1UF
R85
2.74K
C68
68UF
20V
C64
1000PF
R90
0.015
R84
2.74K
C67
68UF
20V
U9
Vin
Ith/RUN
GND
SNS
BOOST
TG
SW
Vfb
LT1624IS8
INPUT CONVERTER
0.1UF
C70
Q26
SPD30N06S2L-13
C62
330PF
R82
3.92K
+5VREG
C71
0.1UF
R87
4.75K
MMBT2907A
0.1UF
C66
Q24
R88
100
Q25
MCR12DCM
CR11
15MQ040N
R86
4.75K
R89
4.75K
+2.5VREF
R69
47.5K
U8:C
LM2901M
C52
.01UF
R74
18.2K
EXTERNAL LOW VOLTAGE CUT-OFF (9V)
C63
100PF
R83
2.43K
R80
18.2K
CR10
15MQ040N
CR9
15MQ040N
L6
10UH
+10V
TP7
C65
150UF
16V
C72
150UF
16V
0.1UF
C73
+VS
TP6
Q22
SI4435DY
Q23
SI4435DY
R57
100K
CROWBAR CIRCUIT
+5VREG
10.0K
R62
+2.5VREF
10.0K
R61
+VEXT
90.9K
R71
Overvoltage Crowbar
Vin 34.4-37.4VDC
+2.5VREF
LM2901M
U8:A
C54
.01UF
6.81K
R70
+VEXT
0.1UF
C61
+10V
22.1K
R66
Overvoltage Crowbar
+13.5-14.7VDC
+2.5VREF
LM2901M
U8:B
C51
.01UF
4.75K
R65
VBAT+
10.0K
R27
MMBT2907A
Q10
0.1UF
C43
C39
0.1UF
R22
100K
R21
1.0K
PWR_ON_OFF
10.0K
R20
U3:A
MC14013BD
ON/OFF CONTROL AND
SOURCE SELECT
U3:B
MC14013BD
R18
100K
R52
10.0K
Q19
2N7002
R53
10.0K
VBAT+
Q20
SI4435DY
C47
0.1UF
R50
100K
R36
47.5K
Q11
2N7002
R42
10.0K
+5VREG
R41
10.0K
Q12
2N7002
R35
10.0K
R34
10.0K
VBAT+
R46
475K
LOW VOLTAGE CUT-OFF (9V)
+3.3V
R29
1.0K
LM2901M
U4:A
0.1UF
C40
100K
R19
C38
0.1UF
100K
R26
MMBT2907A
Q9
0.1UF
C44
0.1UF
C45
R37
332K
+VS
+5V
R28
47.5K
0.1UF
C48
R24
47.5K
R44
47.5K
R45
4.75K
LM2901M
U4:D
LM2901M
U4:B
R30
4.75K
R43
182K
R25
12.1K
OUTPUT OVERCURRENT SHUT-DOWN

IFR SYSTEMS INC.	
Title	Schematic, Power Supply
Size B	Number 0000-5630-500 Rev C
Cage 51190	Filename 056305C0.SCH
Print Date Wed Apr 30, 2003	Sheet 2 of 5

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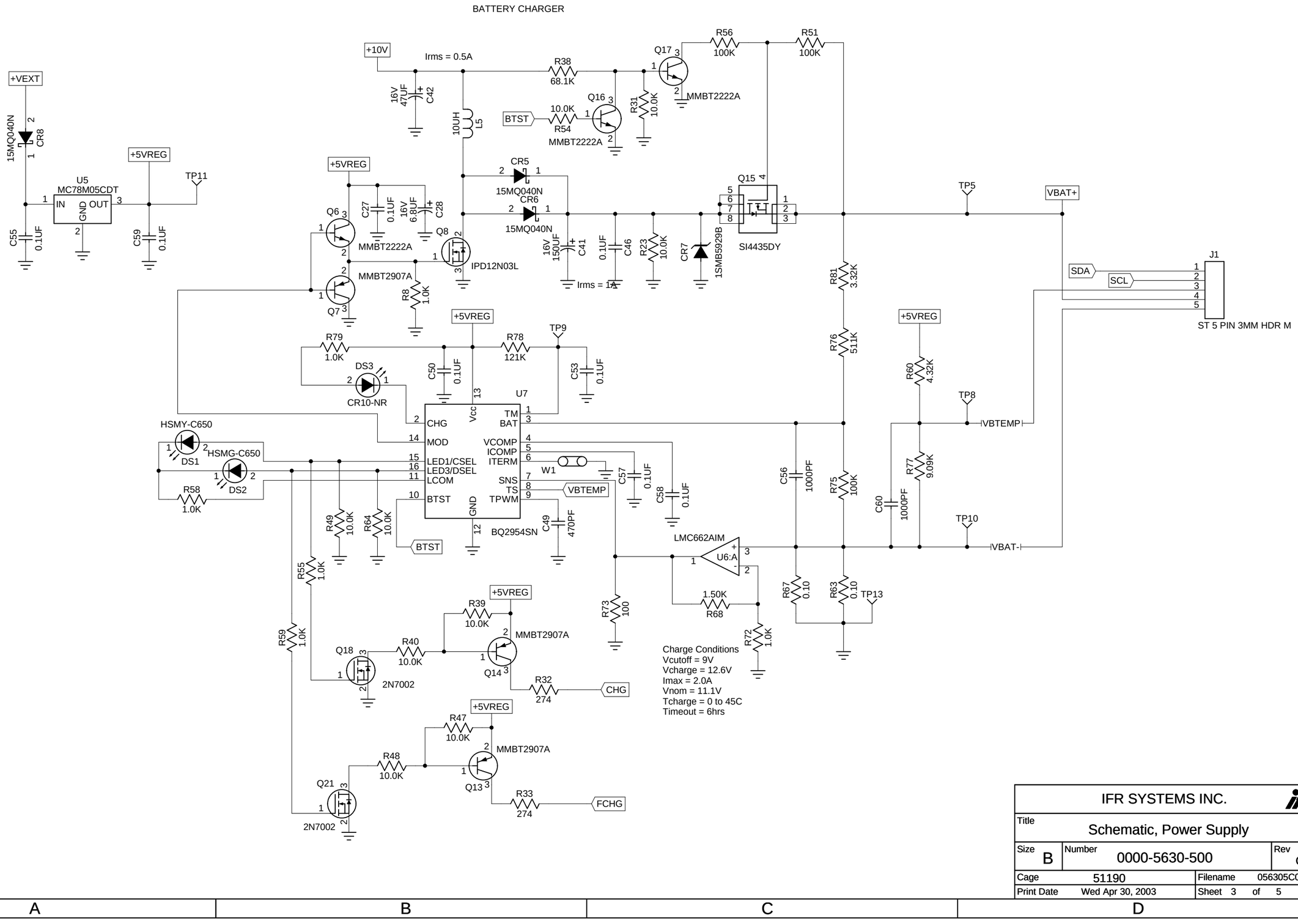
A B C D

BATTERY CHARGER

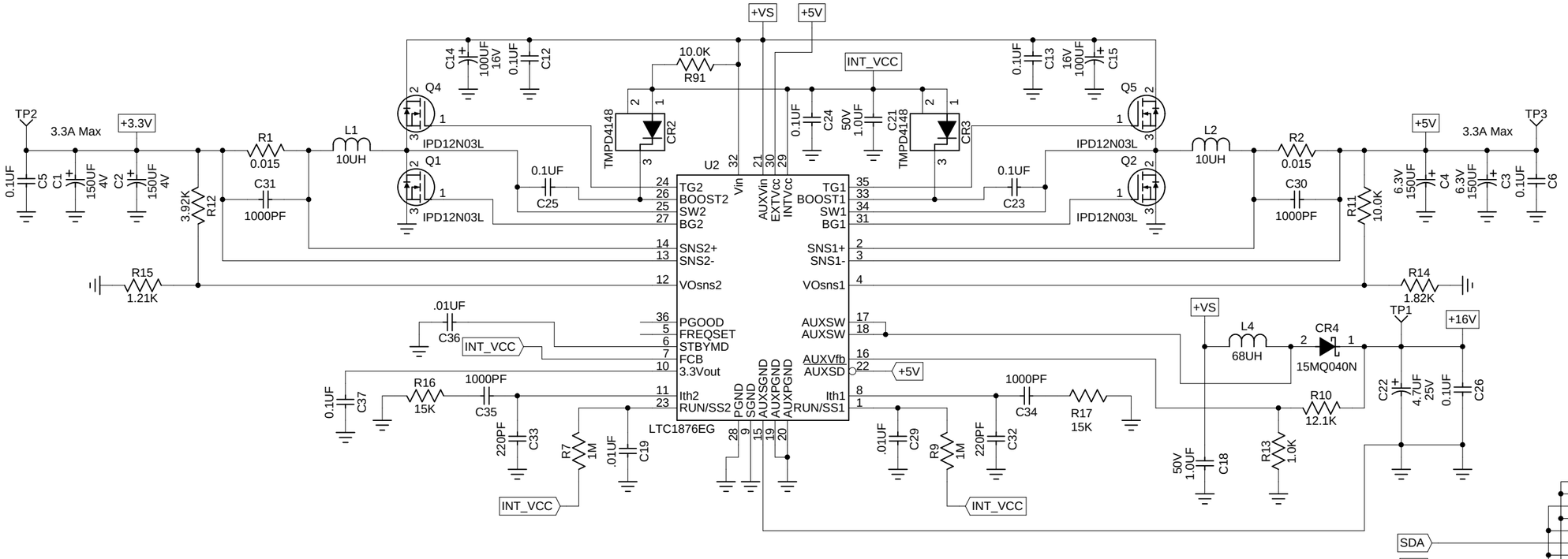


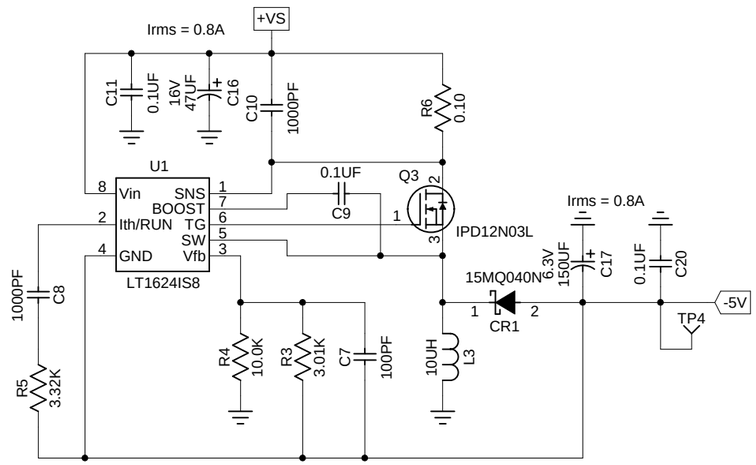
IFR SYSTEMS INC.	
Title	Schematic, Power Supply
Size B	Number 0000-5630-500 Rev C
Cage 51190	Filename 056305C0.SCH
Print Date Wed Apr 30, 2003	Sheet 3 of 5

1 2 3 4

A B C D

SECONDARY OUTPUT CONVERTERS



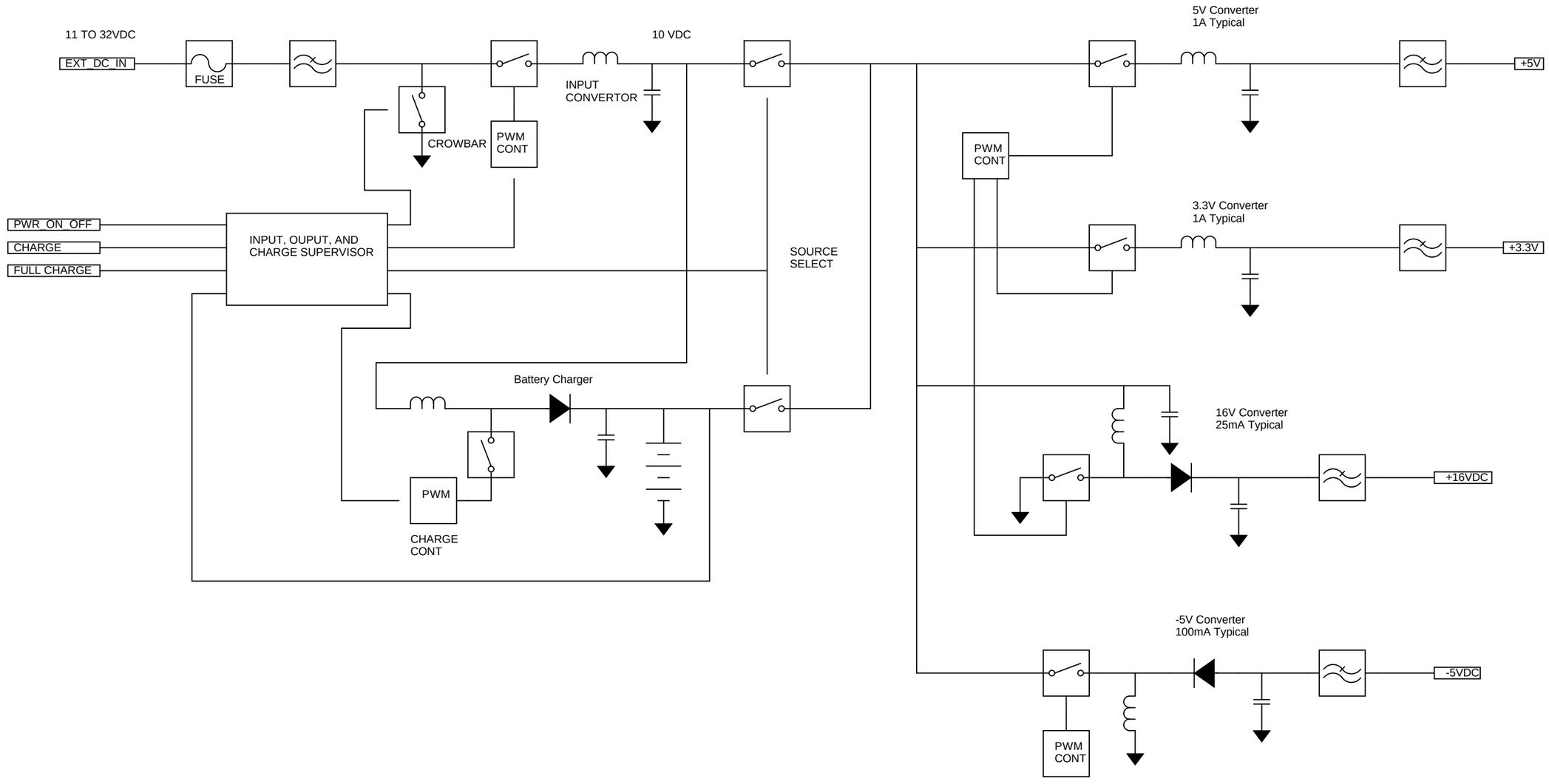


IFR SYSTEMS INC.	
Title: Schematic, Power Supply	
Size: B	Number: 0000-5630-500 — Rev: C
Cage: 51190	Filename: 056305C0.SCH
Print Date: Wed Apr 30, 2003	Sheet 4 of 5

1 2 3 4

A B C D

POWER SUPPLY BLOCK



IFR SYSTEMS INC.	
Title	Schematic, Power Supply
Size B / Number	0000-5630-500 / Rev C
Cage 51190	Filename 056305C0.SCH
Print Date Wed Apr 30, 2003	Sheet 5 of 5

1 2 3 4

A B C D

SECTION 3 - DISASSEMBLY/REASSEMBLY

1. Disassembly

A. General

Contains instructions necessary to remove and disassemble assemblies within the 6000.

B. Preliminary Considerations

(1) Tools Required

TOOL	SIZE	DESCRIPTION
SCREWDRIVER	#2	PHILLIPS
SCREWDRIVER	#1	SLOTTED
WRENCH	5/32" 3/16"	SOCKET
PLIERS		NEEDLE-NOSE

(2) Disassembly Precautions

CAUTION: TAG EACH WIRE AND CABLE PRIOR TO REMOVAL.

CAUTION: AVOID BENDING OR TWISTING SEMI-RIGID COAXIAL CABLES.

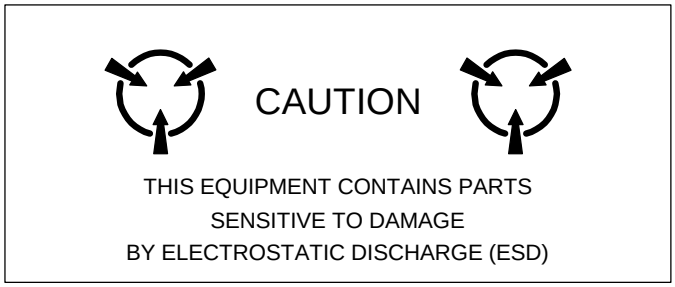
CAUTION: AVOID PLACING UNDUE STRAIN ON ANY WIRE OR CABLE.

CAUTION: AVOID DISCARDING LOOSE ITEMS (NUTS, SCREWS, WASHERS, ETC.).

CAUTION: AVOID EXPOSING COMPONENTS TO EXCESSIVE HEAT WHEN REMOVING SOLDER.

(3) ESD

CAUTION: THE POWER SUPPLY PCB ASSY, RF ASSY, KEYPAD PCB ASSY, PROCESSOR PCB ASSY, MULTI-FUNCTION PCB ASSY, LCD PCB ASSY AND KEYPAD PCB ASSY CONTAIN PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING DISASSEMBLY SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES.



(4) EMC and Safety Compliance

All assemblies, cables, connectors, plastic fasteners, gaskets, fingerstock and miscellaneous hardware within the Test Set are configured to satisfy the safety and EMC compliance standards.

CAUTION: UPON COMPLETION OF ANY MAINTENANCE ACTION; ALL ASSEMBLIES, CABLES, CONNECTORS, PLASTIC FASTENERS, GASKETS, FINGERSTOCK AND MISCELLANEOUS HARDWARE MUST BE CONFIGURED AS INSTALLED AT THE FACTORY.

C. Procedures

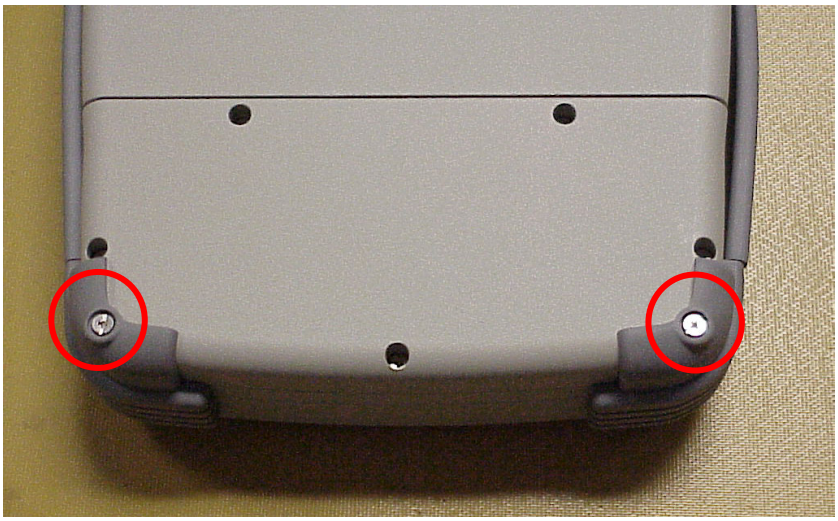
(1) Battery

PRELIMINARY PROCEDURES: None

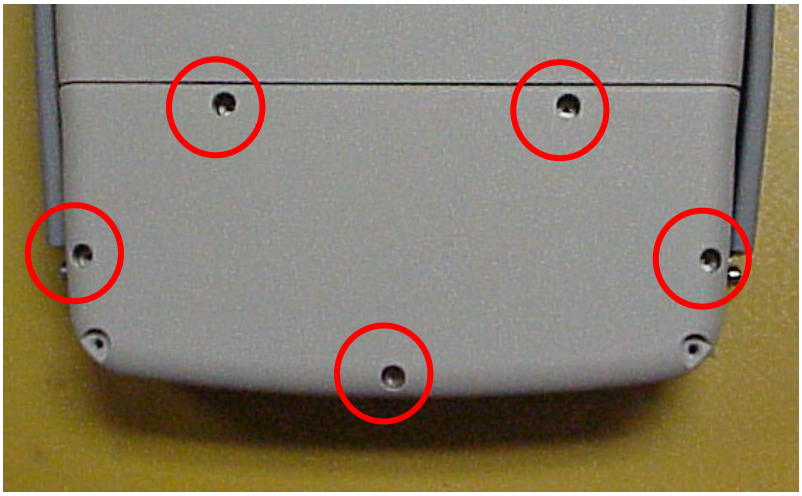
WARNING: DANGEROUS VOLTAGES ARE PRESENT WITH CASE ASSY REMOVED IF POWER IS PRESENT.

STEP	PROCEDURE

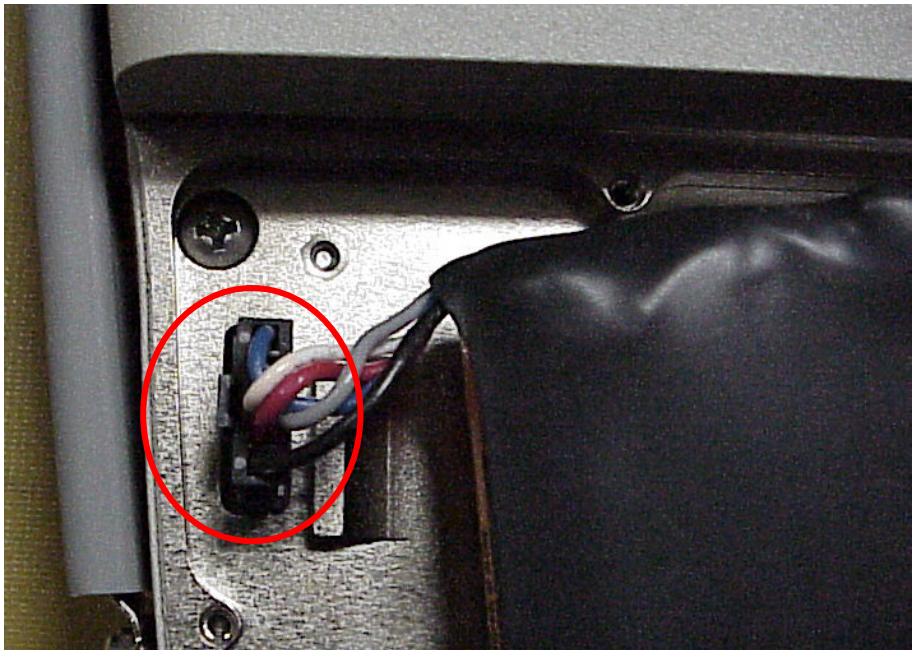
1. Remove external power sources and all external cables from the 6000.
2. Loosen the four captive screws holding bumpers (two in back and two in front). Remove bumpers.



3. Loosen five captive screws securing the Battery Cover. Remove the Battery Cover.



4. Disconnect the Battery wire harness.



5. Remove the Battery.

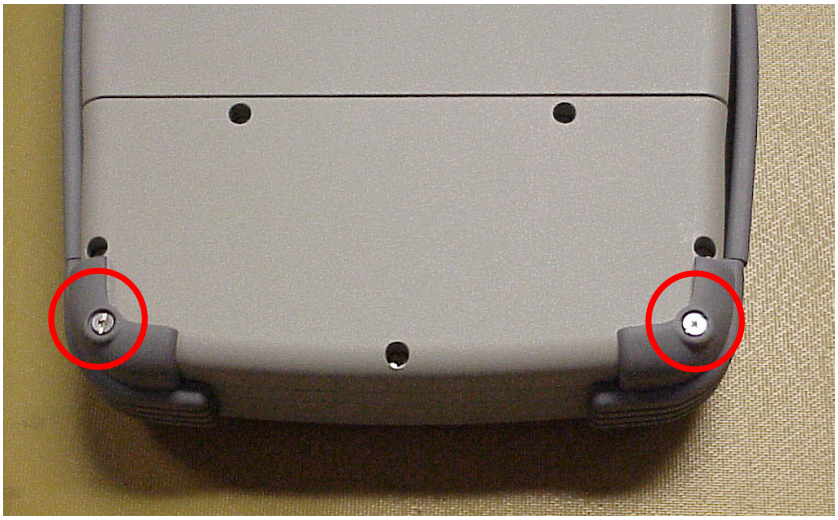
(2) Fuse

PRELIMINARY PROCEDURES: None

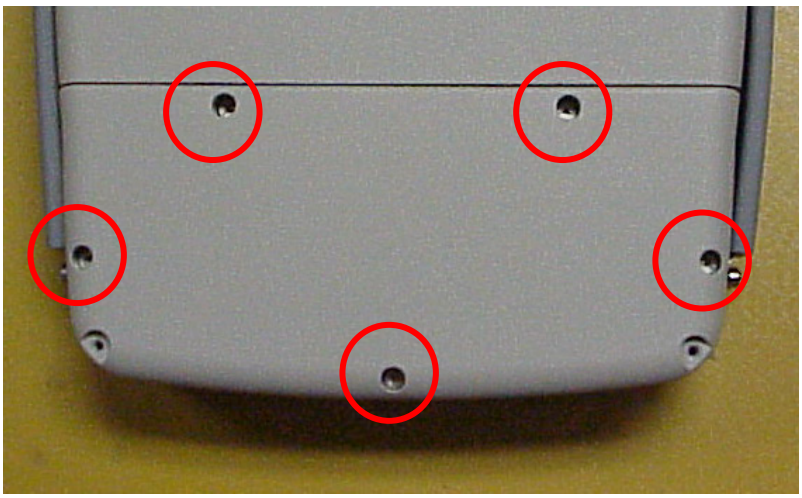
WARNING: DANGEROUS VOLTAGES ARE PRESENT WITH CASE ASSY REMOVED IF POWER IS PRESENT.

STEP	PROCEDURE

1. Remove external power sources and all external cables from the 6000.
2. Loosen the four captive screws holding bumpers (two in back and two in front). Remove bumpers.

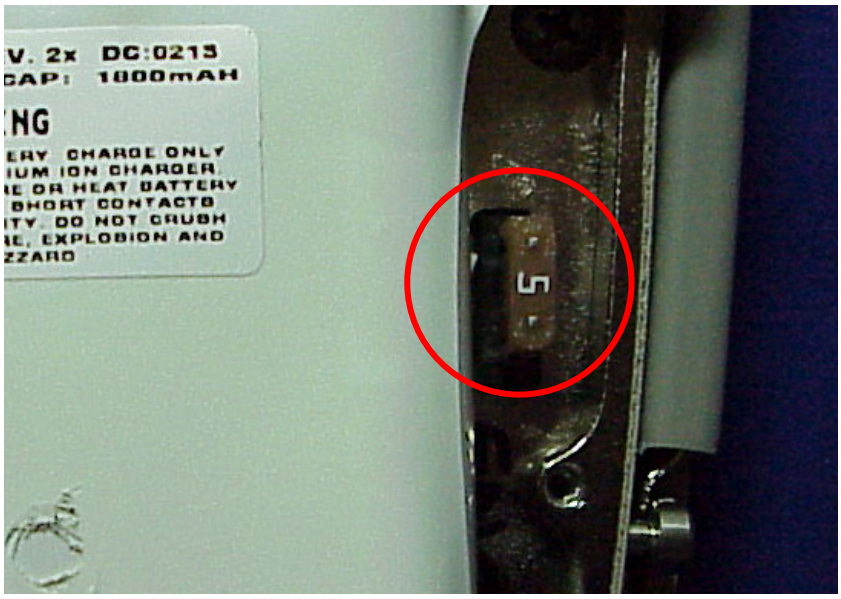


3. Loosen five captive screws securing the Battery Cover. Remove the Battery Cover.



STEP PROCEDURE

4. Remove the Fuse.

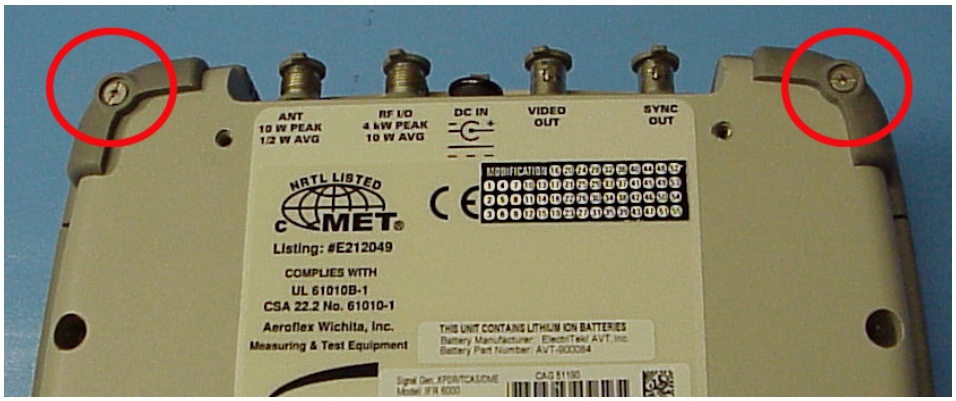


(3) Case Assy

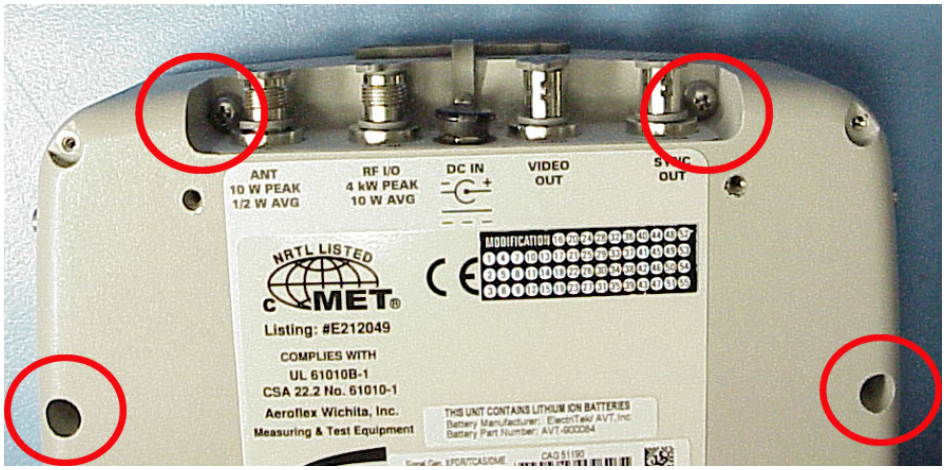
PRELIMINARY PROCEDURES: Battery (para 2-3-1C(1)

STEP	PROCEDURE

1. Loosen the four captive screws holding bumpers (two in back and two in front). Remove bumpers.

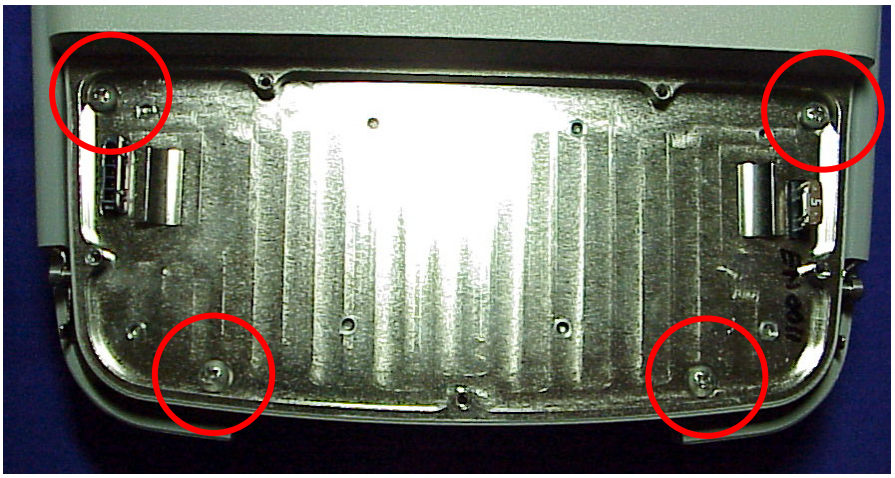


2. Remove four screws.

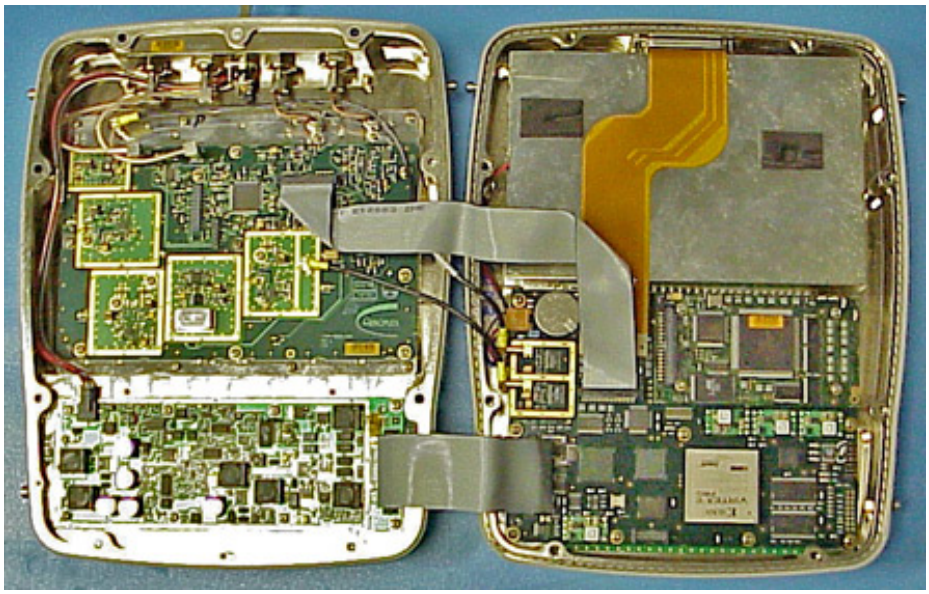


STEP PROCEDURE

3. Remove four screws.



4. Open the Case Assy.

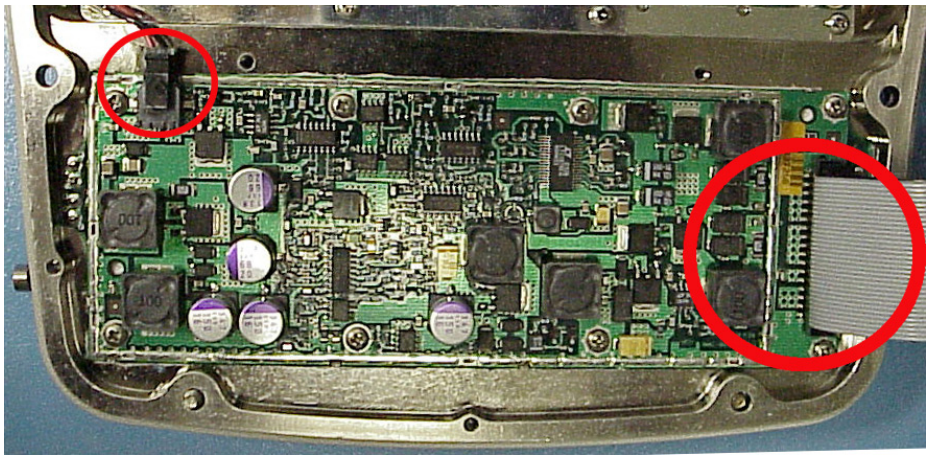


(4) Power Supply PCB Assy

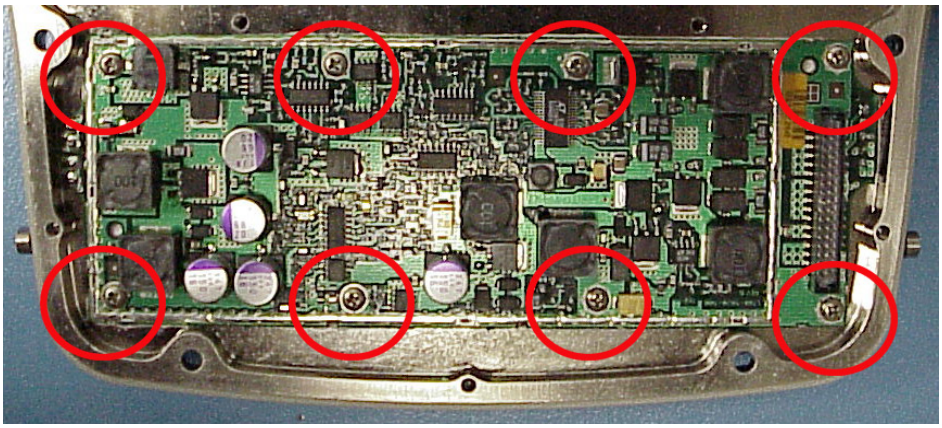
PRELIMINARY PROCEDURES: Case Assy (para 2-3-1C(3)

STEP	PROCEDURE

1. Disconnect wire cable and ribbon cable from the Power Supply PCB Assy.



2. Remove eight screws.



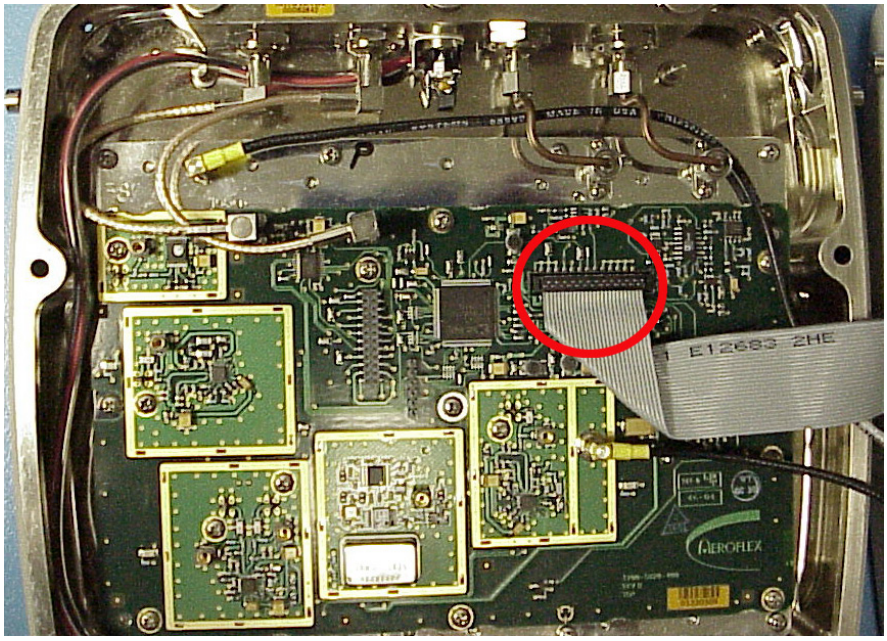
3. Remove Power Supply PCB Assy.

(5) RF Assy

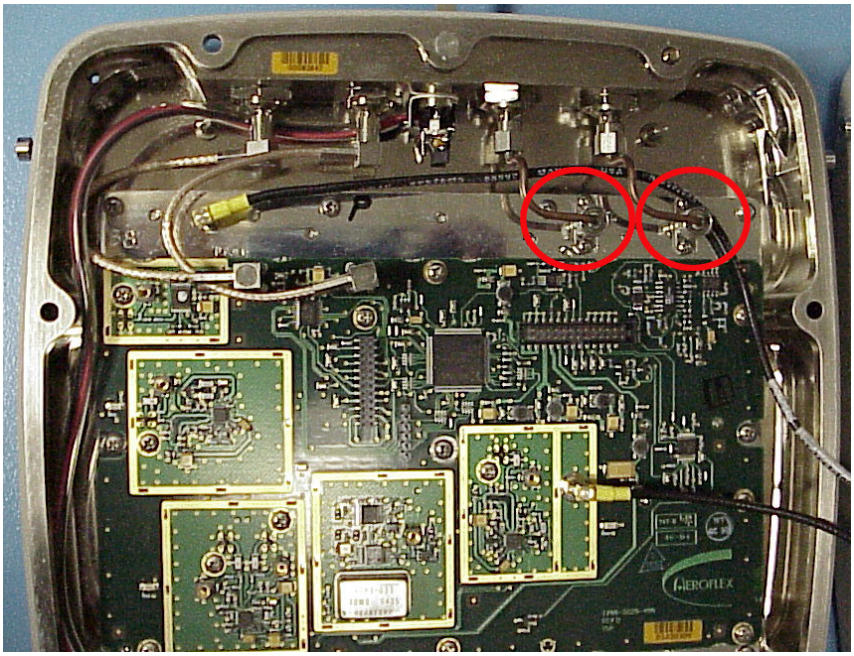
PRELIMINARY PROCEDURES: Case Assy (para 2-3-1C(3)

STEP	PROCEDURE

1. Disconnect ribbon cable from the RF Assy.

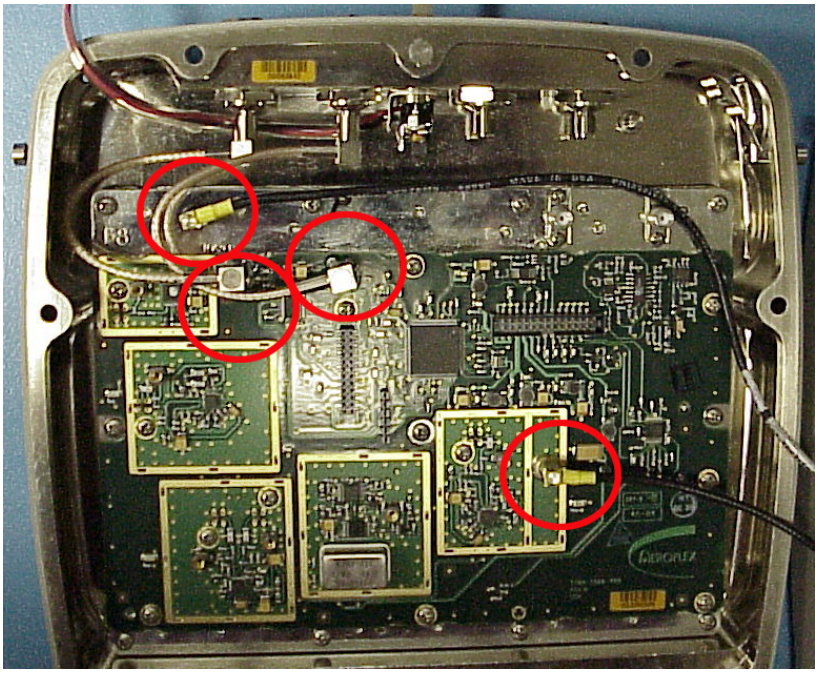


2. Remove two semi-rigid coaxial cables.

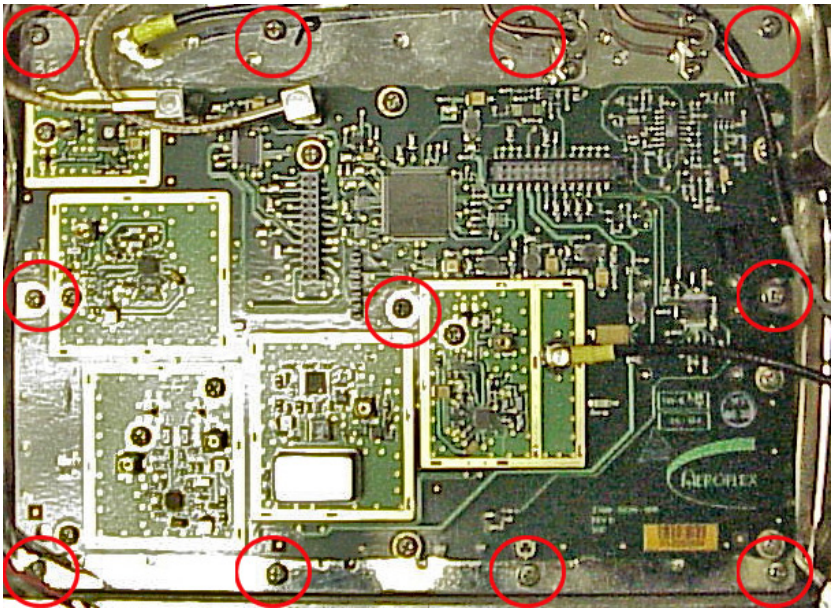


STEP PROCEDURE

3. Disconnect four coaxial cables from the RF Assy.



4. Remove 11 screws.



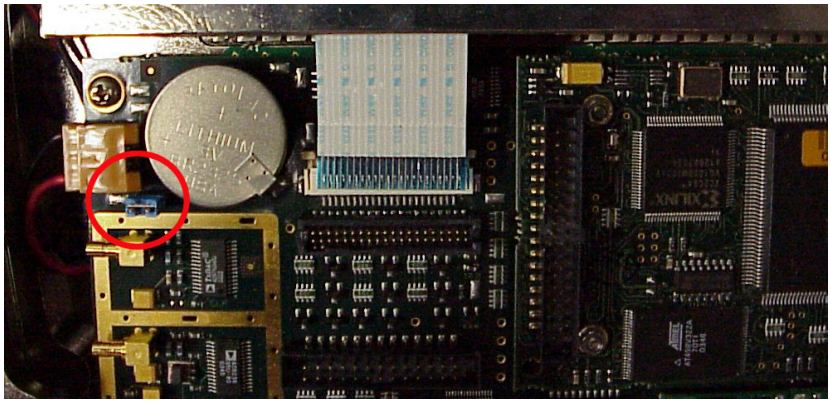
5. Remove the RF Assy.

(6) Processor PCB Assy

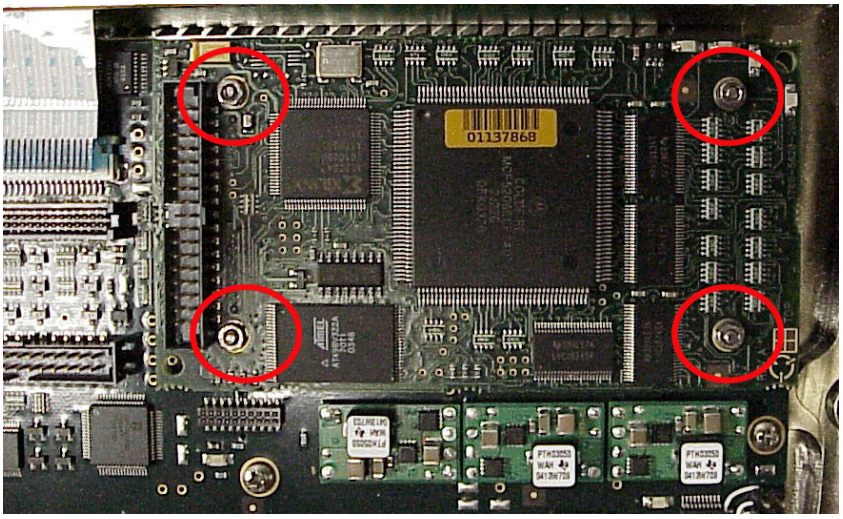
PRELIMINARY PROCEDURES: Case Assy (para 2-3-1C(3)

STEP	PROCEDURE

1. Remove jumper from Multi-Function PCB Assy.



2. Remove four nuts and four lock washers.



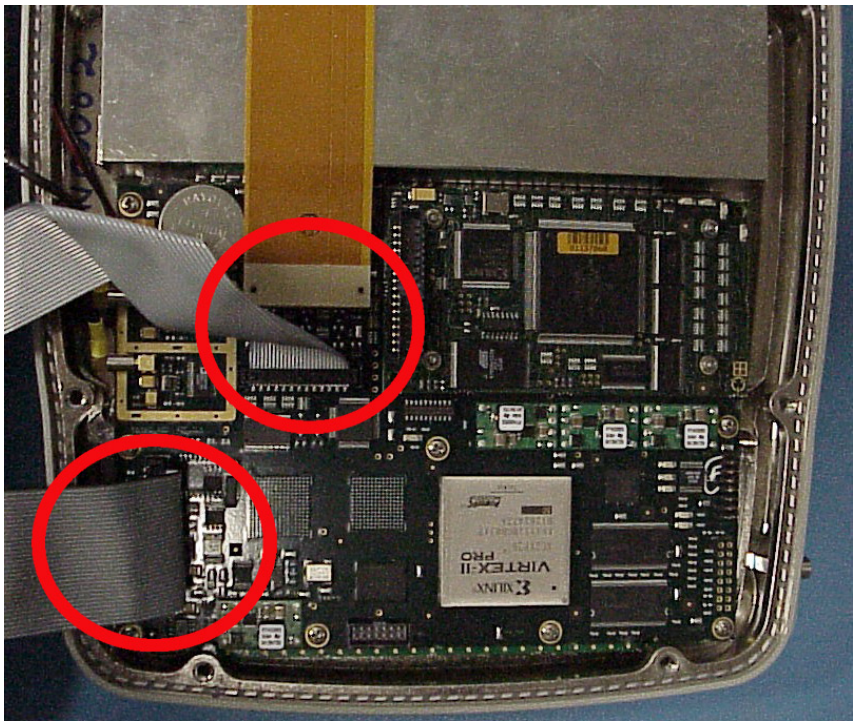
3. Remove the Processor PCB Assy.

(7) Multi-Function PCB Assy

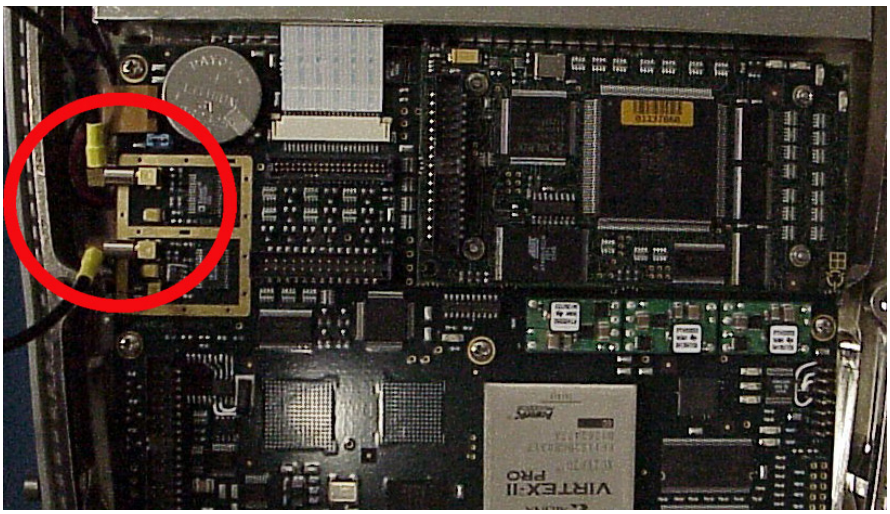
PRELIMINARY PROCEDURES: Case Assy (para 2-3-1C[3])
Processor PCB Assy (para 2-3-1C[6])

STEP	PROCEDURE

1. Disconnect three ribbon cables from the Multi-Function PCB Assy.

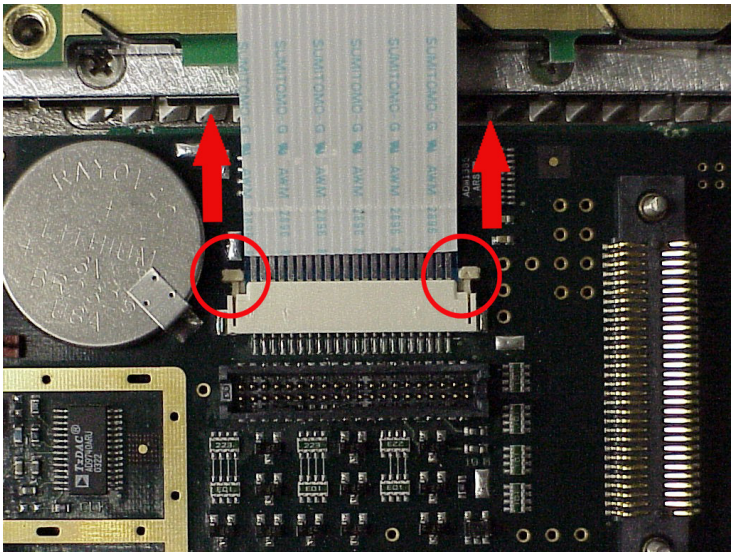


2. Disconnect the two coaxial cables from the Multi-Function PCB Assembly.

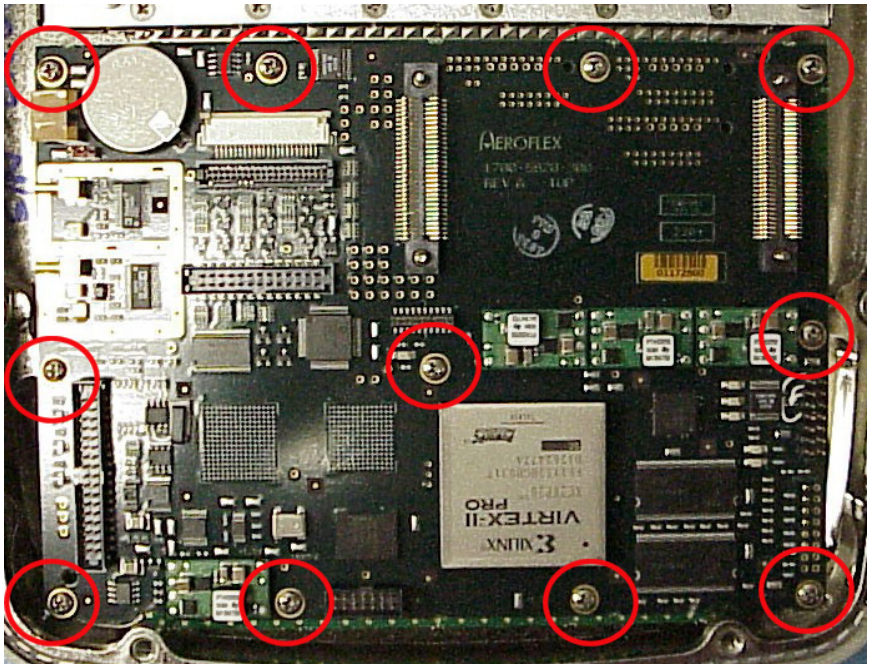


3. Disconnect the ribbon cable by pushing the two brass levers on either side of the cable straight up from the white housing. This housing stays in place and is not removable. Lift the end of the ribbon cable out of the housing.

   CAUTION: EXERCISE CAUTION WHEN REMOVING THE RIBBON CABLE FROM THE MULTI-FUNCTION PCB ASSY.



4. Remove 11 screws.



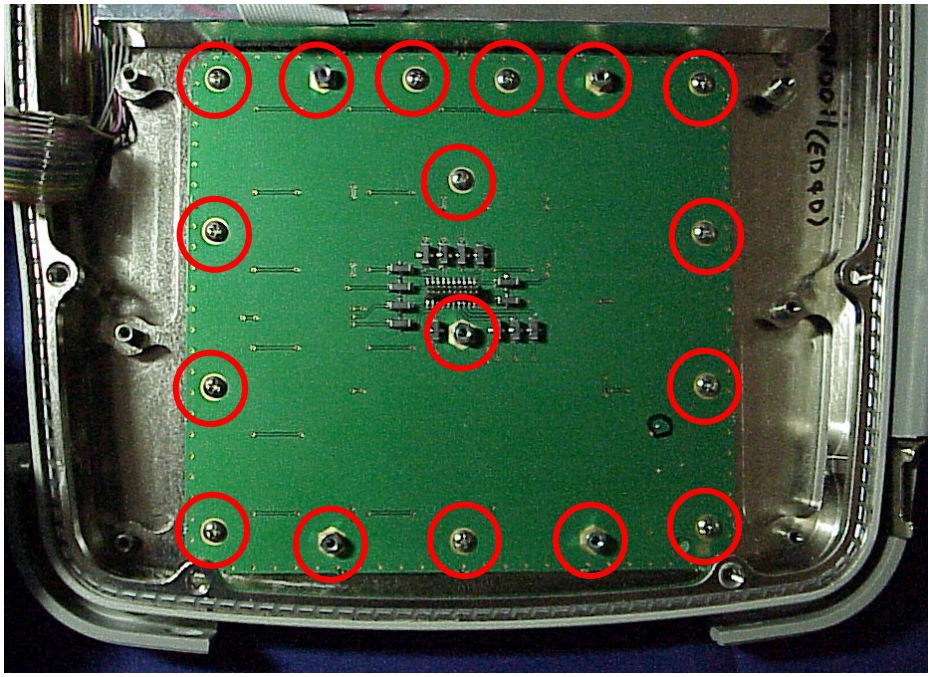
5. Remove Multi-Function PCB Assy.

(8) Keypad PCB Assy

PRELIMINARY PROCEDURES: Case Assy (para 2-3-1C[3])
Processor PCB Assy (para 2-3-1C[6])
Multi-Function PCB Assy (para 2-3-1C[7])

STEP	PROCEDURE

1. Remove 12 screws and five shell nuts.



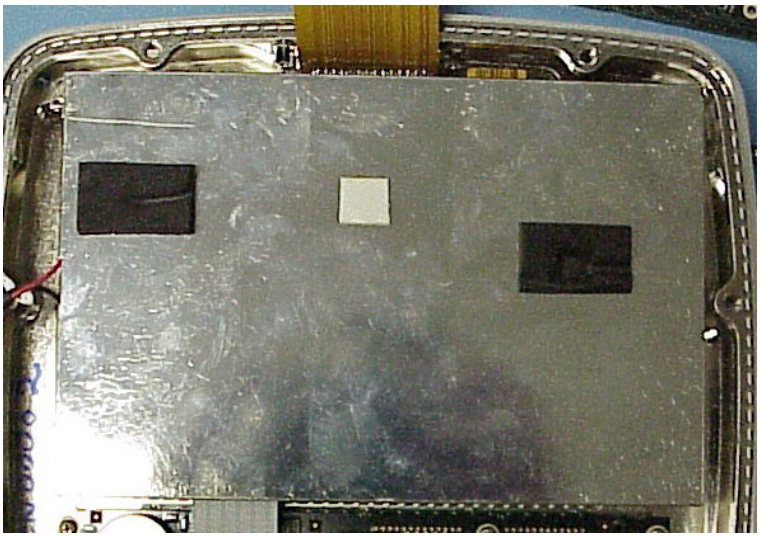
2. Remove Keypad PCB Assy.

(9) LCD PCB Assy

PRELIMINARY PROCEDURES: Case Assy (para 2-3-1C[3])

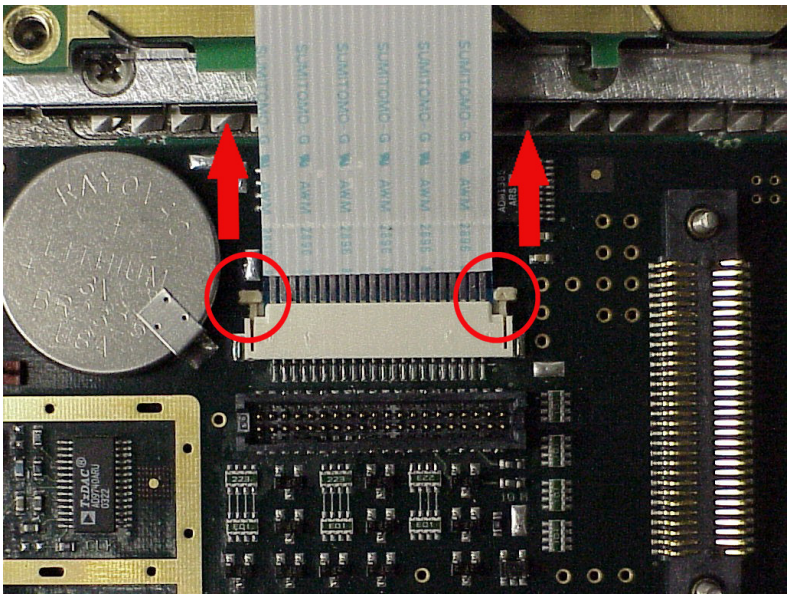
STEP	PROCEDURE

1. Disconnect ribbon cable from Multi-Function PCB Assy. Pry ribbon cable from cover by carefully separating ribbon cable from double sided tape which holds it in place.



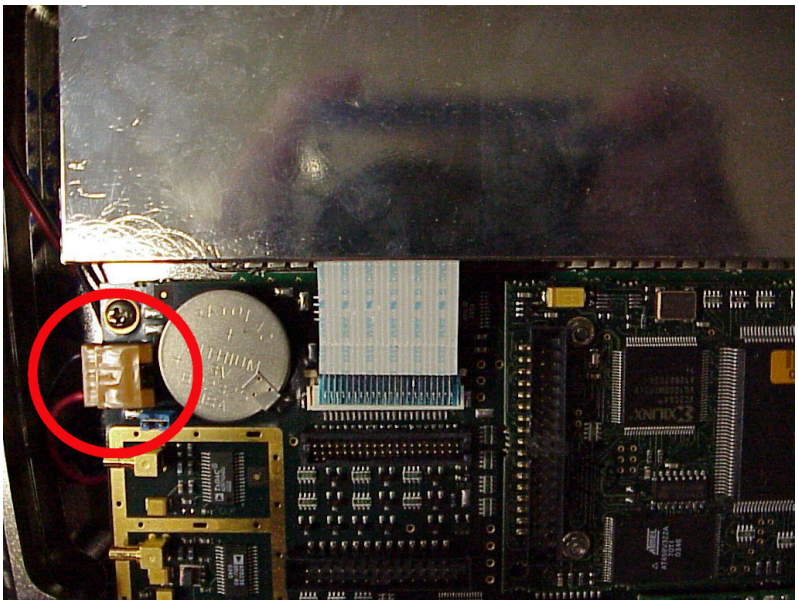
2. Disconnect ribbon cable by pushing the two brass levers on either side of the cable straight up from the white housing. This housing stays in place and is not removable. Lift the end of the ribbon cable out of the housing.

CAUTION: EXERCISE CAUTION WHEN REMOVING THE RIBBON CABLE FROM THE MULTI-FUNCTION PCB ASSY.

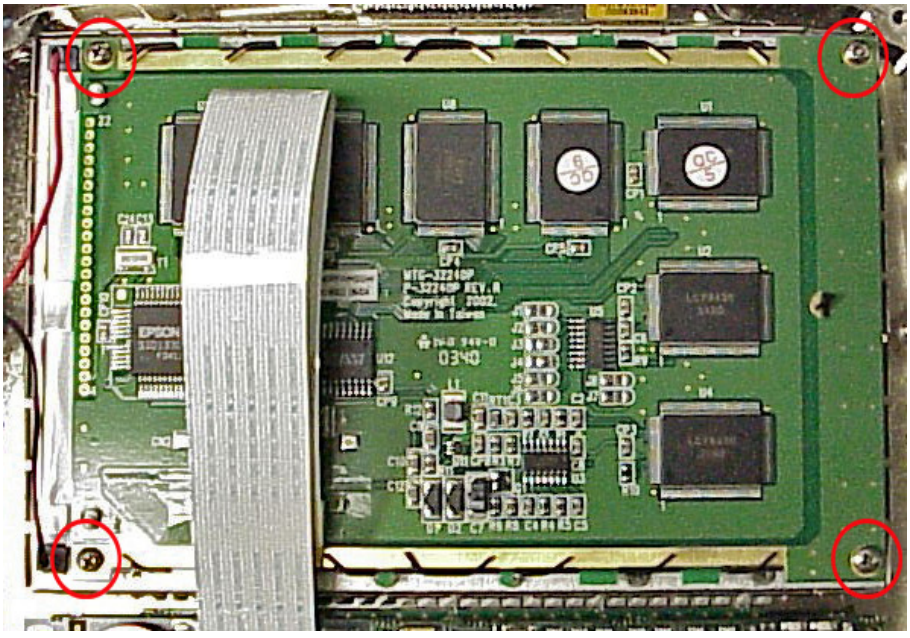


STEP PROCEDURE

3. Disconnect backlight wire connector from Multi-Function PCB Assy. Thread wires and connector through the opening in left side of cover and remove cover.



4. Remove 4 screws.



5. Remove LCD PCB Assy.

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2. Reassembly

A. General

Reassembly depends upon extent of disassembly and should be performed with normal repair and/or cleaning. Perform reassembly in reverse sequence of disassembly procedures unless otherwise specified.

B. Preliminary Considerations

(1) Tools Required

Reassembly requires the same tools required for disassembly unless otherwise specified.

(2) Reassembly Precautions

CAUTION: INSURE ALL COAXIAL CONNECTIONS ARE PROPERLY MATED.

CAUTION: AVOID BENDING OR TWISTING SEMI-RIGID COAXIAL CABLES.

CAUTION: PLACE ALL RIBBON CABLES TO LAY FLAT AND NEATLY FOLDED.

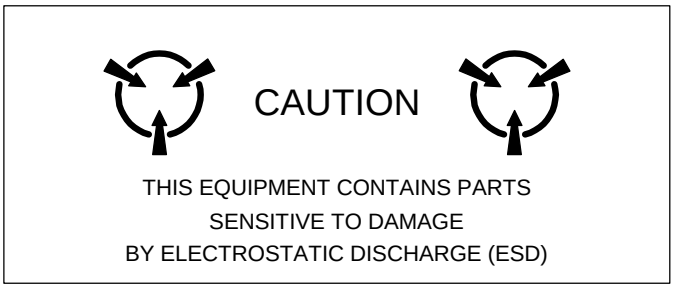
CAUTION: AVOID PLACING UNDUE STRAIN ON ANY WIRE OR CABLE.

CAUTION: AVOID OVERTIGHTENING SCREWS AND NUTS INCLUDING COAXIAL CONNECTORS.

CAUTION: REPLACE EACH REMOVED PLASTIC FASTENER IN SAME LOCATION AS MARKED AND CONFIGURED PRIOR TO REMOVAL.

CAUTION: AVOID EXPOSING COMPONENTS TO EXCESSIVE HEAT WHEN SOLDERING.

(3) ESD



CAUTION: THE POWER SUPPLY ASSY, MULTI-FUNCTION PCB ASSY, RF ASSY AND PROCESSOR PCB ASSY CONTAIN PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING REASSEMBLY SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED.

(4) EMC and Safety Compliance

All assemblies, cables, connectors, plastic fasteners, gaskets, fingerstock and miscellaneous hardware within the Test Set are configured to satisfy the safety and EMC compliance standards.

CAUTION: UPON COMPLETION OF ANY MAINTENANCE ACTION, ALL ASSEMBLIES, CABLES, CONNECTORS, PLASTIC FASTENERS, GASKETS, FINGERSTOCK AND MISCELLANEOUS HARDWARE MUST BE CONFIGURED AS INSTALLED AT THE FACTORY.

C. Reassembly Procedures

(1) Battery

- Reassembly should be performed in reverse sequence of disassembly.
- Torque the five captive screws on the Battery Cover to 8 in/lbs.

(2) Fuse

- Reassembly should be performed in reverse sequence of disassembly.
- Torque the five captive screws on the Battery Cover to 8 in/lbs.

(3) Case Assy

- Reassembly should be performed in reverse sequence of disassembly.
- Torque the eight screws on the Case Assy to 17 in/lbs.

(4) Power Supply PCB Assy

- Reassembly should be performed in reverse sequence of disassembly.
- Install new gap pad between the Power Supply PCB Assy and the Chassis Assy.
- Torque the eight screws on the Power Supply PCB Assy to 6 in/lbs.

(5) RF Assy

- Reassembly should be performed in reverse sequence of disassembly.
- Replace RF gasket if torn or damaged.
- Torque the 11 screws on the RF Assy to 8 in/lbs.
- Torque the two semi-rigid coaxial cable connectors to 10 in/lbs.

(6) Processor PCB Assy

- Reassembly should be performed in reverse sequence of disassembly.
- Torque the 4 nuts on the Processor PCB Assy to 3 in/lbs.

(7) Multi-Function PCB Assy

CAUTION: EXERCISE CAUTION WHEN INSTALLING THE RIBBON CABLE FROM THE LCD ASSY TO THE MULTI-FUNCTION PCB ASSY.

- Reassembly should be performed in reverse sequence of disassembly.
- Torque the 11 screws on the Multi-Function PCB Assy to 6 in/lbs.

(8) Keypad PCB Assy

- Reassembly should be performed in reverse sequence of disassembly.
- Torque the 12 screws on the Keypad PCB Assy to 6 in/lbs.
- Torque the five shell nuts on the Keypad PCB Assy to 6 in/lbs.

(9) LCD PCB Assy

- Reassembly should be performed in reverse sequence of disassembly.
- Reapply new double-stick tape.
- Torque the four screws on the LCD PCB Assy to 6 in/lbs.

SECTION 4 - PARTS LIST

To order parts contact:

Aeroflex
Customer Service Department
10200 West York Street
Wichita, KS 67215-8935

Telephone: (800) 835-2350
FAX: (316) 524-2623

Email: *service@aeroflex.com*

MISCELLANEOUS

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
	1002-5800-2C0	MANUAL, OP, CD, IFR 6000
	1002-5800-2P0	MANUAL, PP, OP, 6000
	1002-5800-8P0	MANUAL, PP, GETTING STARTED, 6000
	1412-5853-000	TRANSIT CASE
	5106-0000-057	FUSE, 5A, 32V, MINI BLADE
	6041-0001-000	POWER CORD (US ONLY)
	6041-5880-800	12 IN. COAXIAL CABLE
	6041-5880-900	72 IN. COAXIAL CABLE
	7001-9903-000	POWER CORD (EUROPEAN)
	7005-5840-500	ANTENNA
	7005-5841-000	BREAKOUT BOX, 6000
	7005-8142-200	ANTENNA SHIELD
	7110-5600-200	POWER SUPPLY

7003-5840-000 **ASSY, COMPOSITE** **D**

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
1	1403-5850-100	CHASSIS,REAR
2	1414-5650-800	COVER,BATTERY
3	2803-0125-006	SCREW,4-40 X 1/8 PPHM
4	2803-0500-006	SCREW,4-40 X 1/2 PPHM
5	2805-0438-006	SCREW,8-32 X 7/16 PPHM
7	2840-0000-060	WASHER,NYL,.312OD,.171ID,.032T
8	1414-0000-008	COVER,MINI POWER JACK
11	2525-5851-900	GASKET, RF
13	1421-5651-300	BUMPER,CORNER
14	1407-5651-400	HANDLE,EXTRUDED
15	1407-5651-500	HANDLE,STRAP
16	1414-5651-700	COVER,BNC/TNC
17	1414-5851-800	COVER, REMOTE
18	2803-0125-005	SCREW,4-40 X 1/8 SHOULDER
19	2403-5851-600	OVERLAY, REAR
20	2525-5652-000	GASKET,POWER SUPPLY
21	2405-5652-300	O-RING,FLEX-SHLD,.094D,10.86ID
22	2405-5652-200	O-RING,FLEX-SHLD,.063D,6.48ID
A01	7010-5630-500	PCB ASSY,POWER SUPPLY
A02	7005-5840-100	MECH ASSY,FRONT CHASSIS
A03	7005-5840-400	MECH ASSY,RF
BT01	7020-0012-500	PURCH ASSY,LIION BATTERY PACK
J01	2123-0000-110	CONN,F,BNC,BH,ADP,SMB,WTRPRF
J02	2123-0000-109	CONN,F,TNC,BH,ADP,SMA,WTRPRF
J03	2123-0000-110	CONN,F,BNC,BH,ADP,SMB,WTRPRF
J04	2123-0000-109	CONN,F,TNC,BH,ADP,SMA,WTRPRF
W01	7007-5680-100	WIRE HARN ASSY,DC INPUT
W02	6045-5680-400	RBN CA ASSY,28GA,34C,6.0L,2MM
W03	6045-5880-600	RBN CA ASSY,28GA,26C,10.25L,2M
W06	6050-0040-500	COAX ASSY, 316,R F SMB/R F SMB
W07	6050-0040-500	COAX ASSY, 316,R F SMB/R F SMB
W10	6042-5880-500	COAX ASSY,RF
W11	6042-5880-500	COAX ASSY,RF

7005-5840-100 ASSY, CHASSIS D

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
1	1403-5850-000	CHASSIS,FRONT
2	1400-5650-200	BRACKET,DISPLAY
3	1414-5650-300	COVER,DISPLAY
4	2508-5650-400	SHIELD,DISPLAY
5	3900-5650-500	LENS,DISPLAY
6	2403-5850-600	OVERLAY, FRONT
7	7067-5650-700	KEYPAD,PEEL-N-PLACE ARRAY
8	2803-0188-003	SCREW,4-40 X 3/16 PFHM
9	2803-0188-006	SCREW,4-40 X 3/16 PPHM
10	2803-0250-006	SCREW,4-40 X 1/4 PPHM
11	2803-0375-006	SCREW, 4-40 X 3/8 PPHM
12	2801-0375-006	SCREW,2-56 X 3/8 PPHM
13	2818-0000-017	STANDOFF,.188 HEX M/F,.187LG
14	2850-0000-012	NUT,HEX,SMALL PAT,2-56
15	2405-5652-100	O-RING,SIL,60 DUR,.063D,16.25L
16	2840-0000-004	WASHER,LOCK,INT TOOTH,2
20	2525-5852-700	GASKET,D-SUB,25-P,EMI
21	2845-5652-500	FINGERSTOCK,98-560,3.630 LG
22	2845-5652-600	FINGERSTOCK,98-560,5.115 LG
24	2850-7882-600	SPCR,FOAM,.25"X.75"X 1.25"
A01	7010-5830-700	PCB ASSY,KEYPAD
A03	7010-5830-300	PCB ASSY,MULTIFUNCTION
A04	7110-5600-000	PURCHASED ASSY,LCD
A05	7110-5800-100	PURCH ASSY,KEYPAD
A06	7110-5830-800	PURCHASED ASSY,FLEX
JTB01	2132-0004-000	CONN,JUMPER BLOCK,.1C,.025 PIN
W05	6050-1990-500	COAX ASSY,316,RFSSMB/RFSSMB
W06	6061-1991-100	COAX ASSY,100,RFSSMB/RFSSMB

7005-5840-400 **ASSY, RF** **D**

REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
1	1415-5851-000	ENCLOSURE,RF
2	2803-0188-006	SCREW,4-40 X 3/16 PPHM
3	2801-0156-006	SCREW,2-56 X 5/32 PPHM
4	2803-0188-002	SM,4-40X3/16,ASH,SS,PA
5	2801-0188-006	SCREW 2-56 X 3/16 PPHMS
6	2801-0438-006	SCREW,2-56 X 7/16 PPHM
A01	7010-5830-400	PCB ASSY,RF CONTROLLER
A02	7010-5830-600	PCB ASSY,RF CONVERTER
A03	7010-5830-900	PCB ASSY,1085MHZ BP FILTER
A2J2	2129-1028-024	CONN,HDR,STR,DUAL,2MM,24P
AT01	2901-0000-022	ATTENUATOR,20DB,FLNG MT,100W
HY01	3401-0100-600	CIRCULATOR,960-1.215GHZ
J01	2123-0000-108	CONN,F,SMA,ST,FLNG,SOL,P
J02	2123-0000-108	CONN,F,SMA,ST,FLNG,SOL,P
J03	2123-0000-067	CONN,M,SSMB,ST,BH,PCM,SOL,G
J04	2123-0000-067	CONN,M,SSMB,ST,BH,PCM,SOL,G
W01	2114-0000-063	TEST POINT POST AMP GOLD
W02	2114-0000-063	TEST POINT POST AMP GOLD
W03	2114-0000-063	TEST POINT POST AMP GOLD
W04	2114-0000-063	TEST POINT POST AMP GOLD
W05	2114-0000-063	TEST POINT POST AMP GOLD

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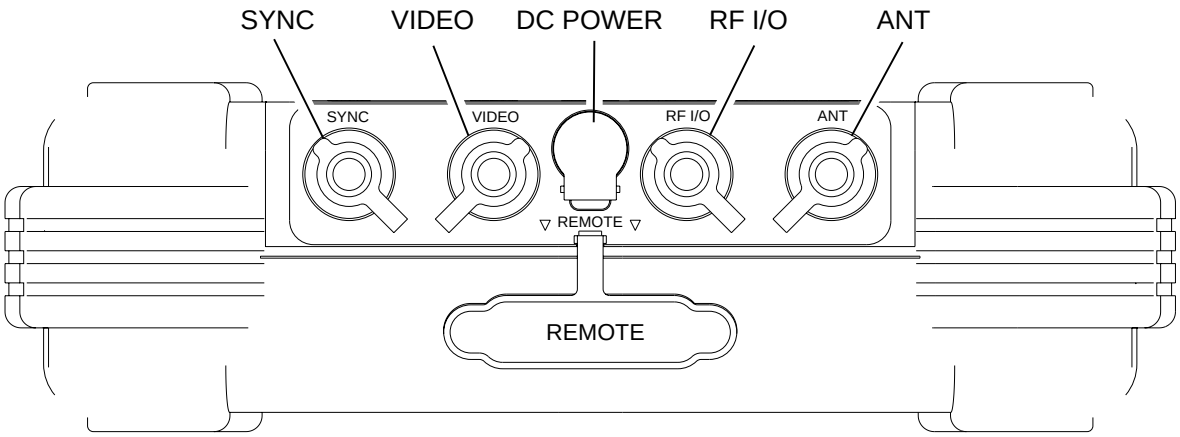
APPENDIX A - CONNECTOR PIN-OUT TABLES

1. I/O CONNECTORS

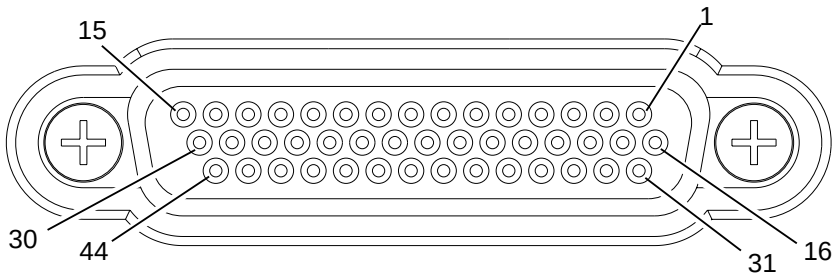


05806

CONNECTOR	TYPE	SIGNAL TYPE	INPUT/OUTPUT
SYNC	BNC	TTL	OUTPUT
VIDEO	BNC	TTL	OUTPUT
DC POWER	2.5 mm CIRCULAR (2.5 mm center, 5.5 mm outer diameter, center positive)	11 to 32 Vdc	INPUT
RF I/O	TNC	RF, 30 W CW MAX	INPUT/OUTPUT
ANT	TNC	RF, 0.5 W CW MAX	INPUT/OUTPUT
REMOTE	44-Pin Female	MIXED	INPUT/OUTPUT
	Refer to Appendix A, Table 2 for REMOTE Connector description.		

I/O Connectors
Table 1

2. REMOTE CONNECTOR PIN-OUT TABLE



05807

PIN NO.	SIGNAL NAME	SIGNAL TYPE	DESCRIPTION
1	VBUS_DN1	Supply	+5V supply for USB device port
2	GND_DN1	Ground	Ground for USB device port
3	VBUS_UP	Supply	+5V supply input from USB host
4	GND_UP	Ground	Ground for USB host port
5	GND	Ground	System Ground
6	HOST-RTS	Output	RS-232 Request to send
7	A2	Input	Altitude Encode Input
8	A4	Input	Altitude Encode Input
9	C2	Input	Altitude Encode Input
10	C4	Input	Altitude Encode Input
11	GND	Ground	System Ground
12	REM_IN1	Input	General Purpose Input
13	REM_OUT2	Output	General Purpose Output
14	GND	Ground	System Ground
15	GND	Ground	System Ground
16	H_D-	In/Out	USB Host Data Compliment
17	H_D+	In/Out	USB Host Data True
18	D_D-	In/Out	USB Host Data Compliment
19	D_D+	In/Out	USB Host Data True
20	GND	Ground	System Ground
21	HOST_TXD	Output	RS-232 Data Output
22	HOST_CTS	Input	RS-232 Clear to send
23	B1	Input	Altitude Encode Input
24	B2	Input	Altitude Encode Input
25	D2	Input	Altitude Encode Input

REMOTE Connector Pin-Out Table
Table 2

2. REMOTE CONNECTOR PIN-OUT TABLE (cont)

PIN NO.	SIGNAL NAME	SIGNAL TYPE	DESCRIPTION
26	GND	Ground	System Ground
27	REM_IN2	Input	General Purpose Input
28	REM_IN3	Input	General Purpose Input
29	REM_OUT4	Output	General Purpose Output
30	GND	Ground	System Ground
31	VBUS_DN1	Supply	+5V supply for USB device port
32	VBUS_DN1	Supply	+5V supply for USB device port
33	VBUS_UP	Supply	+5V supply input from USB host
34	GND_UP	Ground	Ground for USB host port
35	GND	Ground	System Ground
36	HOST_RXD	Input	RS-232 Data Input
37	A1	Input	Altitude Encode Input
38	B4	Input	Altitude Encode Input
39	C1	Input	Altitude Encode Input
40	REM_SP1		Spare Pin
41	D4	Input	Altitude Encode Input
42	REM_IN4	Input	General Purpose Input
43	REM_OUT1	Output	General Purpose Output
44	REM_OUT3	Output	General Purpose Output

REMOTE Connector Pin-Out Table (cont)
Table 2

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APPENDIX B - TEST EQUIPMENT REQUIREMENTS

This Appendix contains a list of test equipment suitable for performing all testing procedures contained in this manual. Other equipment meeting specifications listed in this Appendix may be substituted in place of recommended models. Equipment listed in this Appendix may exceed minimum required specifications for some procedures contained in this manual.

Name	Mfg.	Model
Frequency Counter	Agilent	53181A or Equivalent
Arbitrary Waveform Generator #1	Agilent	33220A or Equivalent
Arbitrary Waveform Generator #2	Agilent	33220A or Equivalent
Spectrum Analyzer	Aeroflex	2392A w/opt. 2
Signal Generator	Aeroflex	2023B w/opt. 7
Measuring Receiver	Agilent	8902A or Equivalent
Measuring Receiver Sensor	Agilent	11722A or Equivalent
Power Meter	Agilent	E4418B or Equivalent
Power Sensor	Agilent	E4412A or Equivalent
Digital Oscilloscope	Tektronix	TDS-3032B or Equivalent
RF Detector	Herotek	DTM180AB or Equivalent
Power Splitter (6 dB)	Weinschel	1506A or Equivalent
VSWR Bridge	Anritsu	60N50 or Equivalent
Transponder/DME Test Set	Aeroflex	ATC-1400A
Computer with RS-232 port and USB port		Must be capable of running Agilent's Intuilink software
Intuilink Software	Agilent	Refer to Agilent website
Tera Term Terminal software		Shareware
Ramp Test Set	Aeroflex	IFR-6000
Breakout Box	Aeroflex	7005-5841-000

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APPENDIX C - METRIC/BRITISH IMPERIAL CONVERSION TABLE WITH NAUTICAL DISTANCE CONVERSIONS

TO CONVERT:	INTO:	MULTIPLY BY:	TO CONVERT:	INTO:	MULTIPLY BY:
cm	feet	0.03281	meters	feet	3.281
cm	inches	0.3937	meters	inches	39.37
feet	cm	30.48	m/sec	ft/sec	3.281
feet	meters	0.3048	m/sec	km/hr	3.6
ft/sec	km/hr	1.097	m/sec	miles/hr	2.237
ft/sec	knots	0.5921	miles	feet	5280
ft/sec	miles/hr	0.6818	miles	km	1.609
ft/sec^2	cm/sec^2	30.48	miles	meters	1609
ft/sec^2	m/sec^2	0.3048	miles	nmi	0.8684
grams	ounces	0.03527	miles/hr	ft/sec	1.467
inches	cm	2.54	miles/hr	km/hr	1.609
kg	pounds	2.205	miles/hr	knots	0.8684
kg/cm^2	psi	0.0703	nmi	feet	6080.27
km	feet	3281	nmi	km	1.8532
km	miles	0.6214	nmi	meters	1853.2
km	nmi	0.5396	nmi	miles	1.1516
km/hr	ft/sec	0.9113	ounces	grams	28.34953
km/hr	knots	0.5396	pounds	kg	0.4536
km/hr	miles/hr	0.6214	psi	kg/cm^2	0.0703
knots	ft/sec	1.689	100 ft	km	3.048
knots	km/hr	1.8532	100 ft	miles	1.894
knots	miles/hr	1.1516	100 ft	nmi	1.645

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APPENDIX D - SPECIFICATIONS

NOTE: A 5 minute warm-up period is required for all specifications.

RF SIGNAL GENERATOR

Output Frequency

Reply Frequency

Range:	962 to 1213 MHz
Accuracy:	± 10 kHz

Output Level

Antenna Port

Range:	-67 to -2 dBm at Antenna port
Resolution:	1 dB
Accuracy:	± 2 dB
Distance to UUT antenna:	6 to 300 ft with supplied antenna

RF I/O Port

Range:	-115 to -47 dBm
Resolution:	1 dB
Accuracy:	
-95 dBm to –47 dBm	± 1 dB
-115 dBm to <-95 dBm	± 2 dB

Reply Pulse Spacing

P1 to P2:	12 µs ± 100 ns (X Channel) @ 50% peak
P1 to P2:	30 µs ± 100 ns (Y Channel) @ 50% peak

Reply Pulse Width

P1/P2:	3.5 µs ± 0.5 µs

Echo Reply

Control:	On/Off
Position:	30 nmi ± 1 nmi
Amplitude:	-11 dB ± 1 dB relative to reply level

Reply Pulse Rise and Fall Times

All Pulses

Rise Time:	2.5 µs ± 0.25 µs (10% to 90%)
Fall Time:	2.5 µs ± 0.25 µs (90% to 10%)

RF SIGNAL GENERATOR (cont)

Reply Delay

X Channel

Fixed Reply Delay:	50 µs ± 100 ns

Y Channel

Fixed Reply Delay:	56 µs ± 100 ns

Range Delay

X and Y Channel

Range:	0 to 450.00 nmi
Resolution:	0.01 nmi
Accuracy:	± 0.01 nmi

Range Rate

X and Y Channel

Range:	10 to 6500 kts
Resolution:	1 kts
Accuracy:	± 0.01 % typical, tested to ± 0.5%

Squitter

PRF:	2700 Hz
Accuracy:	± 2%
Distribution	Per ARINC 568

Reply Efficiency

Range:	0 to 100%
Resolution:	1% increments
Accuracy:	± 0.5%

Ident Tone

Selection:	Selectable three letter code
Frequency:	1350 Hz
Accuracy:	± 2 Hz

UUT MEASUREMENTS

ERP

Range:	+47 to +64 dBm
Resolution:	0.1 dB
Accuracy:	± 2 dB

Direct Connection Peak Pulse Power

Range:	+47 to +64 dBm
Resolution:	0.1 dB
Accuracy:	± 1 dB

Frequency

Range:	1025.00 to 1150.00 MHz
Resolution:	10 kHz
Accuracy:	± 20 kHz

Interrogation Pulse Width

P1 and P2 Pulse Widths

Range:	2.00 to 5.00 µs
Resolution:	1 ns
Accuracy:	± 50 ns

Interrogation Pulse Spacing

P1 to P2 Spacing:	10 to 14 µs (X Channel)
P1 to P2 Spacing:	34 to 38 µs (Y Channel)
Resolution:	10 ns
Accuracy:	± 20 ns

Interrogation PRF

Range 1 to 300 Hz

Resolution:	1 Hz
Accuracy:	± 2 Hz

TRANSPONDER MODE SPECIFICATIONS

Signal Generator

RF Output Frequency

Interrogation Frequency:	1030 MHz
Accuracy:	± 10 kHz

RF Output Level

Antenna Port	MTL + 6 dB typical, automatically controlled for a MTL range of -83 to -68 dBm
Range:	-67 to -2 dBm at antenna port
Resolution:	0.5 dB
Accuracy:	± 2 dB
Distance to UUT antenna:	6 to 200 ft with supplied antenna
RF I/O Port	MTL + 6 dB typical, automatically controlled
Range:	-115 to -47 dBm
Resolution:	0.5dB
Accuracy:	
-95 to –47 dBm	± 1 dB
-115 to <-95 dBm	± 2 dB

ATCRBS/Mode S Interrogation Pulse Spacing

Mode A	
P1 to P2:	2.00 µs ± 25 ns
P1 to P3:	8.00 µs ± 25 ns
Mode C	
P1 to P2:	2.00 µs ± 25 ns
P1 to P3:	21.00 µs ± 25 ns
Mode S	
P1 to P2:	2.00 µs ± 25 ns
P1 to P6:	3.50 µs ± 25 ns
P1 to SPR:	4.75 µs ± 25 ns
P5 to SPR:	0.40 µs ± 50 ns

Intermode Interrogation Pulse Spacing

Mode A	
P1 to P3:	8.00 µs ± 25 ns
P1 to P4:	10.00 µs ± 25 ns
Mode C	
P1 to P3:	21.00 µs ± 25 ns
P1 to P4:	23.00 µs ± 25 ns

TRANSPONDER MODE SPECIFICATIONS (cont)

Interrogation Pulse Widths

Mode A,C,S,Intermode	
P1,P2,P3:	0.80 µs ± 50 ns
Mode S	
P6 (Short DPSK Block):	16.25 µs ± 50 ns
P6 (Long DPSK Block):	30.25 µs ± 50 ns
P5:	0.80 µs ± 50 ns
Intermode	
P4 (Short):	0.80 µs ± 50 ns
P4 (Long):	1.60 µs ± 50 ns

Interrogation Pulse Rise and Fall Times

All Modes	
Rise Time:	50 to 100 ns
Fall Time:	50 to 200 ns

Phase Modulation

All Modes	
Transition Time:	≤ 80 ns
Phase Shift:	180° ± 10°

SLS Levels

ATCRBS	
SLS Level (P2):	-9 dB, -1 to +0 dB relative to P1 level
	0 dB, -0 to +1 dB relative to P1 level
	Off
Mode S	
SLS Level (P5):	-12 dB, -1 to +0 dB relative to P6 level
	+3 dB, -0 to +1 dB relative to P6 level
	Off

Note: SLS level is automatically controlled in the SLS LEVEL test.

Interrogation Test Signals

Mode S	
PRF:	50 Hz ± 5 Hz
ATCRBS	
PRF:	235 Hz ± 5 Hz

TRANSPONDER MODE SPECIFICATIONS (cont)

UUT Measurements

ERP (at 1090 MHz)

Range:	+ 45.5 to + 59 dBm (35.5 to 800 watts)
Resolution:	0.1 dB
Accuracy:	± 2 dB

Direct Connection Peak Pulse Power (at 1090MHz)

Range:	+ 46.5 to + 59 dBm (45 to 800 watts)
Resolution:	0.1 dB
Accuracy:	± 1 dB

Transmitter Frequency

Range:	1087.000 to 1093.000 MHz
Resolution:	10 kHz
Accuracy:	± 50 kHz

Receiver Sensitivity, Radiated MTL

Range:	-67 to -79 dBm into 0 dBi antenna
Resolution:	0.1 dB
Accuracy:	± 2 dB, typical

Receiver Sensitivity, Direct Connection MTL

Range:	-67 to -79 dBm
Resolution:	0.1 dB
Accuracy:	± 2 dB

Reply Delay

ATCRBS

Range:	1.80 to 7.00 µs
Resolution:	10 ns
Accuracy:	± 50 ns

Mode S and ATCRBS Mode S All-Call

Range:	125.00 to 131.00 µs
Resolution:	10 ns
Accuracy:	± 50 ns

TRANSPONDER MODE SPECIFICATIONS (cont)

Reply Delay Jitter

ATCRBS

Range:	0.00 to 2.30 µs
Resolution:	1 ns
Accuracy:	± 20 ns

Mode S and ATCRBS Mode S All-Call

Range:	0.00 to 6.00 µs
Resolution:	1 ns
Accuracy:	± 20 ns

Pulse Spacing

F1 to F2

Range:	19.70 to 21.60 µs
Resolution:	1 ns
Accuracy:	± 20 ns

Mode S Preamble

Range, P1 to P2:	0.8 to 1.2 µs
Range, P1 to P3:	3.3 to 3.7 µs
Range, P1 to P4:	4.3 to 4.7 µs
Resolution:	1 ns
Accuracy:	± 20 ns

Pulse Widths

F1 and F2

Range:	0.25 to 0.75 µs
Resolution:	1 ns
Accuracy:	± 20 ns

Mode S Preamble

Range:	0.25 to 0.75 µs
Resolution:	1 ns
Accuracy:	± 20 ns

Pulse Amplitude Variation

Range, Mode S (Relative to P1):	+3 to -3 dB
Range, ATCRBS (Relative to F1):	+3 to -3 dB
Resolution:	0.1 dB, (0.01 dB via RCI)
Accuracy:	± 0.5 dB

TRANSPONDER MODE (cont)

DF 11 Squitter Period

Range:	0.10 to 4.88 sec
Resolution:	10 ms
Accuracy:	± 10 ms

Diversity Isolation

Range:	0 to >20 dB (Depending on Test Distance)
Test Distance:	1.83m (6ft) to 28.96m (95ft)
Resolution:	0.1 dB
Accuracy:	± 3 dB

TCAS MODE

Signal Generator

Output Frequency

Reply Frequency:	1090 MHz
Accuracy:	± 10 kHz

Output Level (Simulated ERP)

Antenna Port

Range:	-67 to -2 dBm at Antenna port
Resolution:	0.5 dB
Accuracy:	± 2 dB
Distance to UUT antenna:	6 to 300 ft with supplied antenna

Note: Radiated power at 0dBi UUT antenna -68 dBm at 10 Nmi Range, automatically controlled

RF I/O Port

Automatic mode:	-68 dBm @ 10 Nmi Range, automatically controlled
Manual mode range:	-115 to –47 dBm
Resolution:	0.5 dB
Accuracy:	
-95 to –47 dBm	± 1 dB
-115 to <-95 dBm	± 2 dB

Reply Pulse Spacing

Mode C

F1 to F2:	20.30 µs ± 25 ns
F1 to C1:	1.45 µs ± 25 ns
F1 to A1:	2.90 µs ± 25 ns
F1 to C2:	4.35 µs ± 25 ns
F1 to A2:	5.80 µs ± 25 ns
F1 to C4:	7.25 µs ± 25 ns
F1 to A4:	8.70 µs ± 25 ns
F1 to B1:	11.60 µs ± 25 ns
F1 to D1:	13.05 µs ± 25 ns
F1 to B2:	14.50 µs ± 25 ns
F1 to D2:	15.95 µs ± 25 ns
F1 to B4:	17.40 µs ± 25 ns
F1 to D4:	18.85 µs ± 25 ns

TCAS MODE (cont)

Reply Pulse Spacing

Mode S

P1 to P2:	1.00 µs ± 25 ns
P1 to P3:	3.50 µs ± 25 ns
P1 to P4:	4.50 µs ± 25 ns
P1 to D1:	8.00 µs ± 25 ns
D1 to Dn (n=2 to 112):	1.00 µs times (n-1) ± 25 ns

Reply Pulse Widths

Mode C

All Pulses:	0.45 µs ± 50 ns

Mode S

P1 through P4:	0.50 µs ± 50 ns
D1 through D112:	0.50 µs ± 50 ns, 1 µs chip width

Reply Modes

TCAS I / II Mode C (with altitude reporting)

TCAS II Mode S formats 0, 11, 16

Reply Pulse Amplitudes

ATCRBS:	± 1 dB relative to F1
Mode S:	± 1 dB relative to P1

Reply Pulse Rise and Fall Times

All Modes

Rise Time:	50 to 100 ns
Fall Time:	50 to 200 ns

Percent Reply

Range:	0 to 100%
Resolution:	10%
Accuracy:	± 1%

Reply Delay

ATCRBS:	3.0 µs ± 50 ns
Mode S:	128 µs ± 50 ns

Range Delay

Range:	0 to 260 nmi
Resolution:	0.1 nmi
Accuracy:	± 0.02 nmi

TCAS MODE (cont)

Range Rate

Range:	-1200 to +1200 kts
Resolution:	10 kts
Accuracy:	10%

Altitude Range

Range:	-1000 to 126,000 ft
Resolution, Mode C:	100 ft
Resolution, Mode S:	25 ft

Altitude Rate

Range:	-10,000 to +10,000 fpm
Resolution:	100 fpm
Accuracy:	10%

Squitter

Control: On/Off

Rate: 0.8 to 1.2 seconds, randomly distributed

RECEIVER

Pulse Spacing

ATCRBS (Mode C All Call)

S1 to P1:	2.0 us
Accepts:	≤ ±200 ns
Rejects:	≥ ±1.0 us
P1 to P3:	21.0 us
Accepts:	≤ ±200 ns
Rejects: (<10% Replies)	≥ ±1.0 us
P1 to P4:	23.0 us
Accepts:	≤ ±200 ns
Rejects: (<10% Replies)	≥ ±1.0 us

Mode S

P1 to P2:	2.0 us
Accepts:	≤ ±200 ns
Rejects: (<10% Replies)	≥ ±1.0 us
P1 to SPR:	4.75 us
Accepts:	≤ ±200 ns
Rejects: (<10% Replies)	≥ ±1.5 us

Suppresion

ATCRBS (P2 or S1)

>0.5dB above level of P1	<10% Replies

UUT MEASUREMENTS

ERP (at 1030MHz)

ATCRBS

Range:	+43 to +58 dBm (20 to 631 watts)
Resolution:	0.1 dB
Accuracy:	± 2 dB

Mode S

Range:	+43 to +58 dBm (20 to 631 watts)
Resolution:	0.1 dB
Accuracy:	± 2 dB

Direct Connection Peak Pulse Power (at 1030MHz)

ATCRBS

Range:	+43 to +58 dBm (20 to 631 watts)
Resolution:	0.1 dB
Accuracy:	± 1 dB

Mode S

Range:	+43 to +58 dBm (20 to 631 watts)
Resolution:	0.1 dB
Accuracy:	± 1 dB

Frequency

Range:	1029.900 to 1030.100 MHz
Resolution:	1 kHz
Accuracy:	± 10 kHz

TCAS Broadcast Interval

Range	1.0 to 12.0 seconds
Resolution:	0.1 seconds
Accuracy:	± 0.2 seconds

MISCELLANEOUS

Input/Outputs

RF I/O

Type:	Input/Output
Impedance:	50 Ω typical
Maximum Input Level:	4 kW peak
	10 W average
VSWR:	< 1.3:1

Antenna

Type:	Input/Output
Impedance:	50 Ω typical
Maximum Input Level:	10 W peak
	1/2 W average

Video

Type:	Output
Impedance:	50 Ω typical
Generate Video Level:	1.0 ± 0.5V peak to peak into 50 Ω (1030 MHz at -67dBm)
Receive Video Level:	Proportional to IF level
Baseline:	± 0.5V referenced to ground

Test Antenna

VSWR	< 1.5:1
Gain:	6 dB, Typical

Time Base (TCXO)

Temperature Stability	± 1 ppm
Aging ± 1 ppm per year	
Accuracy:	± 1 ppm
Test Limit:	± 0.3 ppm

Battery

Type: Li Ion	
Duration:	> 4 hrs continuous operation
	> 6 hrs, Typical

Input Power (Test Set)

Input Range:	11 VDC to 32 VDC
Power Consumption:	55 W Maximum
	16 W Nominal at 18 VDC with charged battery
Fuse Requirements:	5 A, 32 VDC, Type F

MISCELLANEOUS (cont)

Input Power (Supplied External AC to DC Converter)

Input Range:	100 to 250 VAC, 1.5 A Max, 47-63 Hz
Mains Supply Voltage Fluctuations:	≤ 10% of the nominal voltage
Transient Overvoltages:	According to Installation Category II

Environmental (Test Set)

Use:	Pollution Degree 2
Altitude:	≤ 4800 meters
Operating Temperature:	NOTE 3 -20˚C to 55°C
Storage Temperature:	NOTE 4 -30˚C to 71˚C
Relative Humidity:	95% ±5% from 5° to 30°C,
	75% ±5% from 30° to 40°C,
	45% ±5% from 40° to 55°C

Environmental (Supplied External AC to DC Converter)

Use:	Indoors
Altitude:	≤ 10,000 meters
Operating Temperature:	0° to 40°C
Storage Temperature:	-20˚C to 71˚C

Physical Characteristics

Dimensions

Height:	11.2 inches (28.5 cm)
Width:	9.1 inches (23.1 cm)
Depth:	2.7 inches (6.9 cm)
Weight: (Test set only)	< 8 lbs. (3.6 kg)

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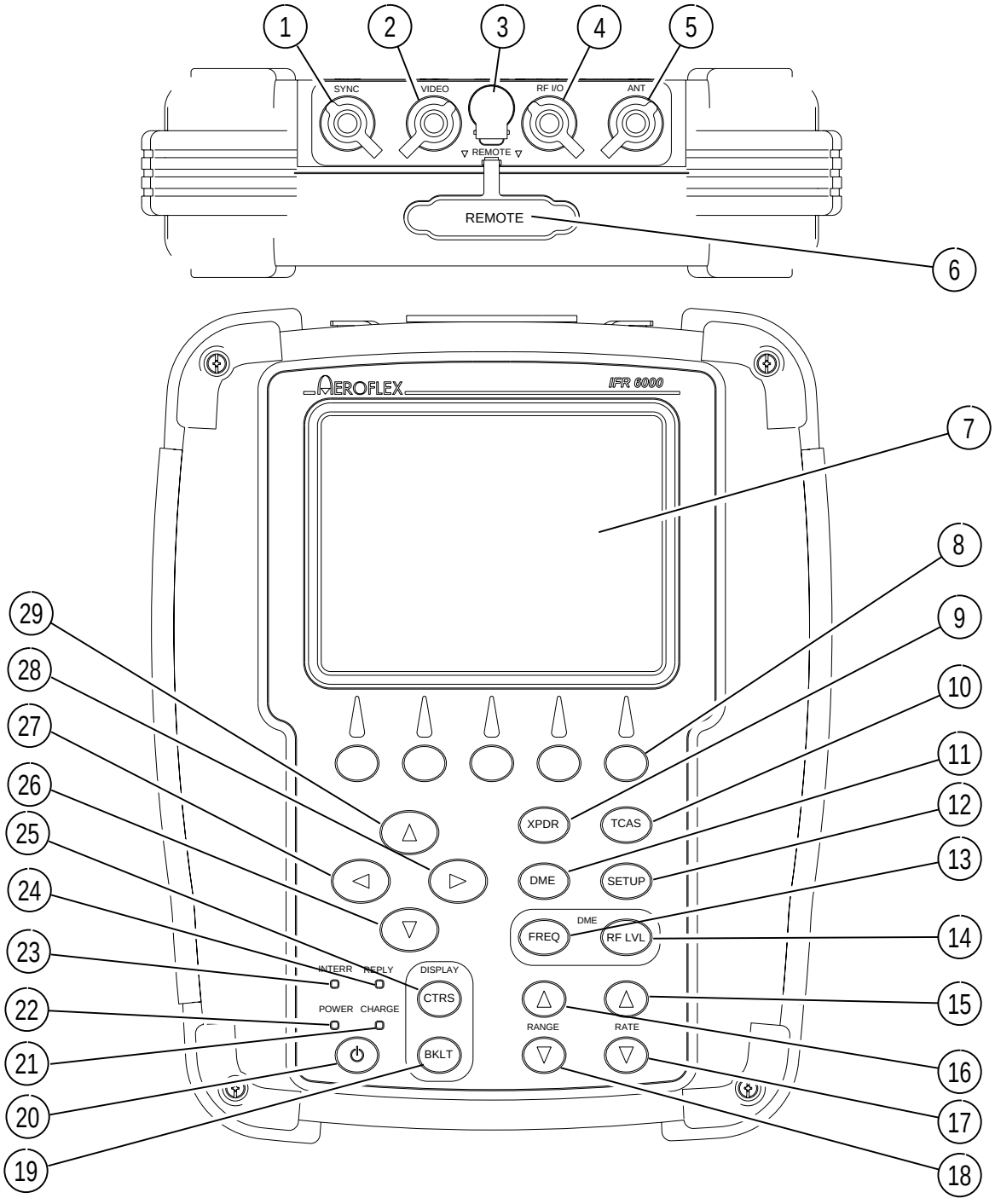
APPENDIX E - CONTROLS, CONNECTORS AND INDICATORS



IFR 6000 Front Panel
Figure 2

NUMERICAL LOCATION LIST		ALPHABETICAL LOCATION LIST	
1.	SYNC Connector	ALTITUDE ENCODER Connector	37
2.	VIDEO Connector	ANT Connector	30
3.	DC POWER Connector	AUX IN Connector	38
4.	RF I/O Connector	AUX OUT Connector 1	31
5.	Test Set ANT Connector	AUX OUT Connector 2	32
6.	REMOTE Connector	AUX OUT Connector 3	33
7.	Display	AUX OUT Connector 4	34
8.	Multi-Function Soft Keys	BACKLIGHT Key	19
9.	XPDR Mode Select Key	CHARGE Indicator	21
10.	TCAS Mode Select Key	CONTRAST Key	25
11.	DME Mode Select Key	DC POWER Connector	3
12.	SETUP Select Key	DECREMENT/SELECT Data Key	26
13.	FREQ Select Key	RF LEVEL Key	14
14.	RF LVL Key	Display	7
15.	RATE INCREMENT Key	DME Mode Select Key	11
16.	RANGE INCREMENT Key	FREQ Select Key	13
17.	RATE DECREMENT Key	INCREMENT/SELECT Data Key	29
18.	RANGE DECREMENT Key	INTERR Indicator	23
19.	BACKLIGHT Key	Multi-Function Soft Keys	8
20.	POWER Key	POWER Indicator	22
21.	CHARGE Indicator	POWER Key	20
22.	POWER Indicator	RANGE DECREMENT Key	18
23.	INTERR Indicator	RANGE INCREMENT Key	16
24.	REPLY Indicator	RATE DECREMENT Key	17
25.	CONTRAST Key	RATE INCREMENT Key	15
26.	DECREMENT/SELECT Data Key	REMOTE Connector	6
27.	SELECT DATA UNIT MSB Key	REMOTE Connector	40
28.	SELECT DATA UNIT LSB Key	REPLY Indicator	24
29.	INCREMENT/SELECT Data Key	RF I/O Connector	4
30.	ANT Connector	RS-232 Connector	39
31.	AUX OUT Connector 1	SETUP Select Key	12
32.	AUX OUT Connector 2	SELECT DATA UNIT MSB Key	27
33.	AUX OUT Connector 3	SELECT DATA UNIT LSB Key	28
34.	AUX OUT Connector 4	SYNC Connector	1
35.	USB HOST Connector	TCAS Mode Select Key	10
36.	USB DEVICE Connector	Test Set ANT Connector	5
37.	Altitude Encoder Connector	USB DEVICE Connector	36
38.	AUX IN Connector	USB HOST Connector	35
39.	RS-232 Connector	VIDEO Connector	2
40.	REMOTE Connector	XPDR Mode Key	9

ITEM DESCRIPTION

1. SYNC Connector

   BNC type connector provides oscilloscope SYNC pulse for each interrogation.

2. VIDEO Connector

   BNC type connector provides interrogation and reply pulses.

3. DC POWER Connector

   Circular Type Connector (2.5 mm center, 5.5 mm outer diameter, center positive) used for battery charging or operation of Test Set.

4. RF I/O Connector

   CAUTION: MAXIMUM INPUT TO THE RF I/O CONNECTOR MUST NOT EXCEED 5 KW PEAK OR 30 W AVERAGE.

   TNC Type connector used for direct connection to UUT antenna connector.

5. Test Set ANT Connector

   TNC Type Connector used for connection to the IFR 6000 directional antenna for over the air testing.

6. REMOTE Connector

   Type HD DB44 Connector used for remote operation and software upgrades. Contains RS-232, USB Host and USB Peripheral connections (altitude encoder inputs and SYNC outputs).

7. Display (LCD)

   38 characters by 16 lines for main screen display with Soft Key boxes at the bottom of the screen.

8. Multi-Function Soft Keys

   Legends for the five soft keys are displayed in boxes at the bottom of the Display (LCD) screen.

9. XPDR MODE Select Key

   Selects Transponder Auto Test Screen.

10. TCAS MODE Select Key

    Selects TCAS Auto Test Screen.

11. DME MODE Select Key

    Selects DME Test Screen.

12. SETUP Key

    Displays the SETUP Menu.

13. FREQ Select Key

    Selects DME Frequency as VOR Paired, TACAN Channel or MHz.

14. RF LVL Key

    DME mode function only. Selects DME range reply and squitter RF level.

15. RATE INCREMENT Key

    Increments DME or TCAS range rate.

16. RANGE INCREMENT Key

    Increments DME or TCAS range.

ITEM DESCRIPTION

17. RATE DECREMENT Key

    Decrements DME or TCAS range rate.

18. RANGE DECREMENT Key

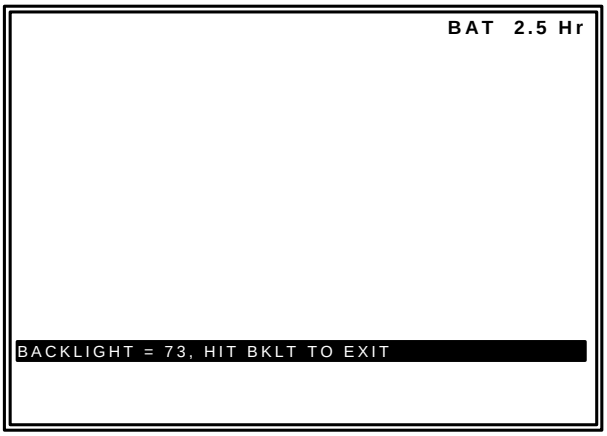
    Decrements DME or TCAS range.

19. BACKLIGHT Key

    Displays/exits the Backlight Adjust Field.

    INCREMENT/SELECT Data Key or DECREMENT/SELECT Data Key may be used to adjust the Backlight Intensity.

    The IFR 6000 powers up with the Backlight set to the setting of the previous session.



20. POWER Key

    Powers the IFR 6000 ON and OFF.

21. CHARGE Indicator

    Illuminated when external DC power is applied for Bench Operation or Battery charging.

    CHARGE Indicator is yellow when the battery is charging, flashing yellow when the battery needs replacing and green when the battery is fully charged.

22. POWER Indicator

    Illuminated when the IFR 6000 is operational.

23. INTERR Indicator

    Illuminated when Test Set is generating an interrogation signal (XPDR Mode) or receives an Interrogation (TCAS Mode) signal.

24. REPLY Indicator

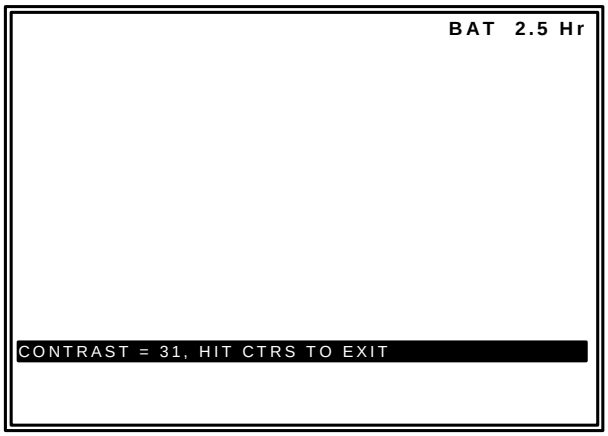
    Illuminated when the Test Set receives a valid reply signal (XPDR Mode) or generates a reply (TCAS Mode) signal.

ITEM DESCRIPTION

25. CONTRAST Key

Displays/exits the Contrast Adjust Field.

The INCREMENT/SELECT Data Key or the DECREMENT/SELECT Data Key may be used to adjust the Contrast.



26. DECREMENT/SELECT Data Key

Decrements data in slewable fields, such as RF LVL. This Key also selects data in fields that have fixed functions, such as ECHO and SQUITTER.

27. SELECT DATA UNIT MSB Key

Moves the slew cursor toward the MSB (Most Significant Bit) of the data field.

Example: When DME or TCAS range is selected, the slew cursor can be moved from the 1.0 nm unit to the 10 nm, 0.1 nm or 0.01 nm unit.

28. SELECT DATA UNIT LSB Key

This Key moves the slew cursor toward the LSB (Least Significant Bit) of the data field.

Example: When DME or TCAS range is selected, the slew cursor can be moved from the 1.0 nm unit to the 10 nm, 0.1 nm or 0.01 nm unit.

29. INCREMENT/SELECT Data Key

Increments data in slewable fields, such as RF LVL. This Key also selects data in fields that have fixed functions, such as ECHO and SQUITTER.

30. ANT Connector

TNC Type Connector used for connection to the IFR 6000 for over the air testing.

31. AUX OUT Connector 1

ATCRBS interrogation trigger used for calibration.

32. AUX OUT Connector 2

ATCRBS interrogation trigger used for calibration.

33. AUX OUT Connector 3

Not Used

ITEM	DESCRIPTION

34. AUX OUT Connector 4

    Not Used

35. USB HOST Connector

    USB Jump Drive interface for software update and test data dump (not active in first release).

36. USB DEVICE Connector

    Remote Control Interface.

37. ALTITUDE ENCODER Connector

    Interface for external encoding altimeter.

38. AUX IN Connector

    Not Used

39. RS-232 Connector

    Used for remote control interface, software update and test data dump.

40. REMOTE Connector

    Used to interface with the IFR 6000.

APPENDIX F - ABBREVIATIONS

A

A	Amperes
AC	Alternating Current
AF	Audio Frequency
AM	Amplitude Modulation
ANT	Antenna
AP	Address Parity
Assy	Assembly
ATTN	Attenuation
AUTO	Automatic
AUX	Auxiliary

B

BAT	Battery
bps	Bits per Second
BRG	Bearing

C

C	Celsius or Centigrade
CAL	Calibration
ccw	Counterclockwise
CDI	Course Deviation Indication
CHNL	Channel
cm	Centimeter (10^{-2} Meters)
COMM	Communication
Cont	Continued
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
CTS	Clear To Send
cw	Clockwise

D

DAC	Digital to Analog Converter
dB	Decibel
dBc	Decibels below Carrier
dBm	Decibels above one Milliwatt
DC	Direct Current
DDM	Difference in Depth of Modulation
DDS	Direct Digital Synthesis
deg	Degrees
DEL	Delete
DEV	Deviation
DIAGS	Diagnostics
DMA	Direct Access Memory
DRAM	Dynamic Random Access Memory
DWN	Down

E

EMC	Electromagnetic Compatibility
EXT	External

F

FM	Frequency Modulation
FPGA	Field Programmable Gate Array
FREQ	Frequency
Ft	Foot/Feet
F/W	Firmware

G

GEN	Generator or Generate
GND	Ground
G/S	Glideslope

H

Hr	Hour
Hrs	Hours
H/W	Hardware
Hz	Hertz

I

IF	Intermediate Frequency
ILS	Instrument Landing System
I/O	Input/Output

K

kg	Kilogram (10^3 Grams)
kHz	Kilohertz (10^3 Hertz)
km	Kilometer (10^3 meters)
kt	Knots (Velocity)

L

LCD	Liquid Crystal Display
LED	Light Emitting Diode
LOC	Localizer
LPF	Low-Pass Filter
LSB	Least Significant Bit
LVL	Level

M

m	Meters
MAX	Maximum
MB	Message, COMM-B
MHz	Megahertz (10^6 Hertz)
MOD	Modulation
mm	Millimeter (10^{-3} Meters)
M MOD	Master Modulation
ms	Millisecond (10^{-3} Seconds)
MSB	Most Significant Bit
mV	Milliwatt
mW	Millivolt

N

N/A	Not Applicable
NAV	Navigation
nmi	Nautical Miles
ns	Nanosecond (10^{-9} Seconds)
NVRAM	Non-Volatile Random Access Memory

O

OUT	Output

P

para	Paragraph
PARAM	Parameter
PCB	Printed Circuit Board
PLL	Phase Lock Loop
ppm	Parts per Million
PREV	Previous
PROM	Programmable Read Only Memory
psi	Pounds per Square Inch
PWR	Power

R

RAM	Random Access Memory
RES	Resolution
RF	Radio Frequency
RMS	Root Mean Square
ROM	Read Only Memory
RTS	Request To Send
R/W	Read/Write
RX	Receive

S

Sec	Seconds
SELCAL	Selective Calling
SP	Spacing
SPM	Scans per Minute
SPR	Synchronous Phase Reversal
SQTR	Squitter
Sqtr	Squitter
SRAM	Static Random Access Memory
SRQ	Service Request
SRS	Segment Request Subfield
SSR	Secondary Surveillance Radar
STD	Standard
SWP	Sweep
SWR	Standing Wave Ratio
SYNC	Synchronous

T

TCXO	Temperature Compensated Crystal Oscillator
TX	Transmit
TTL	Transistor - Transistor Logic

U

UHF	Ultra High Frequency
USB	Upper Sideband
USB	Universal Serial Bus
UUT	Unit Under Test

V

V	Volt
VAC	Volts, Alternating Current
VAR	Variable
Vdc	Volts, Direct Current
VHF	Very High Frequency
VOR	VHF Omni-Directional Range
Vrms	Volts Root Mean Square
VSWR	Voltage Standing Wave Ratio

W

W	Watt

µA	Microamps
µs	Microseconds
µW	Microwatts
Ω	Ohm

INDEX

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