MOTOROLA

MTM700

TETRA Mobile Radio
380-430 MHz (MT912)
806-870 MHz (MT712)

Detailed Service Manual

Part Number: 6866534D19-A

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DOCUMENT HISTORY

The following major changes have been implemented in this manual since the previous edition:

Edition	Description	Date
6866534D19-O	Initial edition	Dec. 2001
6866534D19-A	Update for Rev B and Rev C Radio Tanapas (Packed Data Application via Accessory Connector)	Feb. 2003
	Document History added.	
	Frontpage back: Chapter Copyright added	
	Safety Information updated to new TETRA Standard	
	Chapter 1. Scope: Page 1-2, new Safety leaflet numbers added	
	Chapter 2. Model Information: Update for Expansion Head in M2/M6. Active Data Cable and Compatibility Table added, Part Numbers corrected with Underscore	
	Chapter 5. Programming: Set Up Illustrations updated	
	Chapter 7. Maintenance: Explosion views, Part Numbers corrected, Underscore added	
	Chapter 8.1: 400MHz Schematics, PCBs and Parts List , Rev_A added	
	Chapter 8.2: 800MHz Schematics, PCBs and Parts List, Rev_A added	
	Chapter 8.3: Missing Connector Board Schematic, PCBs and Parts List of Expansion Head added	
	Chapter 9.2: 800MHz Troubleshouting updated	
	Appendix A page 2: Pin Assignment of Accessory Connector changed	
	Appendix B page 4: Service Kits-To-Model Charts updated	

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PRODUCT SAFETY AND RF EXPOSURE FOR MOBILE TWO-WAY RADIOS INSTALLED IN VEHICLES OR AS FIXED SITE CONTROL STATIONS

Caution

BEFORE USING THIS RADIO, READ THIS INFORMATION WHICH CONTAINS IMPORTANT OPERATING INSTRUCTIONS FOR SAFE USAGE AND RF ENERGY AWARENESS AND CONTROL INFORMATION FOR COMPLIANCE WITH RF ENERGY EXPOSURE LIMITS IN APPLICABLE NATIONAL AND INTERNATIONAL STANDARDS.

Compliance with RF Energy Exposure Standards

Your Motorola radio is designed and tested to comply with a number of national and international standards and guidelines regarding human exposure to radio frequency electromagnetic energy, including:

- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2001
- ANATEL, Brasil Regulatory Authority, Resolution 256 (April 11, 2001) “additional requirements for SMR, cellular and PCS product certification.”

COMPLIANCE AND CONTROL GUIDELINES AND OPERATING INSTRUCTIONS FOR MOBILE RADIOS

To ensure optimal performance and compliance with the RF energy exposure limits in the above standards and guidelines, always adhere to the following procedures:

Transmit and Receive

- To transmit (talk), push the Push-To-Talk (PTT) button; to receive, release the PTT button.
- **Transmit only when people outside the vehicle are at least the minimum lateral distance away**, as shown in Table 1, from a properly installed, externally-mounted antenna.

Note: Table 1 lists the minimum lateral distance for bystanders in an uncontrolled environment from the transmitting types of antennas, (i.e. monopoles over a ground plane, or dipoles) at several different ranges of rated radio power for mobile radios installed in a vehicle.

Table 1 Rated Power and Lateral Distance

Rated Power of Vehicle-installed Mobile Two-way Radio	**Minimum Lateral Distance from Transmitting Antenna**
Less than 7 Watts	20 cm (8 Inches)
7 to 15 Watts	30 cm (1 Foot)

Mobile Antennas

- Antennas should be installed in locations that assure the recommended separation distance to any person outside or inside the vehicle.
- Install antennas at the center of the roof or the center of the trunk deck, taking into account the bystander exposure conditions of back-seat passengers.
- These mobile antenna installation guidelines are limited to metal body motor vehicles or vehicles with appropriate ground planes.
- Antennas should be installed in locations that assure the recommended distance to any person in Table 1. For example, if a trunk does not provide a 1 foot separation to the passenger or bystander, then another location should be selected.
- The antenna installation must additionally be in accordance with:

  a) The requirements of the antenna manufacturer

  b) Instructions in the Radio Installation Manual

- Use only Motorola approved supplied antenna or Motorola approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the radio and may violate RF exposure guidelines.

- For a list of Motorola approved antennas, visit the following web site : http://moleurope.comm.mot.com/member/commerce

- For additional information on exposure requirements or other training information, visit http://www.motorola.com/rfhealth.

Fixed Site Antennas

If mobile radio equipment is installed at a fixed location and operated as a control station or as a fixed unit, the antenna installation must comply with the following requirements in order to ensure optimal performance and compliance with the RF energy exposure limits in the above standards and guidelines:

- The antenna must be mounted outside the building on the roof or a tower if at all possible.

- As with all fixed site antenna installations, it is the responsibility of the licensee to manage the site in accordance with applicable regulatory requirements and may require additional compliance actions such as site survey measurements, signage, and site access restrictions in order to ensure that exposure limits are not exceeded.

Electromagnetic Interference/Compatibility

Note: Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed or otherwise configured for electromagnetic compatibility. It may be necessary to conduct compatibility testing to determine if any electronic equipment used in or around vehicles or near fixed antenna sites is sensitive to external RF energy and if any procedures need to be followed to eliminate or mitigate the potential for interaction between the radio transmitter and the equipment or device.

Facilities

To avoid electromagnetic interference and/or compatibility conflicts, **turn off your radio in any facility where posted notices instruct you to do so**. Hospitals or health care facilities may be using equipment that is sensitive to external RF energy.

Vehicles

To avoid possible interaction between the radio transmitter and any vehicle electronic control modules, for example, ABS, engine, or transmission controls, the radio should be installed only by an experienced installer and that the following precautions be used when installing the radio:

1. Refer to the manufacturer’s instructions and or other technical bulletins or recommendations on radio installation.

2. Before installing the radio, determine the location of the electronic control modules and their harnesses in the vehicle.

3. Route all radio wiring, including the antenna transmission line, as far away as possible from the electronic control units and associated wiring.

Driver Safety

Check the laws and regulations on the use of radios in the area where you drive. Always obey them.
When using your radio while driving, please:

- Give full attention to driving and to the road.
- Pull off the road and park before making or answering a call if driving conditions so require.

WARNING

OPERATIONAL WARNINGS

For Vehicles with an Air Bag

Do not mount or place a mobile radio in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a radio is placed in the air bag deployment area and the air bag inflates, the radio may be propelled with great force and cause serious injury to occupants of the vehicle.

Potentially Explosive Atmospheres

Turn off your radio prior to entering any area with a potentially explosive atmosphere. Sparks in a potentially explosive atmosphere can cause an explosion or fire

The areas with potentially explosive atmospheres referred to above include fuelling areas such as below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles, such as grain, dust or metal powders. Areas with potentially explosive atmospheres are often but not always posted.

Blasting Caps and Areas

To avoid possible interference with blasting operations, turn off your radio when you are near electrical blasting caps, in a blasting area, or in areas posted:
"Turn off two-way radio". Obey all signs and instructions.
For radios installed in vehicles fueled by liquefied petroleum gas, refer to the (U.S.) National Fire Protection Association standard, NFPA 58, for storage, handling, and/or container information. For a copy of the LP-gas standard, NFPA 58, contact the National Fire Protection Association, One Battery Park, Quincy, MA.

Caution

ADDITIONAL IMPORTANT INFORMATION FOR SERVICING AND INSTALLING THE RADIO

Only specialized workshops should be contacted for installation, maintenance and repair work.

Attention: This Unit may use a battery on the PCB.
Risk of Explosion if battery is replaced by an incorrect type.
Dispose of used batteries according to the instructions.

This unit is equipped with protection fuses in the Power and Ignition Sense Cable.
Replace these fuses only with the original ratings!

Caution: Failure to use correct manufactures approved parts
may result in physical damage to this unit.

Fuse for Power Cable GKN6270/GKN6274: 10A (Motorola Part Number: 65C80283E05)
Fuse for Ignition Sense Cable HKN9327: 4A (Motorola Part Number: 65C80283E02)

Achtung

ZUSÄTZLICHE SICHERHEITS INFORMATIONEN FÜR SERVICE UND INSTALLATION DES FUNKGERÄTES

Installations, Wartungs- und Reparaturarbeiten dürfen ausschließlich von autorisiertem und geschultem Personal ausgeführt werden.

ACHTUNG: Dieses Gerät kann mit einer Batterie auf der Platine ausgestattet sein.
Explosionsgefahr, bei Einsatz einer falschen Ersatzbatterie.
Entsorgung gebrauchter Batterien entsprechend Vorschrift.

Dieses Gerät ist mit einer Schutzsicherung im Stromversorgungskabel ausgestattet.
Bei Austausch ausschließlich den Originalwert verwenden

WARNUNG: Bei Einsetzen von nicht vom Hersteller freigegebenen Ersatzteilen
kann das Gerät zerstört werden.

Sicherung für Stromversorgungskabel GKN6270/GKN6274: 10A (Motorola Best.-Nr.:65C80283E05)
Sicherung für Zündungserkennungskabel HKN9327: 4A (Motorola Best.-Nr.:65C80283E02)

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CHAPTER 1
SCOPE & WARRANTY INFORMATION

SCOPE OF THIS MANUAL

This manual is intended for use by service technicians familiar with similar types of equipment. It contains information required for the installation of the equipment described and is current as of the printing date. Changes which occur after the printing date may be incorporated by a complete Manual revision or alternatively as additions.

NOTE **Before planning or starting the installation, please read the Safety Information Section in the front of this manual.**

This manual is divided into the following sections:

- Copyright
- User Safety, Training and General Information
- CHAPTER 1 Scope & Warranty Information
- CHAPTER 2 Model Information & Accessories
- CHAPTER 3 Overview
- CHAPTER 4 Theory of Operation
- CHAPTER 5 Programming
- CHAPTER 6 Testsetup & Testing
- CHAPTER 7 Maintenance
- CHAPTER 8 Schematic Diagrams, PCBs and Parts Lists
- CHAPTER 9 Troubleshooting
- Appendix A Connector Pin Functions
- Appendix B Replacement Parts and Kits
- Appendix D Product Specific Information

Manuals & User Guides

Radio Installation Instructions

6866534D67MTM700 Radio Installation Instructions (English)

Service Manuals

6866534D19MTM700 Detailed Service Manual (English)
6804112J73MTM700 Detailed Service Manual (Mandarin)

6866534D20MTM700 Basic Service Manual (English)
6804112J71MTM700 Basic Service Manual (Mandarin)

User Guides (standard version)

6866534D07MTM700 User Guide (English)
6866534D08MTM700 User Guide (German)
6866534D09MTM700 User Guide (French)
6866534D10MTM700 User Guide (Dutch)
6866534D11MTM700 User Guide (Spanish)
6804112J69MTM700 User Guide (Mandarin)

User Guides (Motorcycle version)

6866534D73MTM700 User Guide (English)
6866534D70MTM700 User Guide (German)
6866534D72MTM700 User Guide (French)
6866534D74MTM700 User Guide (Dutch)
6866534D71MTM700 User Guide (Spanish)
6804112J83MTM700 User Guide (Mandarin)

Configuration Manual (Expansion Head Radio)

6866534D91MTM700 Configuration Manual (English)
6804112J81MTM700 Configuration Manual (Mandarin)

Safety Leaflets

6864117B25Safety Leaflet (EMEA) or
6866537D36Safety Leaflet (EMEA) especially for TETRA Mobiles

6804112J96Safety Leaflet (APAC & LACR) or
6804113J25Safety Leaflet (APAC & LACR) especially for TETRA Mobiles

Warranty and Service Support

Motorola offers long term support for its products. This support includes full exchange and/or repair of the product during the warranty period, and service/ repair or spare parts support out of warranty. Warranty Period and Return Instructions

The terms and conditions of warranty are defined fully in the Motorola Dealer or Distributor or Reseller contract. These conditions may change from time to time and the following notes are for guidance purposes only. In instances where the product is covered under a "return for replacement" or "return for repair" warranty, a check of the product should be performed prior to shipping the unit back to Motorola. This is to ensure that the product has been correctly programmed or has not been subjected to damage outside the terms of the warranty.

Prior to shipping any radio back to the appropriate Motorola warranty depot, please contact Customer Resources or your Motorola dealer, distributor or reseller. All returns must be accompanied by a Warranty Claim Form, available from your Customer Service representative or Motorola Online Extranet (MOL) or your Motorola dealer, distributor or reseller (refer to list in Appendix A). Products should be shipped back in the original packaging, or correctly packaged to ensure no damage occurs in transit.

After Warranty Period

After the Warranty period, Motorola continues to support its products in two ways.

- Motorola's Regional Radio Support Centers offer a repair service to both end users and dealers at competitive prices.
- AAD supplies individual parts and modules that can be purchased by dealers who are technically capable of performing fault analysis and repair.

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CHAPTER 2

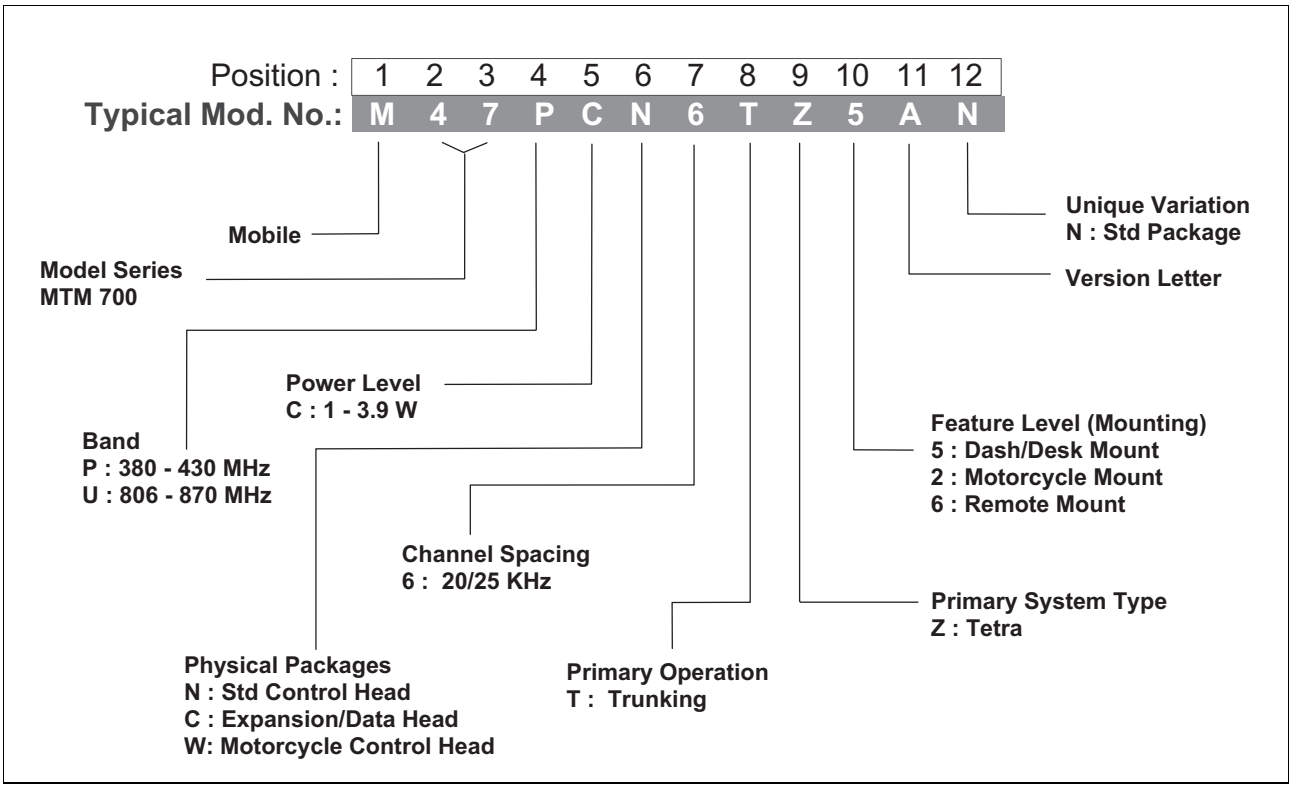
MODEL INFORMATION & ACCESSORIES

MTM700 Mobile Radio Model Information

This manual applies to the following MTM700 Mobile Radio Models

Type No.	Sales Model No.	Short Description	Model
MT912	M47PCN6TZ5AN	MTM700 380-430 MHz, STD DASH/DESK	M1
MT912	M47PCN6TZ6AN	MTM700 380-430 MHz, STD REMOTE	M2
MT912	M47PCC6TZ5AN	MTM700 380-430 MHz, EXP DASH/DESK	M3
MT912	M47PCW6TZ2AN	MTM700 380-430 MHz, M'CYCLE	M4
MT712	M47UCN6TZ5AN	MTM700 806-870 MHz, STD DASH/DESK	M5
MT712	M47UCN6TZ6AN	MTM700 806-870 MHz, STD REMOTE	M6
MT712	M47UCC6TZ5AN	MTM700 806-870 MHz, EXP DASH/DESK	M7
MT712	M47UCW6TZ2AN	MTM700 806-870 MHz, M'CYCLE	M8

Sales Model Nomenclature



MTM700 Model Specifications

GENERAL

ETSi:	ETS 300 394-1
Type Number:	
380-430 MHz	MT912
806-870 MHz	MT712
Temperature Range for Transceiver:	
Operating	-30°C to +60°C
Storage:	-40°C to +85°C
Power Supply:	
Minimum:	10.8 Vdc
Nominal:	13.2 Vdc
Maximum:	15.6 Vdc
max. Current	approx. 3.5 A
Dimensions (HxWxD) in mm:	
Transceiver	48.5 x 169.5 x 155
Standard Control Head	72 x 185 x 53
Weight in grams:	
Transceiver	1350
Standard Control Head	300

RECEIVER

Receiver Type:	Superheterodyne
Frequency Range:	
	380-430 MHz
	851-870 MHz
Channel Spacing:	25 kHz
Sensitivity (3.5%) BER:	-112 dBm
Intermodulation:	-47 dBm
Blocking (50-100 kHz):	-40 dBm
SpuriousRejection:	-45 dBm
Adjacent Channel Interference Ratio:	-45 dB
Frequency Stability:	
Locked to Base	+/-100 Hz
Unlocked to Base	+/- 1 kHz
Audio Rated (@4 Ohms):	
For External Speaker:	10 W
Distortion at Rated Audio:	5% Max.

TRANSMITTER

Modulation Type:	π/4DQPSK
RF Power:	
TMO	3,16 W / 35 dBm
DMO	3,16 W / 35 dBm
Frequency Range:	
TMO	380-430 MHz
	806-825 MHz
DMO	380-430 MHz
	851-870 MHz
Frequency Stability:	
Locked to Base	+/-100 Hz
Not Locked to Base	+/- 1 kHz
Spurious Emissions:	
Conducted/ Radiated	– 36 dBm <=1GHz
	– 30 dBm > 1GHz
Adjacent Channel Power (@ ± 25 kHz):	
380-430 MHz	– 60 dBc

MTM700 Model Descriptions*

Model	Description
M1	Dash/Desk Mount with MTM700 Mobile Radio (380-430MHz) with Direct Mount Control Head, Speaker, Microphone or Handset, Standard User Guide, and Installation Accessories.
M2	Remote Mount with MTM700 Mobile Radio (380-430MHz) with Remote Mount Control Head, optional either with remote mount front housing or expansion control head, Speaker, Microphone or Handset, Remote Mount cables, Standard User Guide, and Installation Accessories.
M3	Expansion Mount with MTM700 Mobile Radio (380-430MHz), with Expansion Control Head, User Guide Data, and Installation Accessories.
M4	Motorcycle Mount with MTM700 Mobile Radio (380-430MHz) with Motorcycle Control Head, Expansion Control Head, Speaker, Microphone, Motorcycle Cables, Motorcycle User Guide, and Installation Accessories.
M5	Dash/Desk Mount with MTM700 Mobile Radio (806-870MHz) with Direct Mount Control Head, Speaker, Microphone or Handset, Standard User Guide, and Installation Accessories.
M6	Remote Mount with MTM700 Mobile Radio (806-870MHz) with Remote Mount Control Head, optional either with remote mount front housing or expansion control head, Speaker, Microphone or Handset, Remote Mount cables, Standard User Guide, and Installation Accessories.
M7	Expansion Mount with MTM700 Mobile Radio (806-870MHz), with Expansion Control Head, User Guide Data, and Installation Accessories.
M8	Motorcycle Mount with MTM700 Mobile Radio (806-870MHz) with Motorcycle Control Head, Expansion Control Head, Speaker, Microphone, Motorcycle Cables, Motorcycle User Guide, and Installation Accessories.

*) Other combinations are not recommend or not possible.

MTM700 Accessories-To-Model Chart

MTM700 ACCESSORIES		380-430 MHz				806-870 MHz			
Control Heads	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Standard Control Head	GMWN4062_	X	X			X	X		
Motorcycle Control Head	SDLN4506_				X				X
Expansion Head	GMCE4053_		X	X	X		X	X	X
Remote Mount Head	GMHN4080_		X				X		
Microphones	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Fist microphone	GMMN4063_	X	X		X	X	X		X
Desktop microphone	GMMN4064_	X				X			
Visor microphone	GMMN4065_	X	X			X	X		
Loudspeakers	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Loud Speaker 13W	GMSN4066_	X	X		X	X	X		X
Small Loud Speaker 5W	GMSN4078_	X	X		X	X	X		X

MTM700 ACCESSORIES		380-430 MHz				806-870 MHz			
Handset	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Telephone Style, Complete Handset	GMUN1006_	X	X	X		X	X	X	
Antennas	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Rooftop Mount Antenna for 380 - 400 MHz	FAE 5521_	X	X	X	X				
Rooftop Mount Antenna for 410 - 430 MHz	FAE 6003_	X	X	X	X				
Rooftop Mount Antenna for 800 MHz (EMEA)	HAF4002_					X	X	X	X
Rooftop Mount Antenna for 800 MHz (APAC)	RRA4976_					X	X	X	X
Mini U to BNC Adapter	5880367B28	X	X	X	X	X	X	X	X
PTT Switches	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Foot switch with remote PTT	RLN4856_	X	X			X	X		
Push button with remote PTT	RLN4857_	X	X		X	X	X		X
Tri-State Emergency Foot switch	RLN4836_	X	X			X	X		
Goose neck with PTT	RLN4858_	X	X			X	X		
Desktop Mount	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Desktop power supply	GPN6145_	X	X			X	X		
Desktop tray without loudspeaker	GLN7318_	X	X			X	X		
Power cable (for supply to desktop mobile)	GKN6266_	X	X			X	X		
Remote Mount	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Back Housing for Remote Mount	GMCN4060_		X				X		
Remote mount cable (radio to C/H) - 3m	RKN4077_		X		X		X		X
Remote mount cable (radio to C/H) - 5m	RKN4078_		X				X		
Remote mount cable (radio to C/H) - 7m	RKN4079_		X				X		
Remote Mount Kits with Control Head	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Remote Mount Kit 3m	PMLN4492_		X				X		
Remote Mount Kit 5m	PMLN4493_		X				X		
Remote Mount Kit 7m	PMLN4494_		X				X		
Remote Mount Exp. Kit 3m	PMLN4495_			X				X	
Remote Mount Exp. Kit 5m	PMLN4496_			X				X	
Remote Mount Exp. Kit 7m	PMLN4497_			X				X	
Power Cable	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
US Linecord (3060665A04) packed	NTN7373AR	X	X	X		X	X	X	
Euro Linecord (3060665A04) packed	NTN7374AR	X	X	X		X	X	X	

MTM700 ACCESSORIES		380-430 MHz				806-870 MHz			
UK Linecord (3002120F02) packed	NTN7375AR	X	X	X		X	X	X	
Argentina Linecord	NTN9246_	X	X	X		X	X	X	
Power Cables (to mobile radio)	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
12V Power Cable to Batt., 3m with Fuse (10A)	GKN6270_	X	X	X	X	X	X	X	X
12V Power Cable to Batt., 6m with Fuse (10A)	GKN6274_	X	X	X	X	X	X	X	X
Ignition Sense Cable, 3m with Fuse (4A)	HKN9327_	X	X	X	X	X	X	X	X
Fuse 10A	65C80283E05	X	X	X	X	X	X	X	X
Fuse 4A	65C80283E02	X	X	X	X	X	X	X	X
Installation	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
External Alarm Relay	GKN6272_	X	X		X	X	X		X
Accessory Connector Kit	GMBN1021_	X	X	X	X	X	X	X	X
Buzzer Kit	GLN7282_	X	X		X	X	X		X
Mounting	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Key lock mount	RLN4779_	X	X	X	X	X	X	X	X
High Profile Mounting Bracket	GLN7317_	X				X			
Low Profile Mounting Bracket	GLN7324_		X	X	X		X	X	X
DIN Mount Kit for Radio Chassis	RLN4781_		X	X	X		X	X	X
Motorcycle Cables	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Cable, M/C CH to Expansion Head Radio	3066516B01				X				X
Cable Kit, Transceiver to Microphone	GMKN4072_				X				X
Remote mount cable (radio to C/H) - 3m	RKN4077_		X	X	X		X	X	X
Programming / Data	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Clear App. S/W TETRA-P Subscriber	PMVN4065_	X	X	X	X	X	X	X	X
TEA1 App. S/W TETRA-P Subscriber	PMVN4066_	X	X	X	X	X	X	X	X
TEA2 App. S/W TETRA-P Subscriber	PMVN4067_	X	X	X	X	X	X	X	X
Programming Cable	GMKN4067_	X	X	X	X	X	X	X	X
Active Data Cable (see following table *)	GMKN1022_	X*	X **			X*	X **		
Interface Cable	GMKN4079_			X				X	
RS232 Interface Cable	GMKN1016_	X	X	X	X	X	X	X	X
Service Tool	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Housing eliminator	6666500A01	X	X	X	X	X	X	X	X

*) Compatibility of Active Data Cable GMKN1022

Category	Model / Part No.	Description	Compatible Yes / No
Radio Model UHF / MT 912	M1 / M47PCN6TZ5AN	MTM700 380-430 Dash/Desk	Yes with Rev. B Tanapas only
	M2 / M47PCN6TZ6AN	MTM700 380-430 Remote	Yes ** with Rev. B Tanapas only
	M3 / M47PCC6TZ5AN	MTM700 380-430 EXP DASH/DESK	No
	M4 / M47PCW6TZ2AN	MTM700 380-430 M'cycle	No
Radio Model 800MHz / MT 712	M5 / M47UCN6TZ5AN	MTM700 806-870 Dash/Desk	Yes with Rev. B Tanapas only
	M6 / M47UCN6TZ6AN	MTM700 806-870 Remote	Yes ** with Rev. B Tanapas only
	M7 / M47UCC6TZ5AN	MTM700 806-870 EXP DASH/DESK	No
	M8 / M47UCW6TZ2AN	MTM700 806-870 M'cycle	No
Kit	GMWN4062_	Std Control Head	No
	GMCE4053_	Data Expansion Control Head	No
	SDLN4506_	Motorcycle Control Head Kit	No

**) The cable, "GMKN1022", is only compatible when an Expansion Head is not fitted as part of a remote mount configuration. In this configuration access to the Tetra PEI for IP Packet Data and SDS services is available on the Expansion head and the Active Data Cable GMKN1022 is not required.

CHAPTER 3
OVERVIEW

General

The MTM700 is Motorola's latest and most advanced digital mobile TETRA radio. This radio generation is based on a new digital platform technology which takes care of constant envelop type of radios as well as the linear modulation type of radios to support the TETRA needs. It covers Trunk Mode Operation (TMO) as well as Direct Mode Operation (DMO) and among other new features it is supplied with extended code and operating memory capacity to support all new market requirements. The MTM700 TETRA radio ensures a high audio quality.

To achieve a high spectrum efficiency, the MTM700 uses digital modulation technology and sophisticated voice-compression algorithm. The voice of the person speaking into the microphone is converted into a digital bit stream consisting of zeros (0) and ones (1). This stream is then modulated into a radio-frequency (RF) signal, which is transmitted over the air to another MTM700. The process is called digital modulation.

Digital Modulation Technique

The MTM700 is a 380-430 MHz or 806-870 MHz mobile that can operate in dispatch mode. It uses two digital technologies: $\pi/4$ DQPSK and Time Division Multiple Access (TDMA).

$\pi/4$ DQPSK is a modulation technique that transmits information by altering the phase of the radio frequency (RF) signal. Data is converted into complex symbols, which alter the RF signal and transmit the information. When the signal is received, the change in phase is converted back into symbols and then into the original data.

The Tetra system can accommodate 4-voice channels in the standard 25 KHz channel as used in the two-way radio.

Time Division Multiple Access (TDMA) is used to allocate portions of the RF signal by dividing time into four slots, one for each unit.

Time allocation enables each unit to transmit its voice information without interference from other transmitting units. Transmission from a unit or base station is accommodated in time-slot lengths of 15 milliseconds and frame lengths of 60 milliseconds. The TDMA technique requires sophisticated algorithms and a digital signal processor (DSP) to perform voice compression/decompression and RF modulation/demodulation.

Voice Compression Technology

Voice is converted into a digital bit stream by sampling the voice at high rate and converting the samples into numbers, which are represented by bits.

Voice compression reduces the number of bits per second while maintaining the voice at an acceptable quality level. The Tetra system uses a coding technique called ACELP (Algebraic Code Excited Linear Prediction). The compressed voice-data bits modulate the RF signal.

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CHAPTER 4

THEORY OF OPERATION

Section Introduction

This section provides a block diagram overview of the main Digital/RF Board. This is supplemented by the detailed block diagram and detailed circuit description.

This Chapter contains the following sections:

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CHAPTER 4.1

THEORY OF OPERATION (400 MHz)

Block Diagram and Overview

The main Digital/RF Block contains the following four sections (see figure below). An overview of these four sections is provided in the following paragraphs:

- Receiver Section
- Transmitter Section
- Frequency Generating Section (Synthesizer)
- Controller Section

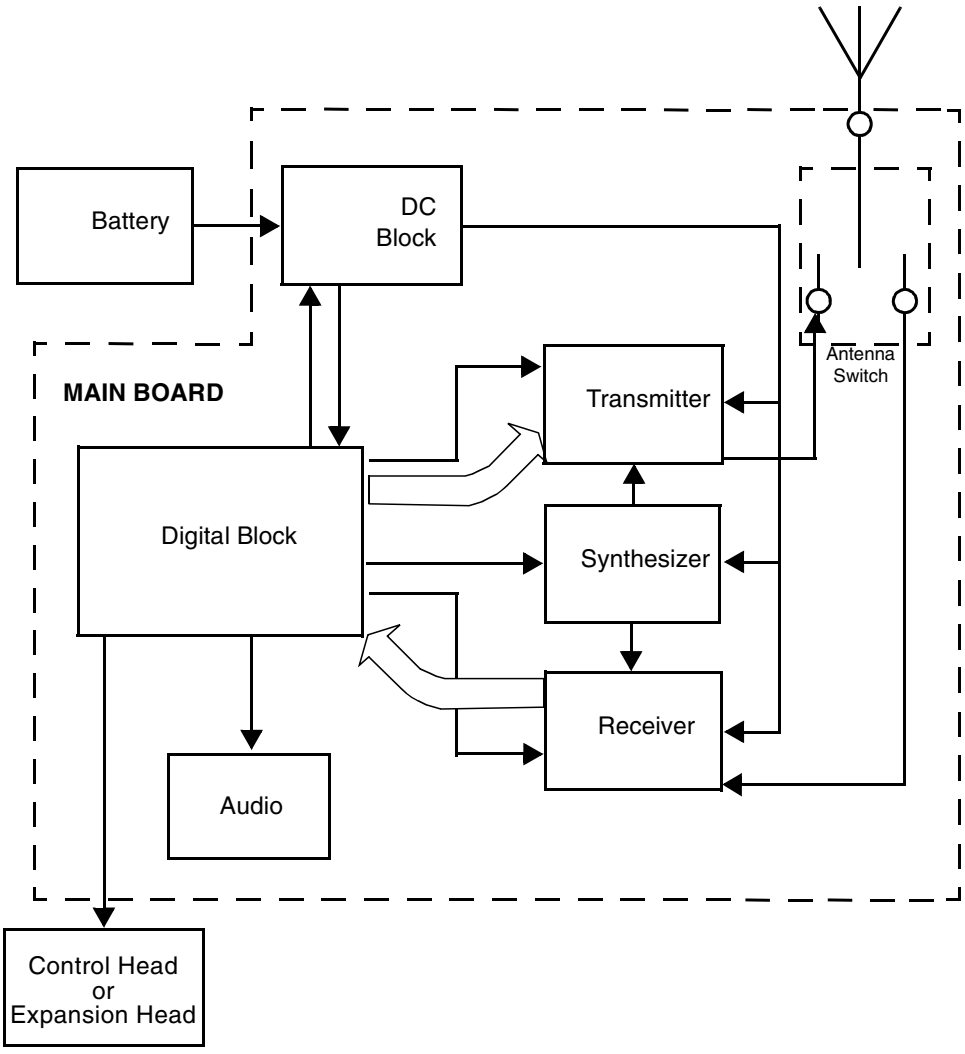

Figure 1 General Block Diagram

Receiver Section

The receiver section includes the following main components:

- Antenna Switch
- AGC_0 Attenuator
- Front End Pre-selector Filter
- Low Noise Amplifier (LNA)
- AGC_1 Attenuator
- Second Pre-selector Filter
- Mixer
- IF Filter
- IF Amplifier
- AGC_2 Attenuator and Buffer
- IF Digitizing Subsystem

The Receiver Path implements an Automatic Gain Control (AGC), which is required to maintain good receiver linearity over a wide range of incoming signal levels and prevents clipping of high level signals.

The IF Digitizing Subsystem performs the following functions:

- Carries out amplification and down conversion of the signal into the second IF.
- Performs IF AGC.
- Converts the second IF analog signal into baseband digital I & Q format.
- Transmits the I & Q baseband data to the DSP for further processing.
- Synthesizes the second LO frequency.
- Synthesizes the Sigma-Delta clock.

Transmitter Section

The transmitter incorporates cartesian feedback circuitry to enhance transmitter linearity to reduce power splatter into adjacent channels. The transmitter circuitry comprises the following components:

- Modulation digital to analog conversion, performed by:
  Analog-to-Digital / Digital-to-Analog IC (ADDAG),
- Modulation up-converter, performed by:
  Low Noise Offset Direct Conversion Transmitter integrated circuit (LNODCT),
- Balun and Attenuator,
- Linear class AB Power Amplifier (PA),
- Directional coupler,
- Isolator (depends on radio model)
- Antenna switch, and
- Harmonic filter.

The transmitter linearization feedback signal is taken from the forward power port of the directional coupler, attenuated, and passed to the RF feedback port of the LNODCT integrated circuit.

Controller Section

This section includes the RedCap2, which controls the transmit, receive and synthesize operations of the integrated circuits located in the RF section. Within the RedCap2 are the DSP and the serial interfaces.

The controller section contains the following:

- Voltage regulators
- Power On/Off circuitry
- RedCap2
- Host memories (FLASH and SRAM)
- Serial peripheral interface (SPI)
- RS232, SB9600, SBEP serial interfaces
- RX and TX path multiplexer
- Programmable potentiometer
- CODEC
- Audio power amplifier (PA)

Frequency Generating Section

The frequency generating section comprises the following components:

- Reference Oscillator - TCXO
- Main Synthesizer - consists of the Main Voltage Controlled Oscillator (VCO) and Low Voltage Fractional-N integrated circuit (LVFRACN). In receive mode, the main synthesizer provides the local oscillator injection to the receiver first mixer. In transmit mode, this synthesizer provides the frequency reference for the transmit frequency translation loop.
- Transmit frequency translation loop. Consists of the transmit Voltage Controlled Oscillator (VCO) and ESCORT Near Unity Divider (NUD) Phase Locked Loop IC.

Block Diagrams Descriptions

The block diagrams descriptions cover Receiver Path, Transmitter Path, Frequency Generation Section, and Controller Section.

Receiver Path

The received signal (see figure below) from the antenna is directed by the Antenna Switch to the Front End Pre-selector Filter.

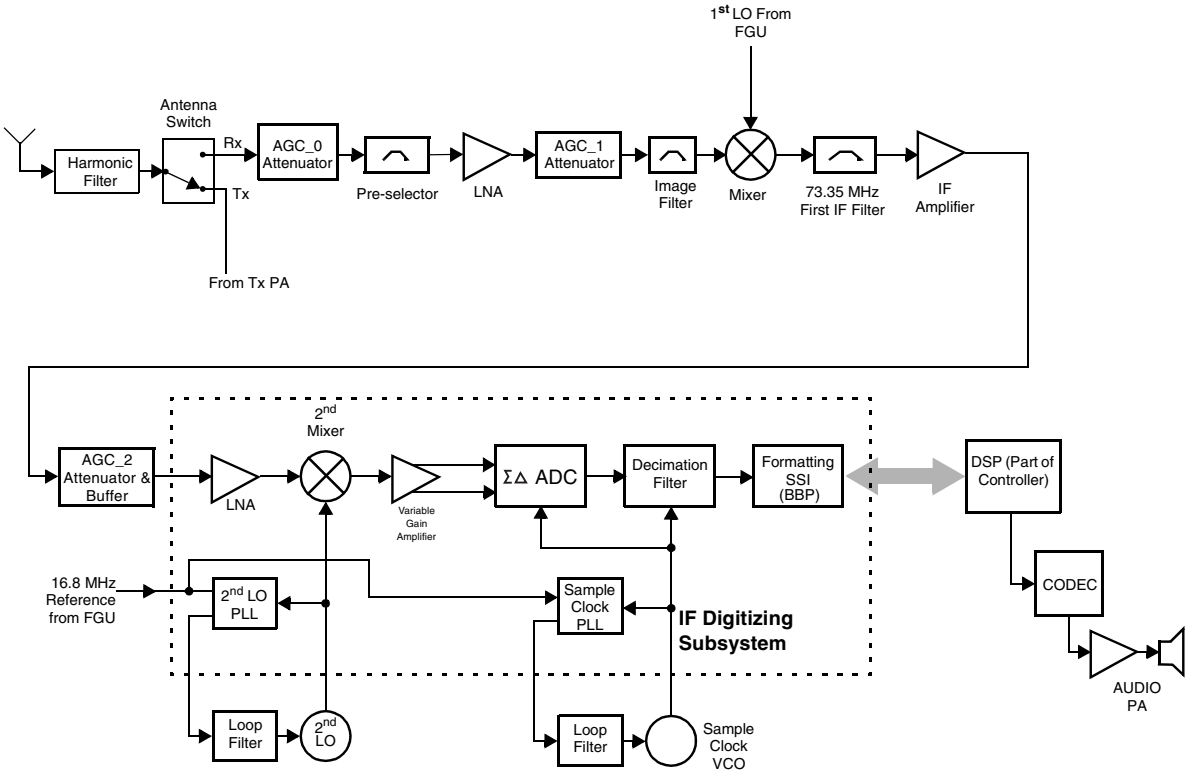

Figure 2 Receive Path Block Diagram

The receive pre-selector filter performs the following functions:

- passes frequencies in the 380 – 430 MHz receive frequency range, and
- blocks unwanted spurious frequencies like half IF and image frequencies.

The signal is mixed with the low side injection local oscillator signal to create the first IF at 73.35 MHz. The IF signal is filtered by the crystal filter, amplified by the IF amplifier, and sent to the IF Digitizing IC.

The IF Digitizing Subsystem performs the following functions:

- down conversion to the second IF at 2.25 MHz,
- perform a bandpass sigma-delta analog-to-digital conversion of the second IF signal into in-phase (I) and quadrature (Q) digital signals.
- Formats the I and Q data streams into a serial bit stream, which is sent for further processing to the Digital Signal Processor (DSP) (part of the micro controller) over the Synchronous Serial Interface (SSI) data link.

The DSP performs the following functions:

- Base band filtering,
- Synchronisation
- Demodulation
- Forward Error Correction (FEC)
- other correction algorithms for overcoming channel errors, and
- the decoder procedure for digital speech data decompression.

Transmitter Path

When the radio is transmitting (see figure below), microphone audio is sent to the CODEC, which performs analog-to-digital conversion and routes the digital signal to the DSP. The DSP performs the following functions:

- coding,
- error correction, and
- generation of the baseband modulation waveform.

From the DSP, baseband digital ‘I’ and ‘Q’ modulation waveform samples are sent to the ADDAG IC, where the digital data is converted into baseband analog ‘I’ and ‘Q’ waveforms and filtered.

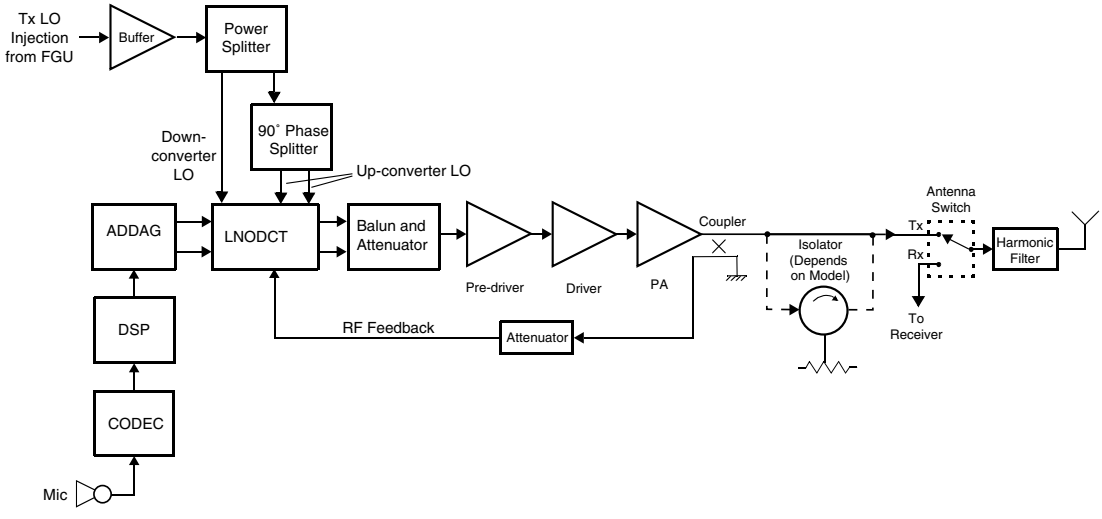

Figure 3 Transmit Path Block Diagram

The analog modulation signal is passed on to the LNODCT where it is up-converted to the transmitter operating frequency. The modulated RF output signal from the LNODCT is converted from differential to single-ended by a balun, and passed to the attenuator, pre-driver IC, driver transistor, power amplifier transistor, directional coupler, and isolator (depends on radio model), from where it is routed to the antenna via the antenna switch and harmonic filter. An RF feedback signal is taken from the directional coupler and fed back to the LNODCT for transmitter power control and linearization.

Frequency Generating Section

The frequency generating section comprises the following components (see figure below):

- 16.8 MHz TCXO Reference Oscillator.
- Main Synthesizer - consists of the Main Voltage Controlled Oscillator (VCO) and Low Voltage Fractional-N (LVFRACN) integrated circuit PLL. In receive mode, the main synthesizer provides the local oscillator injection to the receiver first mixer. In transmit mode, this synthesizer provides the frequency reference for the transmit frequency translation loop.
- Transmit frequency translation loop - consists of the transmit Voltage Controlled Oscillator (VCO) and ESCORT Near Unity Divider (NUD) Phase Locked Loop IC.

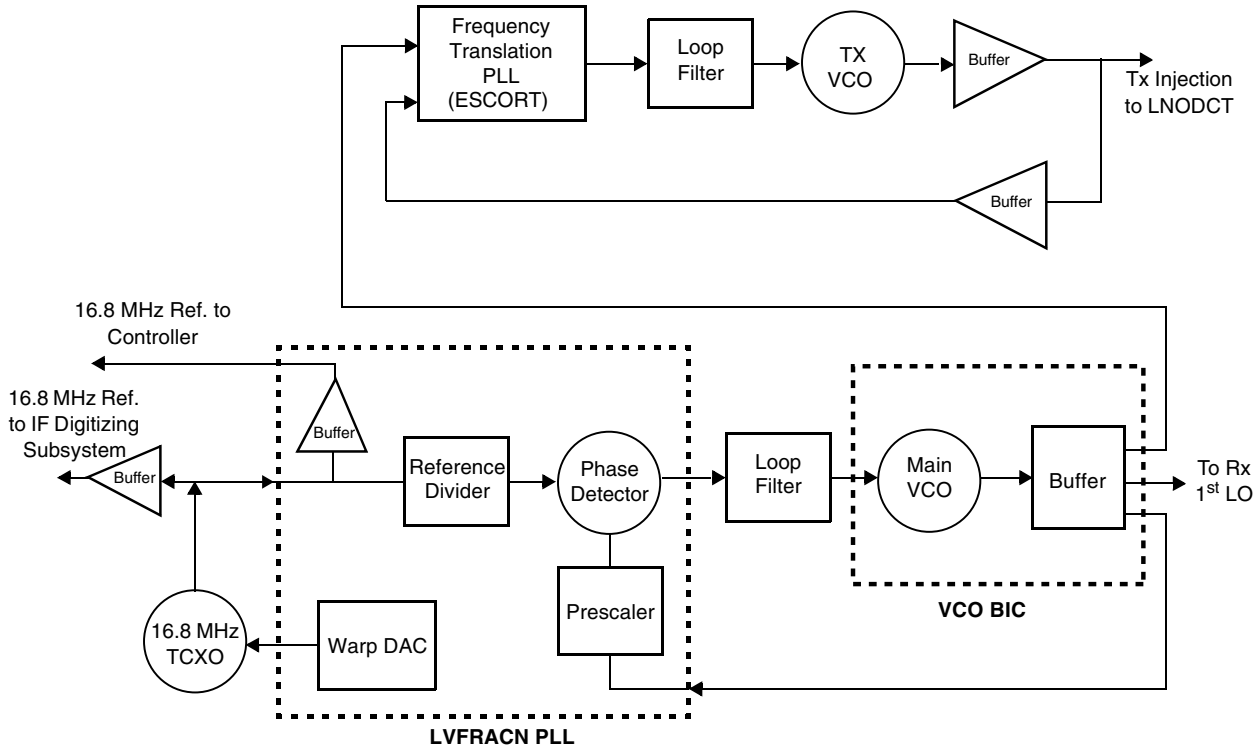

Figure 4 Frequency Generating - Block Diagram

The reference oscillator –TCXO is a temperature compensated crystal oscillator producing an accurate and stable 16.8 MHz master clock, from which all other clocks in the radio are derived. It provides the reference frequency for the following components:

- the main frequency synthesizer,
- the IF Digitizing Subsystem,
- the ADDAG, and
- the micro controller

Its operating frequency is fine tuned by means of a warp voltage signal generated by the LVFRACN IC.

Main Synthesizer

The Main Synthesizer consists of the main VCO and LVFRACN PLL IC. The main synthesizer provides the LO signal to the first mixer for down-converting the received signal to the 73.35 MHz first IF frequency and in transmit mode provides the reference frequency for the ESCORT frequency translation loop.

Transmit frequency translation loop

The transmitter frequency translation loop consists of the transmit VCO and ESCORT near unity divider PLL IC. This subsystem generates the carrier frequency injection signal for the LNODCT.

Controller Section

The controller section contains the RedCap2 dual core (DSP / RISC) processor and its external memory, the TX and RX audio processing, the serial interfaces and I/O circuitry. The RedCap2 and its external memory is placed on a sub-board in the controller section.

The RedCap2 controls the receive / transmit frequencies, power levels, control head display and keypad, serial interfaces, accessories, MMI, and other radio functions. This microprocessor can be operated through the RS232 interface by a personal computer to program the FLASH.

The TX audio circuitry selects between the different microphone inputs, controls the TX audio level and converts the analog audio signal to a digital format.

The RX audio circuitry converts the received signal from digital format to an analog audio signal, performs volume control and amplifies the signal to speaker level.

The DSP performs signalling, and voice encoding and decoding.

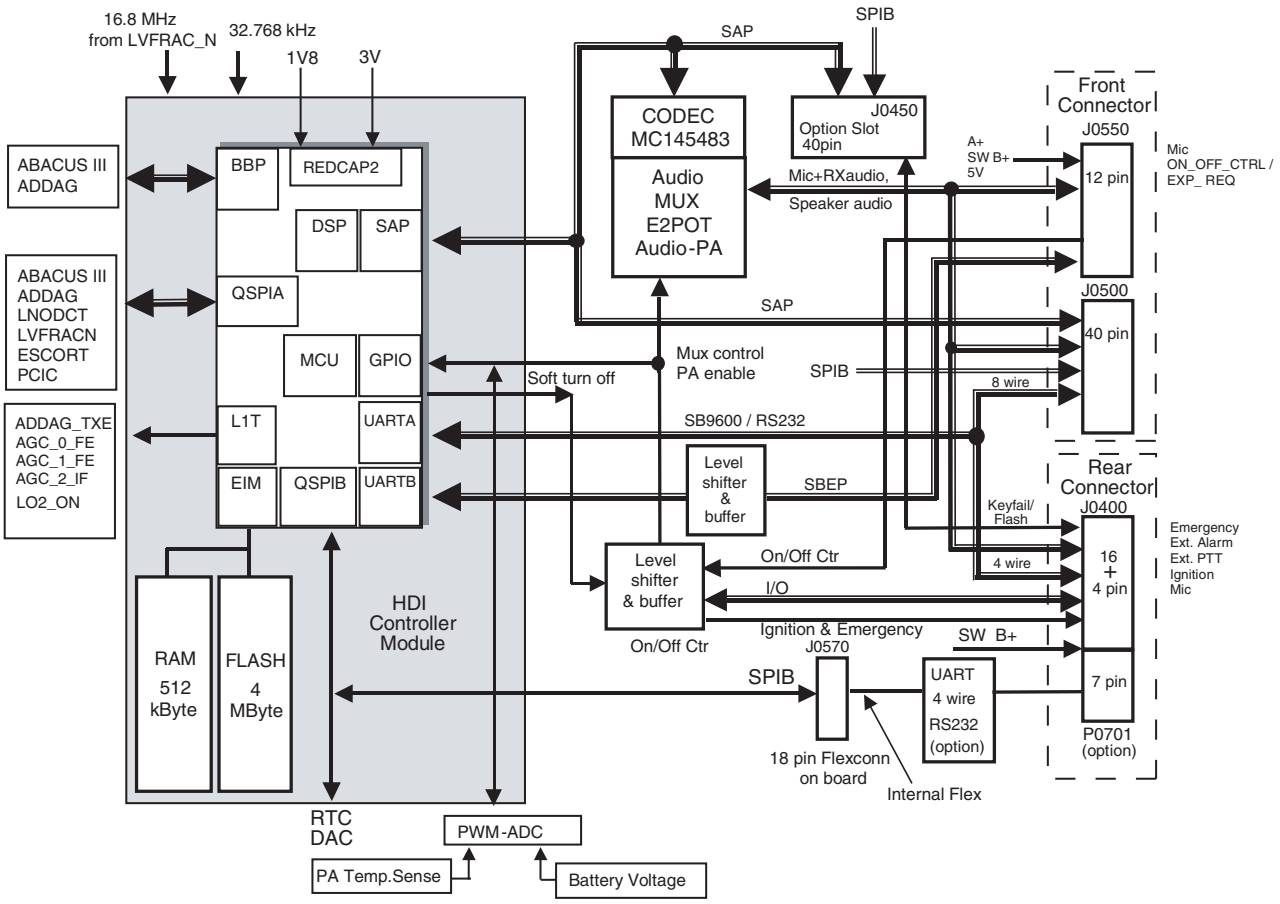

Figure 5 Controller Block Diagram

Detailed Circuit Description

Receiver Path, Detailed Circuit Description

For the Receive Path Block Diagram see Figure 2.

Antenna Switch

The signal coming from the antenna is routed to the receiver section via the harmonic filter, which is comprised of L5461, L5462, and C5462 to C5467. The signal continues to flow through quarter wave transformer L5452 and C5555 to the Rx section toward AGC_0 attenuator and pre-selector filter.

AGC_0 Attenuator

The switchable AGC_0 attenuator (D5025) provides a defined attenuation above a defined field strength to protect the digital IF section from overdrive. If the processor detects a field strength above a defined limit, it selects the high attenuation state.

Pre Selector Filter

From the AGC_0 Attenuator the signal is passed to the first pre-selector filter (D5011, D5012) and from there routed to Low Noise Amplifier (LNA, Q5031). The first pre-selector filter is a varactor tuned band pass filter, which is set by the microprocessor via the PCIC and signal FECNTL_1, to pass the receiver frequency and reject any spurious signals. Limiter diode D5013 protects Q5031 from destructive RF input levels

LNA and AGC_1 Attenuator

The Low noise amplifier (LNA) Q5031 amplifies the incoming received signal. It maintains a large gain and small Noise Figure. In receive mode, a low K9V1 signal enables current source Q5001, which enables the LNA. In transmit mode, the current source and LNA are disabled to provide further isolation of the transmitted signal from the antenna switch towards the mixer stage. From the LNA the signal passes to the AGC_1 attenuator pin diode D5031. From D5031, the signal passes to the second pre-selector filter (D5041, D5042).

The Automatic Gain Control (AGC) attenuator provides a low attenuation
(0.2 dB) and a high attenuation state (18 dB). This attenuation state is dependent on the state of the AGC_1_FE signal from the digital signal processor. If the processor detects a field strength above a defined limit, it selects the high attenuation state. In the low attenuation state, pin diode D5031 is ON, and pin diode D5018 is OFF. In the high attenuation state, pin diode D5031 is OFF, and pin diode D5018 is ON

Second Pre-selector

The second pre-selector filter (D5041, D5042), also a varactor tuned band pass filter, provides further attenuation of incoming spurious response signals. The microprocessor controls the filter via the PCIC and signal FECNTL_1 for low attenuation at the receiver frequency and high attenuation at

the image and half IF frequencies. From the output of the second pre-selector filter the received signal is sent to the RF input port of the first mixer.

Mixer

Mixer U5061 down-converts the incoming RF signal to the 73.35 MHz first IF, utilizing a first local oscillator signal tuned 73.35 MHz below the desired receiver operating frequency. An impedance matching network is placed between the mixer output and IF filter U5201.

IF Filter, Amplifier, AGC_2 Attenuator

The IF signal is routed via IF filter (U5201) to IF amplifier Q5201. From there it is routed either through buffer Q5101 or through pin diode AGC attenuator (D5201, D5202) to IF IC U5101. The AGC attenuator has two states (ON or OFF) and receives its control signal from the micro-processor.

IF Digitizing Subsystem

The IF Digitizing Subsystem is comprised of U5101. Here the IF signal is amplified and then mixed with an internally generated 2nd LO signal to produce the second IF signal. The 2nd IF signal is first processed by a variable gain amplifier and then converted to in-phase and quadrature (I and Q) digital data samples by means of a bandpass sigma-delta analog-to-digital converter. The I and Q digital signals are formatted into a single serial bit stream and sent for further processing to the Digital Signal Processor (DSP) (part of micro-processor) over the Synchronous Serial Interface (SSI) data link.

An internal AGC circuit controls the gain of the variable gain amplifier (VGA) to ensure that the maximum signal level into the ADC does not exceed a fixed analog ADC clip level and the rms output level of the ADC is maintained at an established reference level.

An internal phase locked loop control circuit controls the frequency of voltage controlled oscillator Q5180 which generates the 71.1 MHz 2^{nd} LO injection frequency.

An internal phase locked loop control circuit controls the frequency of voltage controlled oscillator Q5190 which generates the 18MHz sample clock frequency utilized by the ADC and decimation filters.

Both phase locked loops derive their frequency reference from the LVFRACN 16.8 MHz master clock.

Transmitter Path, Detailed Circuit Description

For the Transmit Path Block Diagram see Figure 3.

ADDAG

The Analog to Digital/Digital to Analog IC U5802 (ADDAG) receives the modulation waveform as serial data transmitted by the DSP at a 48 kbps rate to the SSI port (pin 33, STD). Data is transmitted as a 16-bit 'I' word followed by a 16-bit 'Q' word. The ADDAG provides a serial clock of 2.4MHz to the DSP (pin 34, SCK) and sends a frame sync signal (pin 35, SFS) at the beginning of every 'I' word transmission, to instruct the DSP to send data. In the ADDAG, the received serial I & Q words are converted into parallel I & Q words, and transferred to an interpolation filter. The interpolation filter increases the sampling rate to reduce in-band quantization noise, as well as to reduce image at multiples of the input data. The interpolated samples are rounded to 8 bits, and run through 8-bit D/A converters. The D/A converters take the digital I & Q words and convert them into analog signals, which are filtered and amplified. The output is comprised of two separate low-level differential signals, I & Q (pin 8, OUTI; pin 7, OUTIB; pin 6, OUTQ; pin 5, OUTQB). The output signals are routed to the LNODCT IC for up conversion to the transmitter operating frequency. The ADDAG sends a 2.4MHz low-level differential reference clock signal (pin 2, TCLCK; pin 1, TCLCKB) to the LNODCT. It also sends a differential signal (pin 48, TSLOT; pin 47, TSLOTB) that marks the beginning and end of each transmission slot (whenever a TXE signal {pin 37 TXE} is received from the DSP). After receiving the TSLOT signal, the LNOCDT toggles the ASW line (pin 10, ASW) which signals the ADDAG to set VCNTO signal LOW (pin 11, VCNTO) which enables the Antenna Switch during the transmit slot. The ADDAG starts to receive data from DSP after TXE signal (pin 37, TXE).

Tx LO

The Tx LO signal path processes the signal generated by the Transmit Frequency Translation Loop (part of the FGU), which determines the operating frequency of the transmitter. The input signal is amplified by Q5801, and passed to the power splitter (R5804, R5809, R5814). One output of the power splitter is routed to I-Q splitter U5801 which converts the single input signal into two quadrature (90 degree phase shift) 'I' and 'Q' signals which are subsequently routed to the LNODCT up conversion LO input (pins 46, LOQ; 45, LOQB; 57, LOI; 56, LOIB). The signal at the second output of the power splitter is applied to the LNODCT feedback down conversion LO input (pin 24, MVCO).

LNODCT

The Low Noise Offset Direct Conversion Transmitter (LNODCT) U5803 performs the following tasks:

- up converts the baseband I and Q modulation waveform to the transmitter operating frequency,
- controls power output, and
- cancels power amplifier distortion products created by non-linearities in the RF power amplifier output stage.

The differential base-band signals from the ADDAG are input into the LNODCT on pins 58 – 61 (BINQB, BINQ, BINIB and BINI). The baseband I and Q waveforms are passed through a variable attenuator and then they are summed with the down-converted I & Q feedback signal. The base-band signal is then amplified and sent to the up-mixer. The up-mixer consists of two mixers, one for the I channel and the other for the Q channel. The split I & Q LO signal is mixed with the base-band I & Q signals to produce an I and Q modulated signal at RF frequency. The signal is then output dif-

ferentially on pins 51 and 52 (RFOUTB, RFOUT), where the differential RF signal is converted to a single-ended unbalanced output by means of BALUN L5807. The output signal from the BALUN is applied to the RF Power Amplifier.

RF Power Amplifier

The RF Power Amplifier consists of attenuator R5830, R5831, R5832, pre-driver IC U5401, driver transistor Q5421, and output transistor Q5431. The overall RF gain of the power amplifier string is fine tuned by the BIAS1 voltage from the controller, which is applied to VCNTRL pin 1 on pre- driver U5401. The BIAS1 signal is buffered by amplifier Q5501. The operating bias point of driver Q5421 and PA Q5431 is set by BIAS2 and BIAS3 respectively, buffered by Q5521 and Q5542.

Directional Coupler and RF Feedback Path

A directional coupler exists at the RF PA output, and is used to pass the signal to the Antenna Switch and sample the signal thus providing the necessary feedback for the linearization and feedback correction. The sampled signal is routed via attenuator R5453, R5454, R5455 and the BALUN L5812 to the LNODCT (pin 37, RFIN, pin 36, RFINB). Internally to the LNODCT, the RF feedback signal is mixed down to base-band in a quadrature down mixer, and summed with the base-band input signal to provide cancellation of modulation distortion generated in the power amplifier.

Antenna Switch

The RF signal from the Directional Coupler is applied to PIN diode D5451. This PIN diode is turned on during the transmission time slot, to route the transmitter output signal to the harmonic filter (C5462-6467, L5461, and L5462), and from there on to the antenna connector. During the transmit time slot, pin diode D5551 is also turned on, preventing power from the transmitter from reaching the receiver LNA. During receive time slots, PIN diodes D5451 and D5551 are OFF, allowing receive signals to pass from the antenna connector through the harmonic filter, through L5452, and on to the receiver input preselector.

Harmonic Filter

From the antenna switch the signal is routed to the harmonic filter, consisting of C5462-6467, L5461, and L5462. The filter is required to attenuate transmitter harmonics during transmit mode, and leakage of local oscillator harmonics during receive mode.

Frequency Generating Section Detailed Circuit Description

For the Frequency Generating Section Block Diagram see Figure 4.

This section describes the generating circuits that supply all the required frequencies for the required transmitter and receiver functions. These circuits are described as follows:

- 16.8 MHz Reference Oscillator - TCXO.
- Main VCO and Main Synthesizer.
- Transmit frequency translation loop.

Reference Oscillator - TCXO

16.8 MHz TCXO (Y5362) is a temperature compensated crystal oscillator producing an accurate and stable 16.8 MHz master clock to the radio RF circuits. Its operating frequency is fine tuned by means of a warp voltage signal generated by the LVFRACN IC (U5331, pin 25). On radio power- up, an initial warp voltage setting is programmed into the LVFRACN IC by the microprocessor via the SPI bus, using a stored value programmed into the radio codeplug during factory tuning. While the receiver is registered to the radio system, an automatic frequency control algorithm is executed by the microprocessor, to fine tune the LVFRACN warp voltage to bring the TCXO frequency into alignment with the radio system frequency standard.

The output signal at pin 3 of the TCXO is passed to LVFRACN IC U5331, where it is used as a reference for the main frequency synthesizer. The TCXO output is also buffered by Q5351, and passed to other radio circuits via REF16_8_OSC. The LVFRACN IC buffers the 16.8 MHz reference, and provides it at FREFOUT (pin 41) for use by other radio circuits.

Main VCO and Main Synthesizer

The synthesizer components are LVFRACN, Loop Filter and VCO Buffer IC (VCO BIC). It produces the receiver first LO signal, as well as serving as the reference for the transmit frequency translation loop.

The operating frequency of Voltage Controlled Oscillator (VCO) in U5701is determined by resonator L5732, in conjunction with C5735, C5737, C5738, C5736, L5733, and varactors D5731-5734. The operating frequency of the oscillator is varied by means of varactor tuning voltage VCTRL, supplied by the LVFRACN U5331 IOUT signal (pin 43), and filtered by loop filter components C5303, R5304, C5305, R5303, R5302, and C5301. The RF output of the VCO is buffered by U5701. U5701 pin 12 provides a sample of the VCO output to the LVFRACN prescaler input (pin 32), where the signal is divided down to a lower comparison frequency by means of a programmable frequency divider. The divided down VCO signal is compared to a signal derived from the 16.8 MHz reference clock to generate an error signal (IOUT) which is filtered by the loop filter and tunes the VCO to the programmed operating frequency.

A LOCK_FN signal is available at LVFRACN pin 4 to provide feedback to the microprocessor that the synthesizer has successfully locked to the programmed frequency.

The “RX_OUT” signal from buffer U5701 pin 8 is amplified by Q5701, and supplied to the first mixer LO port.

The “TX_OUT” signal from buffer U5701 pin 10 provides the frequency reference for the Transmit Frequency Translation Loop.

Transmit Frequency Translation Loop

The Transmit Frequency Translation Loop comprises the following components:

- transmit Voltage Controlled Oscillator (VCO) and
- the ESCORT Near Unity Divider (NUD) Phase Locked Loop IC.

The operating frequency of Voltage Controlled Oscillator Q5601 is determined by resonator U5601 in conjunction with C5603, C5604, C5606, C5607, L5603, and varactors D5601-5604. The operating frequency of the oscillator is varied by means of a tuning voltage applied to the varactors.

The translation loop works as follows:

- A sample of the VCO operating frequency is buffered by Q5631 and applied to the FREQA input of the NUD IC U5702, where it is divided by a programmable divider set to 1.25, and phase compared to a reference frequency supplied to U5702 FREQB pin 9 from the main synthesizer.
- The result of this comparison is a VCO tuning signal, buffered by charge pump transistors Q5651, filtered by loop filter components C5653, R5652, and C5654, and applied to the VCO varactors.
- The action of the feedback loop is to maintain the operating frequency of the Transmit VCO at 1.25 times the programmed operating frequency of the main synthesizer.
- The loop bandwidth of the transmit frequency translation loop is set to a high value in order for the corrective feedback action of the loop to suppress re-modulation of the VCO as a result of leakage of the modulated transmitter signal from the transmitter Power Amplifier output back into the VCO.

Controller Section

For the Controller Section Block Diagram see Figure 5.

This section describes the related circuits as follows:

- DC Power Distribution
- Microprocessor
- Host Memories
- Radio Audio System

DC Power Distribution

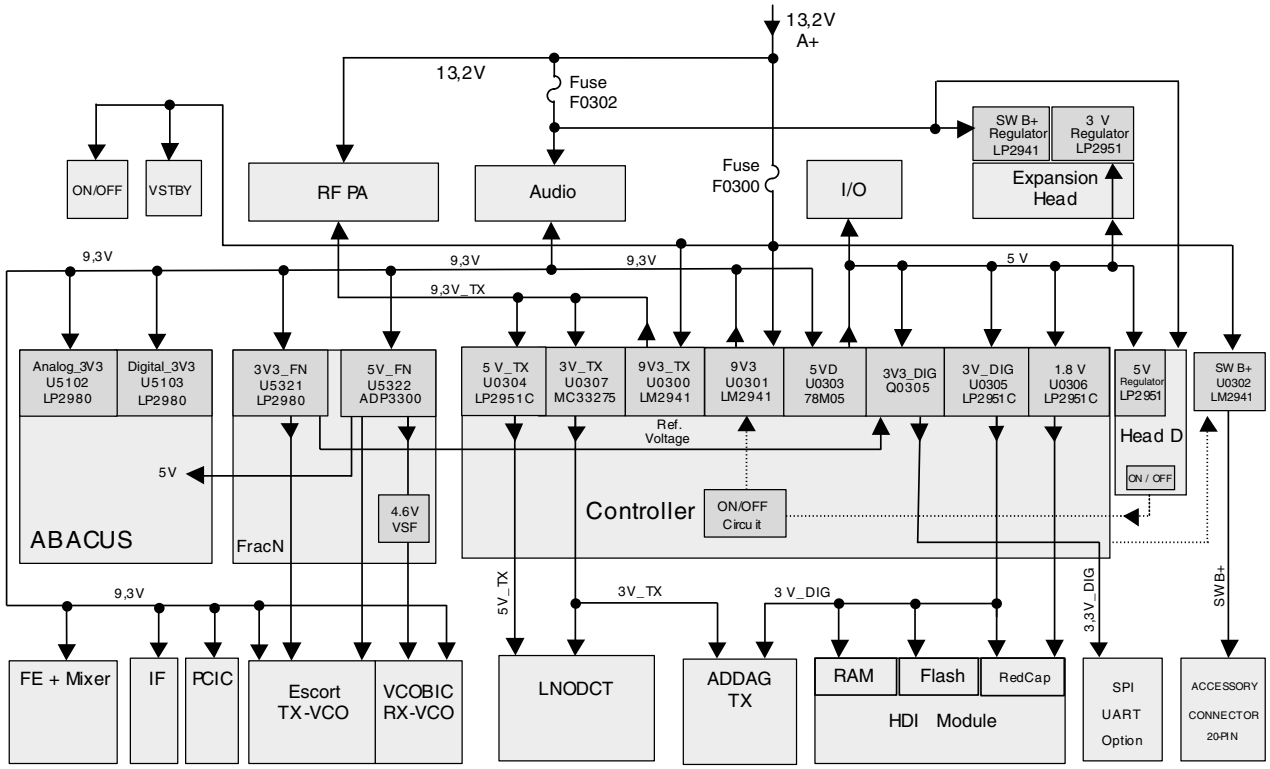

Figure 6 DC Power Distribution Diagram

DC Power Input

The DC power of nominal 13.2 volts enters the radio at connector J0301. Diode VR0300 acts as protection against transients and wrong polarity of the supply voltage. The supply voltage is fed directly to the RF PA, through the 3A fuse F0302 to the audio circuitry, expansion head and control head, and through the 3A fuse F0300 to regulators U0300, U0301, U0302, and the ON/OFF and VSTBY circuitry. The fuses protect the board from over current in case of a short on the connector pins or circuit failure.

9V3 Linear Regulator U0301

Regulator U0301 is connected to the 13.2 volts supply voltage via fuse F0300. The output of this regulator is controlled by the ON/OFF circuitry. When any of the signals RTC_ON_SW, ON_OFF_CONTROL_SV, SOFT_TURN_OFF, IGNITION is at high level or EMERGENCY is at low level the regulator is switched on via transistors Q0302, Q0301, Q0303. In addition, regulators U0300 and U0302 are also switched on by the same signal. The output voltage of U0301 is set to 9.3 volts with resistors R0307 and R0308.

9V3_TX Linear Regulator U0300

Regulator U0300 is connected to the 13.2 volts supply voltage via fuse F0300. The output of this regulator is controlled by the ON/OFF circuitry. When any of the signals RTC_ON_SW, ON_OFF_CONTROL_SV, SOFT_TURN_OFF, IGNITION is at high level or EMERGENCY is at low level the regulator is switched on via transistors Q0302, Q0301, Q0303. The output voltage of U0300 is set to 9.3 volts with resistors R0305 and R0306.

SW B+ Current Limit Regulator U0302

Regulator U0302 is connected to the 13.2 volts supply voltage via fuse F0300. The output of this regulator is controlled by the ON/OFF circuitry. When any of the signals RTC_ON_SW, ON_OFF_CONTROL_SV, SOFT_TURN_OFF, IGNITION is at high level or EMERGENCY is at low level the regulator is switched on via transistors Q0302, Q0301, Q0303. The output voltage of U0302 is set far above the maximum possible input voltage with resistors R0303 and R0304 so that this regulator acts as a current limiter for the EXT_SWB+ voltage on the 20 pin accessory connector.

5VD Linear Regulator U0303

Regulator U0303 gets its input voltage from the 9.3 volt regulator U0301. The output voltage 5VD is fixed to 5 volts and is the input voltage for the regulators U0305 and U0306. The voltage 5VD is also fed to the standard control head.

5V_FN Linear Regulator U5322

Regulator U5322 gets its input voltage from the 9.3 volt regulator U0301. The output voltage 5V_FN is fixed to 5 volts and is mainly used in the frequency generating unit (FGU).

3V3_FN Linear Regulator U5321

Regulator U5321 gets its input voltage from the 9.3 volt regulator U0301. The output voltage 3V3_FN is fixed to 3.3 volts and is mainly used in the frequency generating unit (FGU).

Analog_3V3 Linear Regulator U5102

Regulator U5102 gets its input voltage from the 9.3 volt regulator U0301. The output voltage ANALOG_3V3 is fixed to 3.3 volts and is mainly used in the receiver section.

Digital_3V3 Linear Regulator U5103

Regulator U5103 gets its input voltage from the 9.3 volt regulator U0301. The output voltage DIGITAL_3V3 is fixed to 3.3 volts and is mainly used in the receiver section.

3V_TX Linear Regulator U0307

Regulator U0307 gets its input voltage from the 9.3 volt regulator U0300. The output voltage 3V_TX is fixed to 3 volts and is mainly used in the transmitter section.

5V_TX Linear Regulator U0304

Regulator U0304 gets its input voltage from the 9.3 volt regulator U0300. The output voltage 5V_TX is fixed to 5 volts and is mainly used in the transmitter section.

3V3_DIG Voltage Follower Q0305

Transistor Q0305 is configured as voltage follower and gets its input voltage from the 5 volt regulator U0303. The output voltage 3V3_DIG is set to 3.3 volts by the reference voltage 3V3_FN from U5321. Diode D0303 compensates the base to emitter voltage drop of Q0305. The voltage is used for the optional UART connected to J0570.

3V_DIG Linear Regulator U0305

Regulator U0305 gets its input voltage from the 5 volt regulator U0303. The output voltage 3V_DIG is set to 3 volts with resistors R0320 and R0317 and is mainly used in the controller section.

1.8 V Linear Regulator U0306

Regulator U0306 gets its input voltage from the 5 volt regulator U0303. The output voltage 1.8V is set to 1.8 volts with resistors R0319 and R0318 and is used in the controller section.

4.6V VSF Voltage

The fractional N synthesizer U5331 creates the 4.6 volts super filter voltage (VSF). This voltage is used for the main VCO.

Microprocessor

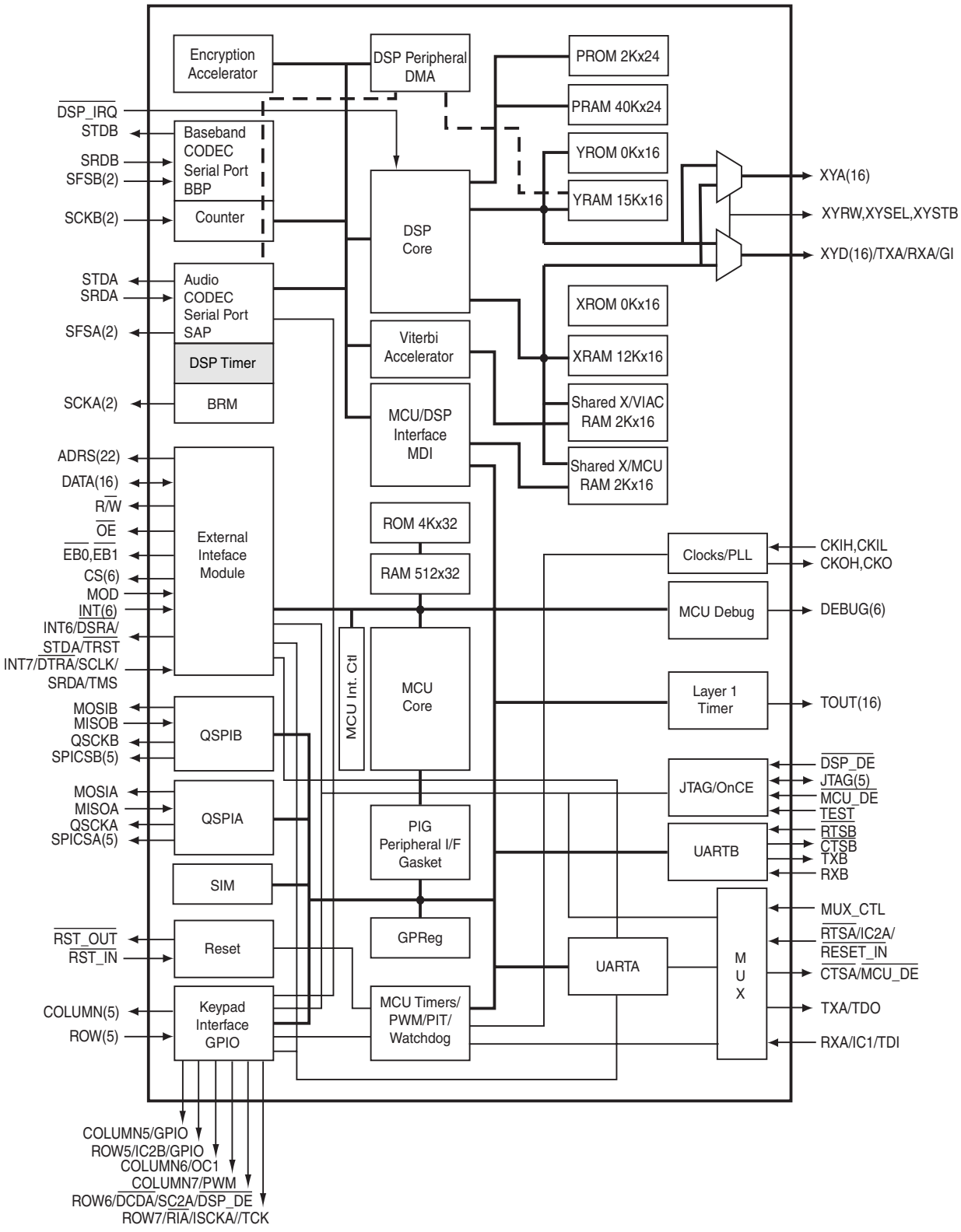

Figure 7 RedCap2 Block Diagram

The RedCap2 dual core (DSP / RISC) processor (U0100-1) located on the micro-controller sub-board controls the radio hardware, communicates via various interfaces with external equipment or accessories and performs digital signal processing. Beside its internal memory the RedCap2 uses the FLASH Memory and the SRAM also located on the sub-board. The RedCap2 exchanges digitized audio data with the CODEC via its Serial Audio Port (SAP). The RedCap2 sends digital baseband data to the ADDAG and receives digital baseband data from the ABACUS via its Baseband Port (BBP). To communicate with the RF IC's the RedCap2 uses its Queued Serial Peripheral Interface A (QSPIA). A second interface, QSPIB is used for communication with external equipment or accessories. The RedCap2 has 2 universal asynchronous receiver / transmitter ports (UARTA and UARTB) for communication with external equipment e.g. a control head or a control terminal (PC). UARTA communicates via SB9600 and RS232 protocol and UARTB communicates via SBEP protocol.

Host Memories

Flash Memory

The 4MByte FLASH Memory (U0102) located on the micro-controller sub-board contains the radio's Application Software and the Radio Code Plug. The Code Plug stores customer related information such as telephone numbers, addresses, etc. The RedCap2 accesses the data via a 22 bit wide address bus (A0-A21), a 16 bit wide data bus (DQ0-DQ15), and 6 control lines (EN_CE, EN_OE, EN_WE, EN_RP, EN_WP, VPP). When the FLASH Memory or the controller sub-board has been replaced or the software needs to be upgraded, the new Code Plug and application software must be programmed into the FLASH Memory.

SRAM Memory

The 512kByte SRAM (U0101) located on the micro controller sub-board stores data that can change very frequently, and which is generated and stored by the Application Software during its normal operation. The information is lost when the radio is turned off. The RedCap2 accesses the data via a 18 bit wide address bus (A0-A17), a 16 bit wide data bus (IO1-IO16), and 6 control lines (EN_CS, EN_CS2, EN_OE, EN_WE, LB, UB).

Serial Peripheral Interface (SPI)

The RedCap2 uses the SPI protocol to communicate with the RF IC's ABACUS, ADDAG, LNODCT, LVFRACN, ESCORT and PCIC. All these IC's are connected to the RedCap2's QSPIA module. The interface comprises the lines SPIA_MOSI(TX), SPIA_MISO(RX), SPIA_CS, and SPIA_CLK. The SPI bus is a synchronous bus, the timing clock signal CLK is sent while SPI data is transferred. Therefore, whenever there is activity on either MOSI or MISO, there should be a uniform signal on CLK.

The RedCap2 uses its module QSPIB to communicate with the DAC, the real time clock (RTC) U0100, the optional RS232 interface connected to the 7 pin connector P0701, and the external UART in the expansion head via the 40 pin connector J0500.

RS232, SB9600, SBEP Serial Interfaces

The RedCap2 uses three serial protocols to communicate with external devices: RS232, SB9600 and SBEP. The interface lines are available on the rear or front connectors, dependent on the interface. Not all interfaces can be used at the same time.

SBEP Serial Interface

The RedCap2 communicates with the standard control head via the SBEP serial interface. This interface comprises line BUS+ and is available on the 12 pin front connector J0550. Op-amps

U0102-1 and U0102-2 perform buffering and level shifting from 3 volts to 5 volts level. The RedCap2 uses its UARTB for the SBEP serial interface.

RS232 and SB9600 Serial Interfaces

The configuration of the RS232 and SB9600 serial interfaces depends on the radio setup. If no expansion head is connected to the radio, RedCap2 module UARTA provides either a 4-wire RS232 or an SB9600 interface on the 20 pin accessory connector J0400. If at power up pin BUSY_OUT on the accessory connector J0400 is connected to pin BUSY_IN, the RedCap2 assumes that SB9600 equipment is connected and configures UARTA for the SB9600 interface. If both pins are not connected to each other at power up, the UARTA will be configured for RS232 interface. The interface comprises lines RS232_TX, RS232_RX, RS232_CTS, RS232_RTS. These lines are not buffered and at 0 or 3 volts level.

An optional RS232 interface board can be fitted in the accessory connector J0400 when no expansion head is connected. This board provides a 4-wire RS232 interface with standard RS232 levels available on the 7 pin connector P0701. The RedCap2 uses its QSPIB module for this interface.

If an expansion head is connected to the radio, the serial interfaces on the 20 pin accessory connector J0400 can not be used. The UARTA is configured for an 8-wire RS232 interface, which is available on the 9 pin connector of the expansion head. This interface has standard RS232 levels and can be connected to an external data terminal. In addition, the RedCap2 configures its QSPIB module to provide either a 4-wire RS232 or SB9600 interface with 5 volts level on the 25 pin expansion head connector. If line MUX_CTRL_1 is at 0 volt, the interface is switched to RS232 mode. If line MUX_CTRL_1 is at 3 volts, the interface is switched to SB9600 mode. The interface comprises lines BUSY_IN, BUSY_OUT, RESET_OUT, and the QSPIB lines SPIB_MOSI, SPIB_MISO, SPIB_CLK, SPIB_CS1_UART and is available on the 40 pin front connector J0500 with signals at 3 volts high level. The RedCap2 uses the SB9600 interface to communicate with the motorcycle control head. If no motorcycle control head is connected, the interface can be used to control the radio via the SB9600 protocol with an external control terminal.

Radio Audio System

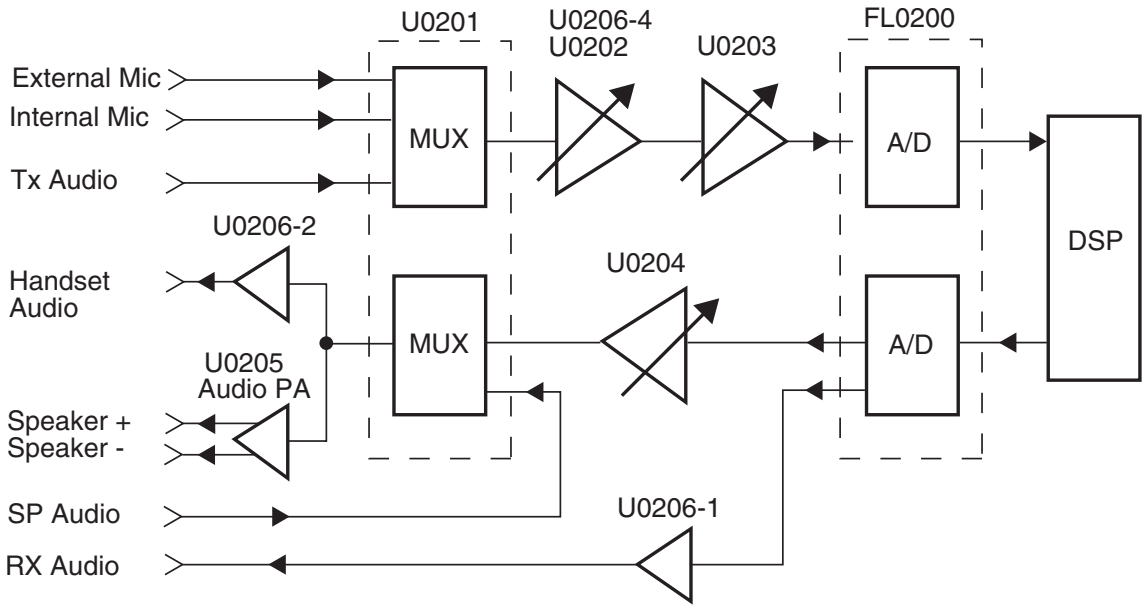

Figure 8 Audio Block Diagram

The Audio system consists of the following components:

- RX and TX path multiplexer
- RX and TX programmable potentiometer
- CODEC
- DSP
- Audio PA

TX Path

The speech audio is fed to the internal microphone input (INT_MIC), the external microphone input (EXT_MIC) or the TX audio input (TX_AUDIO). The internal and external microphone inputs have a DC bias prepared for connecting a microphone. The TX audio input has a DC blocking capacitor. Multiplexer U0201 selects one of the possible inputs and feeds the signal to amplifier U206-4. The gain of this amplifier is switchable via gate U0202. The programmable potentiometer U0203 attenuates the signal according to the radio mode of operation. Finally, the CODEC FL0200 converts the analog signal into digital format and transfers it to the DSP via the serial audio port (SAP). The DSP performs the functions of audio filtering, ACELP speech compression, digital modulation, and transfers the data to the RF section. When the radio is operating in the telephone interconnect mode, the DSP performs the required tasks such as echo and noise reduction.

RX Path

The receiver feeds the digital output signal via the baseband port (BBP) to the DSP which performs the functions of digital demodulation, ACELP speech de-compression, and audio filtering. After processing, the DSP feeds the signal via the serial audio port (SAP) to the CODEC FL0200. The CODEC converts the digital audio format to an analog signal. One of the CODEC's analog output signals is amplified by U0206-1 and then fed to the RX_AUDIO pin on the 20 pin accessory connector J0400. The second output signal from the CODEC is fed to the programmable potentiometer U0204 which attenuates the analog signal according to the radio mode of operation or the setting of the volume control. The multiplexer U0201 selects between the signal from the potentiometer or the signal SP_AUDIO from the 40 pin expansion head connector J500 and routes the audio to the audio power amplifier (PA) U0205 and the amplifier U0206-2. The amplified audio from U0206-2 is available on the HANDSET_AUDIO pins on the 20 pin accessory connector J0400 and the 40 pin expansion head connector J0500. The audio PA has one inverted and one non-inverted output that produces the differential audio output signals SPEAKER+ and SPEAKER-. Both signals are available on the 20 pin accessory connector J0400 and the 12 pin control head connector J0550.

CHAPTER 4.2

THEORY OF OPERATION (800 MHz)

Diagram and Overview

The main Digital/RF Block contains the following four sections (see figure below). An overview of these four sections is provided in the following paragraphs:

- Receiver Section
- Transmitter Section
- Frequency Generating Section (Synthesizer)
- Controller Section

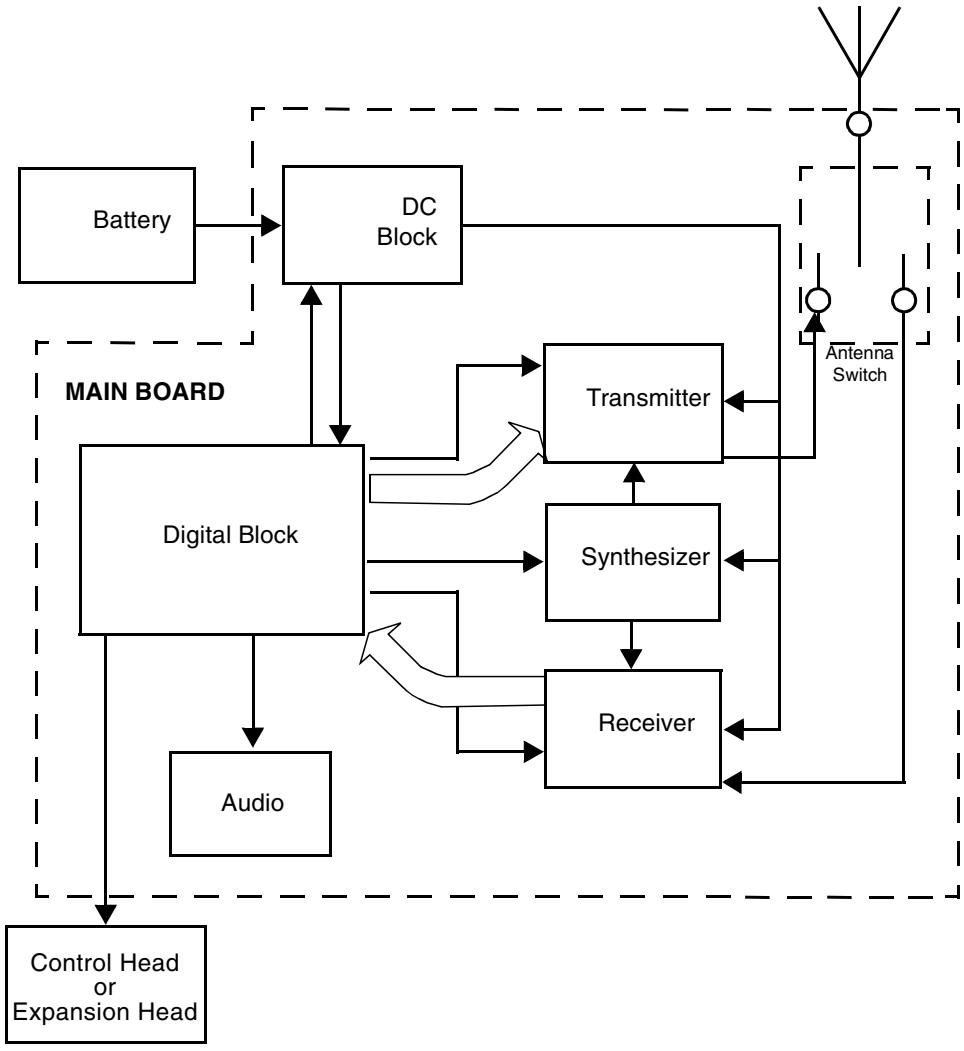

Figure 1 General Block Diagram

Receiver Section

The receiver section includes the following main components:

- Antenna Switch
- Limiter
- Front Pre-selector Filter
- Low Noise Amplifier (LNA)
- Second Pre-selector Filter
- Mixer
- IF Filter
- IF Amplifier
- Dynamic Range Extension Circuit
- IF Digitizing Subsystem

The IF Digitizing Subsystem performs the following functions:

- Carries out amplification and down conversion of the signal into the second IF.
- Performs IF AGC.
- Converts the second IF analog signal into baseband digital I & Q format.
- Transmits the I & Q baseband data to the DSP for further processing.
- Synthesizes the second LO frequency.
- Synthesizes the Sigma-Delta clock.
- Calculates the received signal strength.

Transmitter Section

The transmitter incorporates cartesian feedback circuitry to enhance transmitter linearity to reduce power splatter into adjacent channels. The transmitter circuitry comprises the following components:

- Modulation digital to analog conversion, perfomed by:
  Analog-to-Digital / Digital-to-Analog IC (ADDAG),
- Modulation up-converter, perfomed by:
  Low Noise Offset Direct Conversion Transmitter integrated circuit (LNODCT),
- Balun and Attenuator,
- Linear class AB Power Amplifier (PA),
- Directional coupler,
- Isolator,
- Antenna switch, and
- Harmonic filter.

The transmitter linearization feedback signal is taken from the forward power port of the directional coupler, attenuated, and passed to the RF feedback port of the LNODCT integrated circuit.

Controller Section

This section includes the RedCap2, which controls the transmit, receive and synthesize operations of the integrated circuits located in the RF section. Within the RedCap2 are the DSP and the serial interfaces.

The controller section contains the following:

- Voltage regulators
- Power On/Off circuitry
- RedCap2
- Host memories (FLASH and SRAM)
- Serial peripheral interface (SPI)
- RS232, SB9600, SBEP serial interfaces
- RX and TX path multiplexer
- Programmable potentiometer
- CODEC
- Audio power amplifier (PA)

Frequency Generating Section

The frequency generating section comprises the following components:

- Reference Oscillator - TCXO
- Main Synthesizer - consists of the Main Voltage Controlled Oscillator (VCO) and Low Voltage Fractional-N integrated circuit (LVFRACN). In receive mode, the main synthesizer provides the local oscillator injection to the receiver first mixer. In transmit mode, this synthesizer provides the frequency reference for the transmit frequency translation loop.
- Transmit frequency translation loop. Consists of the transmit Voltage Controlled Oscillator (VCO) and ESCORT Near Unity Divider (NUD) Phase Locked Loop IC.

Block Diagrams Descriptions

The block diagrams descriptions cover Receiver Path, Transmitter Path, Frequency Generation Section, and Controller Section.

Receiver Path

The received signal (see figure below) from the antenna is directed by the Antenna Switch to the Front Pre-selector Filter.

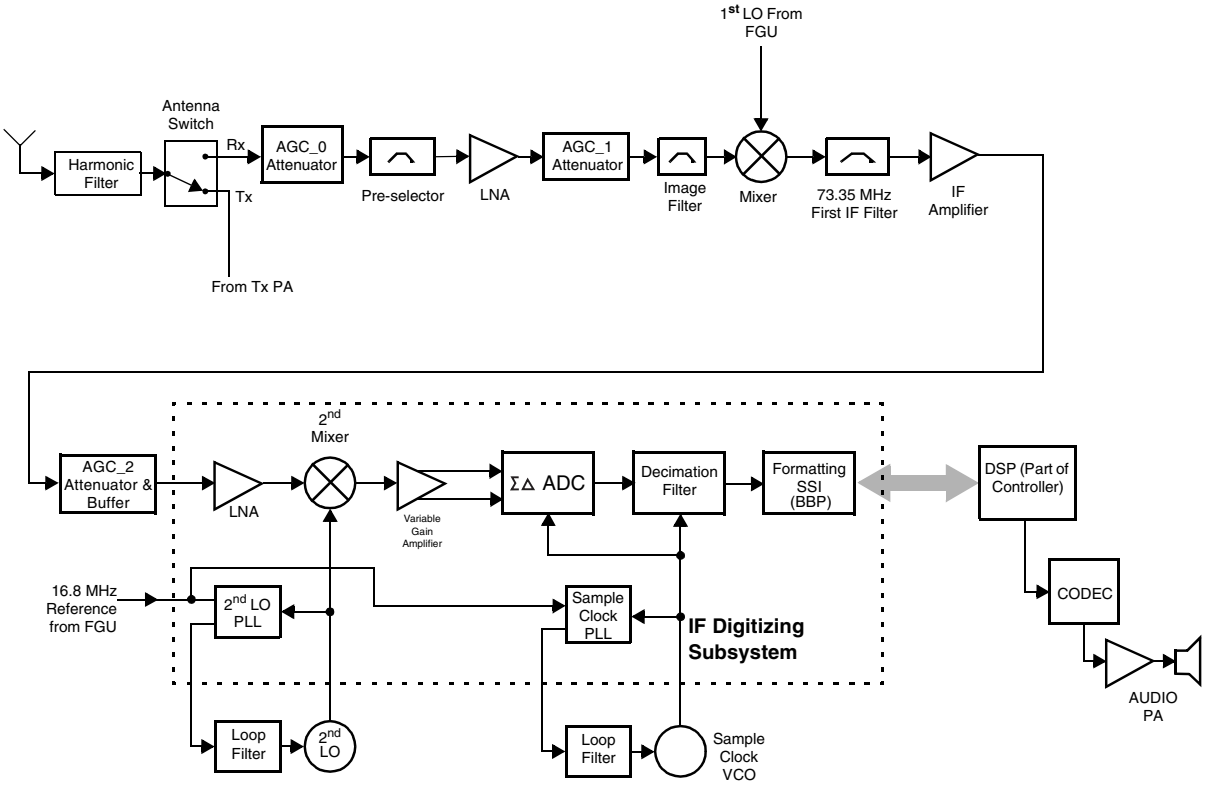

Figure 2 Receive Path Block Diagram

The receive pre-selector filter performs the following functions:

- passes frequencies in the 851 – 870 MHz receive frequency range, and
- blocks unwanted spurious frequencies like half IF and image frequencies

The signal is mixed with the low side injection local oscillator signal to create the first IF at 73.35 MHz. The IF signal is filtered by the crystal filter, amplified by the IF amplifier, and sent to the IF Digitizing IC.

The IF Digitizing Subsystem performs the following functions:

- down conversion to the second IF at 2.25 MHz,
- bandpass sigma-delta analog-to-digital conversion of the second IF signal into in-phase (I) and quadrature (Q) digital signals.
- formatting of the I and Q data streams into a serial bit stream, which is sent for further processing to the Digital Signal Processor (DSP) (part of the microcontroller) over the Synchronous Serial Interface (SSI) data link.

The DSP performs the following functions:

- demodulation,
- Forward Error Correction (FEC)
- other correction algorithms for overcoming channel errors, and
- the decoder procedure for digital speech data decompression.

Transmitter Path

When the radio is transmitting (see figure below), microphone audio is sent to the CODEC, which performs analog-to-digital conversion and routes the digital signal to the DSP. The DSP performs the following functions:

- coding,
- error correction, and
- generation of the baseband modulation waveform.

From the DSP, baseband digital ‘I’ and ‘Q’ modulation waveform samples are sent to the ADDAG IC, where the digital data is converted into baseband analog ‘I’ and ‘Q’ waveforms and filtered.

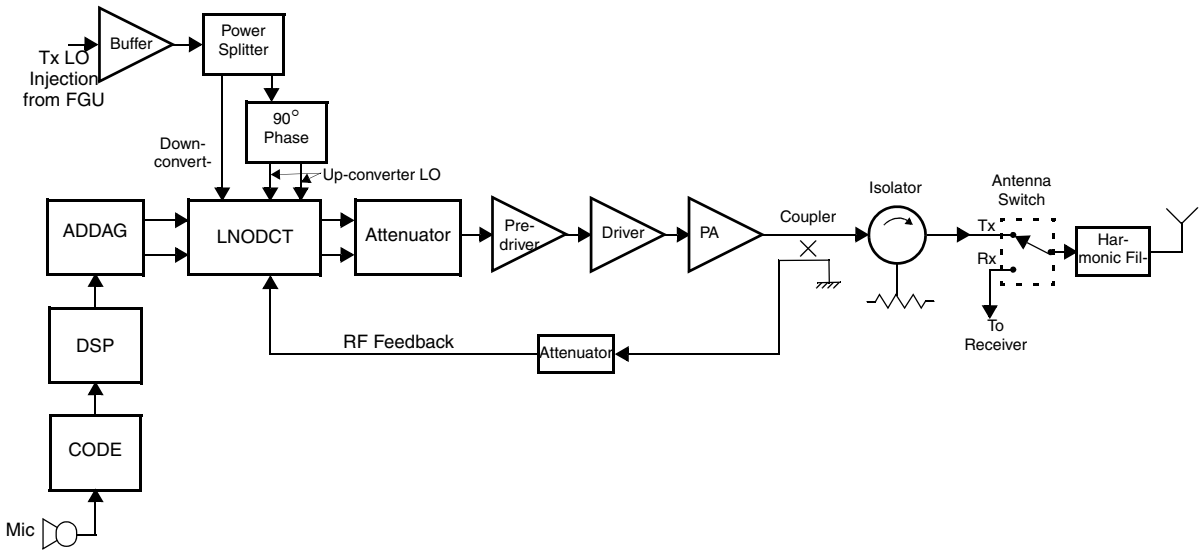

Figure 3 Transmiter Path Block Diagram

The analog modulation signal is passed on to the LNODCT where it is up-converted to the transmitter operating frequency. The modulated RF output signal from the LNODCT is converted from differential to single-ended by a balun, and passed to the attenuator, pre-driver IC, driver transistor, power amplifier transistor, directional coupler, and isolator, from where it is routed to the antenna via the antenna switch and harmonic filter. An RF feedback signal is taken from the directional coupler and fed back to the LNODCT for transmitter power control and linearization.

Frequency Generating Section

The frequency generating section comprises the following components (see Figure below):

- 16.8 MHz TCXO Reference Oscillator.
- Main Synthesizer - consists of the Main Voltage Controlled Oscillator (VCO) and Low Voltage Fractional-N (LVFRACN) integrated circuit PLL. In receive mode, the main synthesizer provides the local oscillator injection to the receiver first mixer. In transmit mode, this synthesizer provides the frequency reference for the transmit frequency translation loop.
- Transmit frequency translation loop - consists of the transmit Voltage Controlled Oscillator (VCO) and ESCORT Near Unity Divider (NUD) Phase Locked Loop IC.

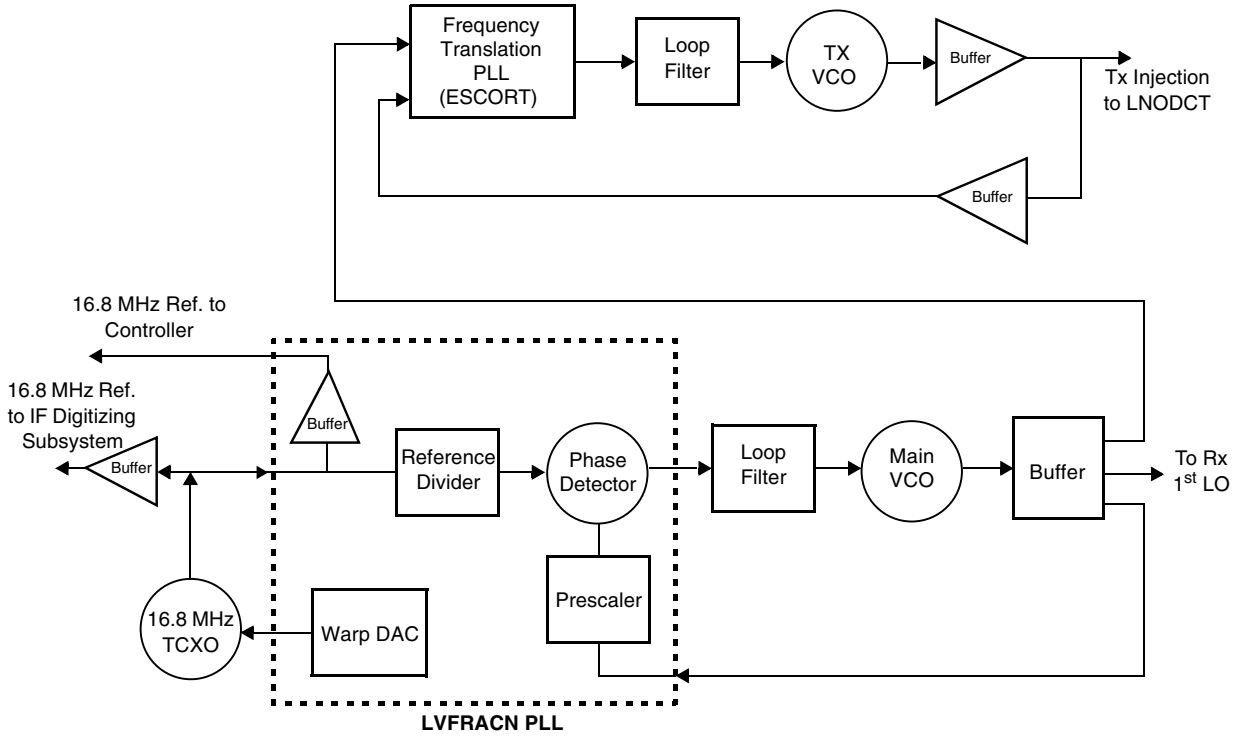

Figure 4 Frequency Generating - Block Diagram

The reference oscillator –TCXO is a temperature compensated crystal oscillator producing an accurate and stable 16.8 MHz master clock, from which all other clocks in the radio are derived. It provides the reference frequency for the following components:

- the main frequency synthesizer,
- the IF Digitizing Subsystem,
- the ADDAG, and
- the microcontroller

Its operating frequency is fine tuned by means of a warp voltage signal generated by the LVFRACN IC.

Main Synthesizer

The Main Synthesizer consists of the main VCO and LVFRACN PLL IC. The main synthesizer provides the LO signal to the first mixer for down-converting the received signal to the 73.35 MHz first IF frequency and in transmit mode provides the reference frequency for the ESCORT frequency translation loop.

Transmit frequency translation loop

The transmitter frequency translation loop consists of the transmit VCO and ESCORT near unity divider PLL IC. This subsystem generates the carrier frequency injection signal for the LNODCT.

Controller Section

The controller section contains the RedCap2 dual core (DSP / RISC) processor and its external memory, the TX and RX audio processing, the serial interfaces and I/O circuitry. The RedCap2 and its external memory is placed on a sub-board in the controller section.

The RedCap2 controls the receive / transmit frequencies, power levels, control head display and keypad, serial interfaces, accessories, MMI, and other radio functions. This microprocessor can be operated through the RS232 interface by a personal computer to program the FLASH.

The TX audio circuitry selects between the different microphone inputs, controls the TX audio level and converts the analog audio signal to a digital format.

The RX audio circuitry converts the received signal from digital format to an analog audio signal, performs volume control and amplifies the signal to speaker level.

The DSP performs signalling, and voice encoding and decoding.

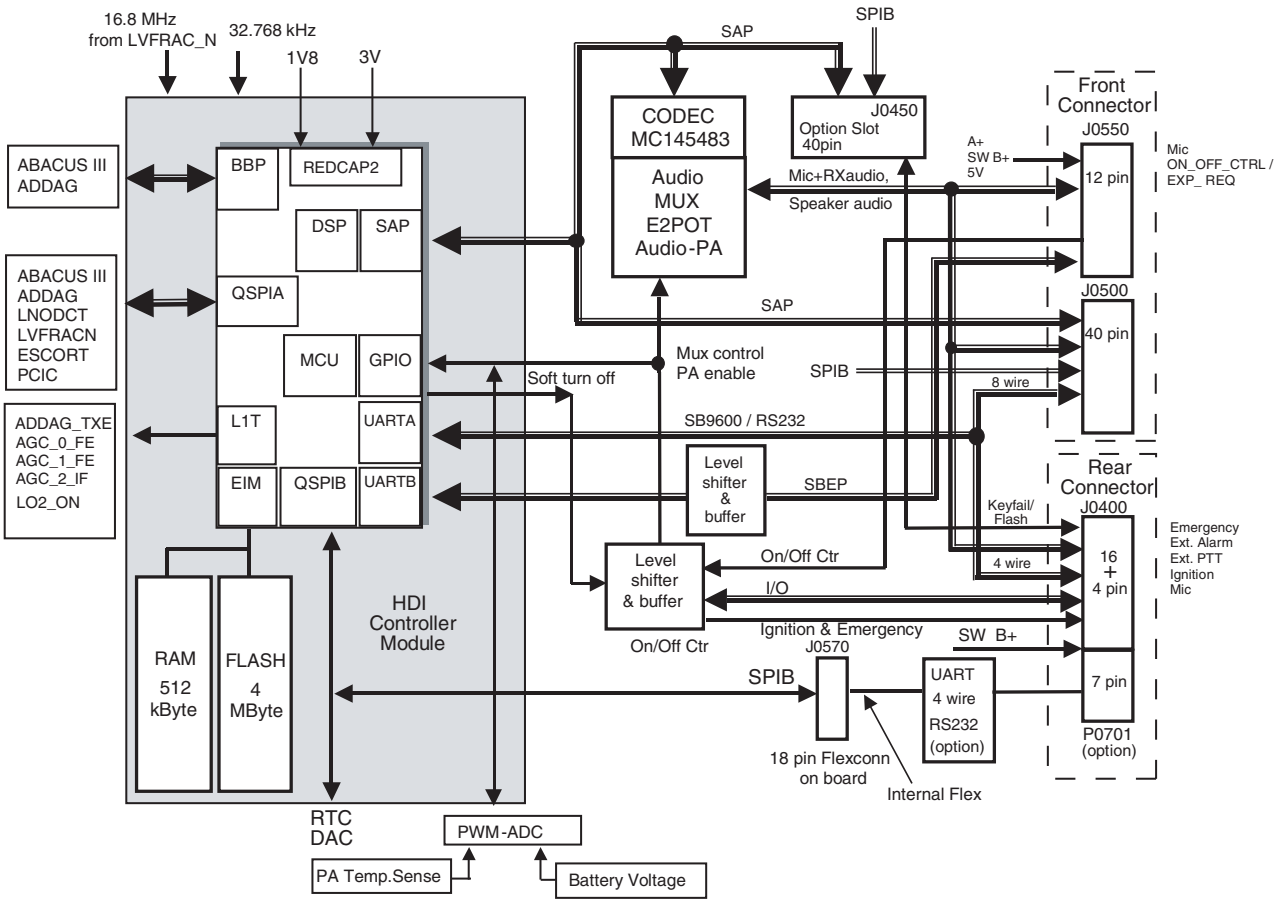

Figure 5 Controller Block Diagram

Detailed Circuit Description

Receiver Path, Detailed Circuit Description

For the Receive Path Block Diagram see Figure 2.

Antenna Switch

The signal coming from the antenna is routed to the receiver section via the harmonic filter, which is comprised of L5461, L5462, and C5462 to C5467. The signal continues to flow through quarter wave transformer L5452 and C5555 to the Rx section toward pre-selector filter. The limiter (D5002) function is to prevent entrance of signals with power higher than 30dBm, which may damage the receiver front-end.

Pre-selector Filter

The signal is passed to the first pre-selector filter (FL5002) and from there routed to Low Noise Amplifier (LNA) (U5003). The first pre-selector filter attenuates incoming spurious RF frequencies, especially the image frequency.

LNA

The Low noise amplifier (LNA) U5003 amplifies the incoming received signal. It maintains a large gain and small Noise Figure. When LNA “enable” (pin 3, VPD) receives a supply of 1.9 V from DC switch (Q5002), the amplifier is enabled. From the LNA the signal passes to the second pre-selector filter (FL5001).

Second Pre-selector

The second pre-selector filter (FL5001) provides further attenuation of incoming image and half-IF spurious response signals, as well as noise at the image frequency that may be generated by the LNA. From the output of the second pre-selector filter the received signal is sent to the RF input port of the first mixer.

Mixer

Mixer U5002 down-converts the incoming RF signal to the 73.35 MHz first IF, utilizing a first local oscillator signal tuned 73.35 MHz below the desired receiver operating frequency. An impedance matching network (L5012, C5037, C5036, L5201, C5203, L5011, L5018) is placed between the mixer output and IF filter U5201.

IF Filter, Amplifier, Dynamic Range Extension

The IF signal is routed via IF filter (FL5201) to IF amplifier Q5201. From there it is routed to the Dynamic Range Extension circuitry which comprises Q5101, its bias components, and D5121. This circuitry is required to maintain good receiver linearity over a wide range of incoming signal levels,

and prevent clipping of high level signals. This circuit avoids the use of fixed switchable attenuators typically used in Automatic Gain Control (AGC) circuits.

IF Digitizing Subsystem

The IF Digitizing Subsystem is comprised of U5101. Here the IF signal is amplified and then mixed with an internally generated 2nd LO signal to produce the second IF signal. The 2nd IF signal is first processed by a variable gain amplifier and then converted to in-phase and quadrature (I and Q) digital data samples by means of a bandpass sigma-delta analog-to-digital converter. The I and Q digital signals are formatted into a single serial bit stream and sent for further processing to the Digital Signal Processor (DSP) (part of Microcontroller) over the Synchronous Serial Interface (SSI) data link.

An internal AGC circuit controls the gain of the variable gain amplifier (VGA) to ensure that the maximum signal level into the ADC does not exceed a fixed analog ADC clip level and the rms output level of the ADC is maintained at an established reference level.

An internal phase locked loop control circuit controls the frequency of voltage controlled oscillator Q5180 which generates the 71.1 MHz 2^{nd} LO injection frequency.

An internal phase locked loop control circuit controls the frequency of voltage controlled oscillator Q5190 which generates the 18MHz sample clock frequency utilized by the ADC and decimation filters.

Both phase locked loops derive their frequency reference from the LVFRACN 16.8 MHz master clock.

Transmitter Path, Detailed Circuit Description

For the Transmit Path Block Diagram see figure 3.

ADDAG

The Analog to Digital/Digital to Analog IC U5802 (ADDAG) receives the modulation waveform as serial data transmitted by the DSP at a 48 kbps rate to the SSI port (pin 33, STD). Data is transmitted as a 16-bit 'I' word followed by a 16-bit 'Q' word. The ADDAG provides a serial clock of 2.4MHz to the DSP (pin 34, SCK) and sends a frame sync signal (pin 35, SFS) at the beginning of every 'I' word transmission, to instruct the DSP to send data. In the ADDAG, the received serial I & Q words are converted into parallel I & Q words, and transferred to an interpolation filter. The interpolation filter increases the sampling rate to reduce in-band quantization noise, as well as to reduce image at multiples of the input data. The interpolated samples are rounded to 8 bits, and run through 8-bit D/A converters. The D/A converters take the digital I & Q words and convert them into analog signals, which are filtered and amplified. The output is comprised of two separate low-level differential signals, I & Q (pin 8, OUTI; pin 7, OUTIB; pin 6, OUTQ; pin 5, OUTQB). The output signals are routed to the LNODCT IC for up conversion to the transmitter operating frequency. The ADDAG sends a 2.4MHz low-level differential reference clock signal (pin 2, TCLCK; pin 1, TCLCKB) to the LNODCT. It also sends a differential signal (pin 48, TSLOT; pin 47, TSLOTB) that marks the beginning and end of each transmission slot (whenever a TXE signal {pin 37 TXE} is received from the DSP). After receiving the TSLOT signal, the LNOCDT toggles the ASW line (pin 10, ASW) which signals the ADDAG to set VCNTO signal LOW (pin 11, VCNTO) which enables the Antenna Switch during the transmit slot. The ADDAG starts to receive data from DSP after TXE signal (pin 37, TXE).

Tx LO

The Tx LO signal path processes the signal generated by the Transmit Frequency Translation Loop (part of the FGU), which determines the operating frequency of the transmitter. The input signal is amplified by Q5801, and passed to the power splitter (R5804, R5809, R5814). One output of the power splitter is routed to I-Q splitter U5801 which converts the single input signal into two quadrature (90 degree phase shift) 'I' and 'Q' signals which are subsequently routed to the LNODCT up conversion LO input (pins 46, LOQ; 45, LOQB; 57, LOI; 56, LOIB). The signal at the second output of the power splitter is applied to the LNODCT feedback down conversion LO input (pin 24, MVCO).

LNODCT

The Low Noise Offset Direct Conversion Transmitter (LNODCT) U5803 performs the following tasks:

- up converts the baseband I and Q modulation waveform to the transmitter operating frequency,
- controls power output, and
- cancels power amplifier distortion products created by non-linearities in the RF power amplifier output stage.

The differential base-band signals from the ADDAG are input into the LNODCT on pins 58 – 61 (BINQB, BINQ, BINIB and BINI). The baseband I and Q waveforms are passed through a variable attenuator and then they are summed with the down-converted I & Q feedback signal. The base-band signal is then amplified and sent to the up-mixer. The up-mixer consists of two mixers, one for the I channel and the other for the Q channel. The split I & Q LO signal is mixed with the base-band I & Q signals to produce an I and Q modulated signal at RF frequency. The signal is then output dif-

ferentially on pins 51 and 52 (RFOUTB, RFOUT), where the differential RF signal is converted to a single-ended unbalanced output by means of BALUN L5807. The output signal from the BALUN is applied to the RF Power Amplifier.

RF Power Amplifier

The RF Power Amplifier consists of attenuator R5413, R5414, R5415, pre-driver IC U5401, driver transistor Q5421, and output transistor Q5431. The overall RF gain of the power amplifier string is fine tuned by the BIAS_PA_1 voltage from the controller, which is applied VCNTRL pin 1 on pre-driver U5401. The BIAS_PA_1 signal is buffered by amplifier Q5501. The operating bias point of driver Q5421 and PA Q5431 is set by BIAS_PA_2 and BIAS_PA_3 respectively, buffered by Q5521 and Q5542.

Directional Coupler and RF Feedback Path

A directional coupler exists at the RF PA output, and is used to pass signal to Isolator FL5451 and sample the signal thus providing the necessary feedback for the linearization and feedback correction. The sampled signal is routed via attenuator R5453, R5454, R5455 to the LNODCT (pin 37, RFIN). Internally to the LNODCT, the RF feedback signal is mixed down to base-band in a quadrature down mixer, and summed with the base-band input signal to provide cancellation of modulation distortion generated in the power amplifier.

Isolator

The signal in the forward path is fed to the input port of isolator FL5451. The isolator is placed at the PA output to decrease the influence of antenna impedance variations on PA performance. Reflected power returned from the antenna is absorbed in a 50 Ohm resistor inside the isolator, preventing the reflected power from reaching the PA output device, where it could degrade the operation of the cartesian feedback linearization loop.

Antenna Switch

The RF signal from the Isolator is applied to PIN DIODE D5451. This PIN diode is turned on during the transmission time slot, to route the transmitter output signal to the harmonic filter (C5462-6467, L5461, and L5462), and from there on to the antenna connector. During the transmit time slot, pin diode D5551 is also turned on, preventing power from the transmitter from reaching the receiver LNA. During receive time slots, PIN diodes D5451 and D5551 are OFF, allowing receive signals to pass from the antenna connector through the harmonic filter, through L5452, and on to the receiver input preselector.

Harmonic Filter

From the antenna switch the signal is routed to the harmonic filter, consisting of C5462-6467, L5461, and L5462. The filter is required to attenuate transmitter harmonics during transmit mode, and leakage of local oscillator harmonics during receive mode.

Frequency Generating Section Detailed Circuit Description

For the Frequency Generating Section Block Diagram See Figure 4.

This section describes the generating circuits that supply all the required frequencies for the required transmitter and receiver functions. These circuits are described as follows:

- 16.8 MHz Reference Oscillator - TCXO.
- Main VCO and Main Synthesizer.
- Transmit frequency translation loop.

Reference Oscillator - TCXO

16.8 MHz TCXO (Y5362) is a temperature compensated crystal oscillator producing an accurate and stable 16.8 MHz master clock to the radio RF circuits. Its operating frequency is fine tuned by means of a warp voltage signal generated by the LVFRACN IC (U5331, pin 23). On radio power-up, an initial warp voltage setting is programmed into the LVFRACN IC by the microprocessor via the SPI bus, using a stored value programmed into the radio codeplug during factory tuning. While the receiver is registered to the radio system, an automatic frequency control algorithm is executed by the microprocessor, to fine tune the LVFRACN warp voltage to bring the TCXO frequency into alignment with the radio system frequency standard.

The output signal at pin 3 of the TCXO is passed to LVFRACN IC U5331, where it is used as a reference for the main frequency synthesizer. The TCXO output is also buffered by Q5351, and passed to other radio circuits via REF16_8_OSC. The LVFRACN IC buffers the 16.8 MHz reference, and provides it at FREFOUT (pin 41) for use by other radio circuits.

Main VCO and Main Synthesizer

The synthesizer components are LVFRACN, Loop Filter, VCO and buffer. It produces the receiver first LO signal, as well as serving as the reference for the transmit frequency translation loop.

The operating frequency of Voltage Controlled Oscillator Q5712 is determined by resonator W5701, in conjunction with C5735, C5737, C5730, L5733, and varactors D5732 and D5734. The operating frequency of the oscillator is varied by means of varactor tuning voltage VCTRL, supplied by the LVFRACN U5331 IOUT signal (pin 43), and filtered by loop filter components C5303, R5304, C5305, R5303, R5302, and C5301. The RF output of the VCO is buffered by U5701. U5701 pin 12 provides a sample of the VCO output to the LVFRACN prescaler input (pin 32), where the signal is divided down to a lower comparison frequency by means of a programmable frequency divider. The divided down VCO signal is compared to a signal derived from the 16.8 MHz reference clock to generate an error signal (IOUT) which is filtered by the loop filter and tunes the VCO to the programmed operating frequency.

A LOCK_FN signal is available at LVFRACN pin 4 to provide feedback to the microprocessor that the synthesizer has successfully locked to the programmed frequency.

The “RX_OUT” signal from buffer U5701 pin 8 is amplified by Q5701, and supplied to the first mixer LO port.

The “TX_OUT” signal from buffer U5701 pin 10 provides the frequency reference for the Transmit Frequency Translation Loop.

Transmit Frequency Translation Loop

The Transmit Frequency Translation Loop comprises the following components:

- transmit Voltage Controlled Oscillator (VCO) and
- the ESCORT Near Unity Divider (NUD) Phase Locked Loop IC.

The operating frequency of Voltage Controlled Oscillator Q5601 is determined by resonator W5601 in conjunction with C5603, C5604, C5606, C5607, L5603, and varactors D5602 and D5604. The operating frequency of the oscillator is varied by means of a tuning voltage applied to the varactors.

The translation loop works as follows:

- A sample of the VCO operating frequency is buffered by Q5631 and applied to the FREQA input of the NUD IC U5702 (pin 16), where it is divided by a programmable divider set to 1.0625, and phase compared to a reference frequency supplied to U5702 FREQB pin 9 from the main synthesizer.
- The result of this comparison is a VCO tuning signal, buffered by charge pump transistors Q5651, Q5652, and Q5653, filtered by loop filter components C5653, R5652, and C5654, and applied to the VCO varactors.
- The action of the feedback loop is to maintain the operating frequency of the Transmit VCO at 1.0625 times the programmed operating frequency of the main synthesizer.
- The loop bandwidth of the transmit frequency translation loop is set to a high value in order for the corrective feedback action of the loop to suppress remodulation of the VCO as a result of leakage of the modulated transmitter signal from the transmitter Power Amplifier output back into the VCO.

Controller Section

For the Controller Section Block Diagram see Figure 5.

This section describes the related circuits as follows:

- DC Power Distribution
- Microprocessor
- Host Memories
- Radio Audio System

DC Power Distribution

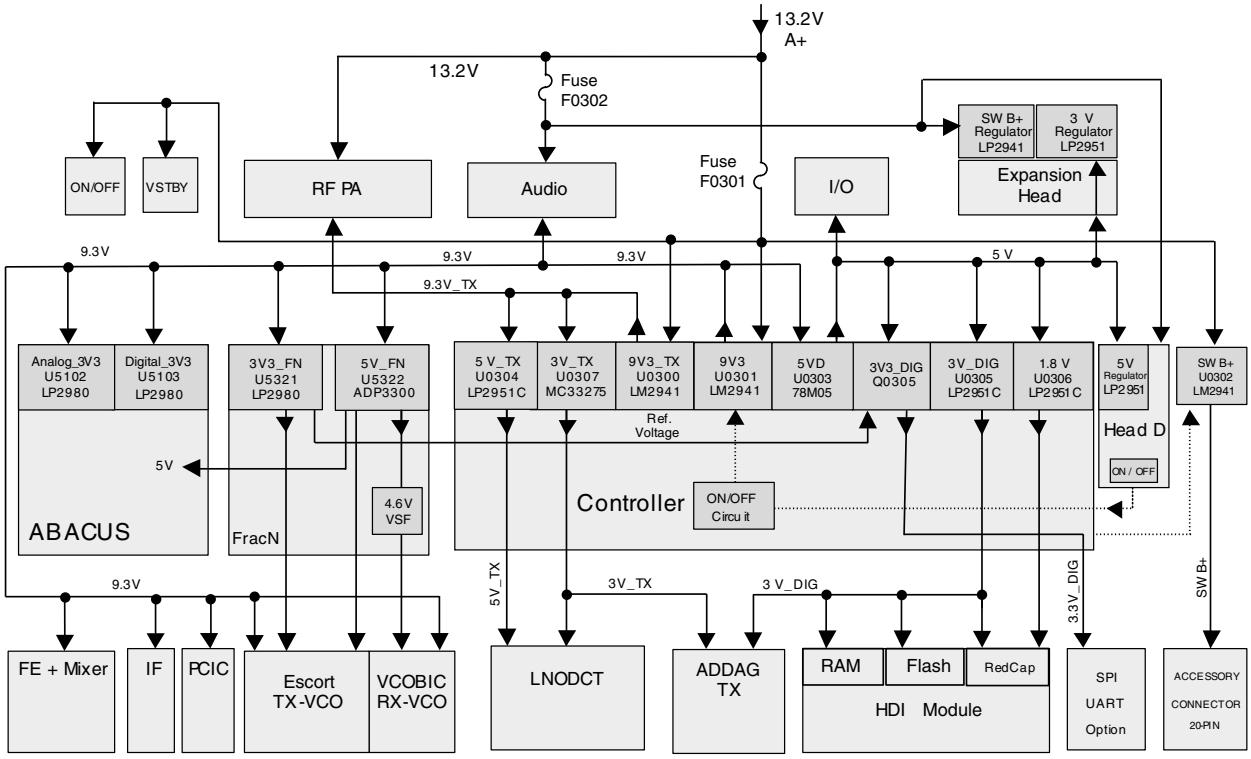

Figure 6 DC Power Distribution Diagram

DC Power Input

The DC power of nominal 13.2 volts enters the radio at connector J0301. Diode VR0300 acts as protection against transients and wrong polarity of the supply voltage. The supply voltage is fed directly to the RF PA, through the 3A fuse F0302 to the audio circuitry, expansion head and control head, and through the 3A fuse F0301 to regulators U0300, U0301, U0302, and the ON/OFF and VSTBY circuitry. The fuses protect the board from over current in case of a short on the connector pins or circuit failure.

9V3 Linear Regulator U0301

Regulator U0301 is connected to the 13.2 volts supply voltage via fuse F0300. The output of this regulator is controlled by the ON/OFF circuitry. When any of the signals RTC_ON_SW,

ON_OFF_CONTROL_SV, SOFT_TURN_OFF, IGNITION is at high level or EMERGENCY is at low level the regulator is switched on via transistors Q0302, Q0301, Q0303. In addition, regulators U0300 and U0302 are also switched on by the same signal. The output voltage of U0301 is set to 9.3 volts with resistors R0307 and R0308.

9V3_TX Linear Regulator U0300

Regulator U0300 is connected to the 13.2 volts supply voltage via fuse F0300. The output of this regulator is controlled by the ON/OFF circuitry. When any of the signals RTC_ON_SW, ON_OFF_CONTROL_SV, SOFT_TURN_OFF, IGNITION is at high level or EMERGENCY is at low level the regulator is switched on via transistors Q0302, Q0301, Q0303. The output voltage of U0300 is set to 9.3 volts with resistors R0305 and R0306.

SW B+ Current Limit Regulator U0302

Regulator U0302 is connected to the 13.2 volts supply voltage via fuse F0300. The output of this regulator is controlled by the ON/OFF circuitry. When any of the signals RTC_ON_SW, ON_OFF_CONTROL_SV, SOFT_TURN_OFF, IGNITION is at high level or EMERGENCY is at low level the regulator is switched on via transistors Q0302, Q0301, Q0303. The output voltage of U0302 is set far above the maximum possible input voltage with resistors R0303 and R0304 so that this regulator acts as a current limiter for the EXT_SWB+ voltage on the 20 pin accessory connector.

5VD Linear Regulator U0303

Regulator U0303 gets its input voltage from the 9.3 volt regulator U0301. The output voltage 5VD is fixed to 5 volts and is the input voltage for the regulators U0305 and U0306. The voltage 5VD is also fed to the standard control head.

5V_FN Linear Regulator U5322

Regulator U5322 gets its input voltage from the 9.3 volt regulator U0301. The output voltage 5V_FN is fixed to 5 volts and is mainly used in the frequency generating unit (FGU).

3V3_FN Linear Regulator U5321

Regulator U5321 gets its input voltage from the 9.3 volt regulator U0301. The output voltage 3V3_FN is fixed to 3.3 volts and is mainly used in the frequency generating unit (FGU).

Analog_3V3 Linear Regulator U5102

Regulator U5102 gets its input voltage from the 9.3 volt regulator U0301. The output voltage ANALOG_3V3 is fixed to 3.3 volts and is mainly used in the receiver section.

Digital_3V3 Linear Regulator U5103

Regulator U5103 gets its input voltage from the 9.3 volt regulator U0301. The output voltage DIGITAL_3V3 is fixed to 3.3 volts and is mainly used in the receiver section.

3V_TX Linear Regulator U0307

Regulator U0307 gets its input voltage from the 9.3 volt regulator U0300. The output voltage 3V_TX is fixed to 3 volts and is mainly used in the transmitter section.

5V_TX Linear Regulator U0304

Regulator U0304 gets its input voltage from the 9.3 volt regulator U0300. The output voltage 5V_TX is fixed to 5 volts and is mainly used in the transmitter section.

3V3_DIG Voltage Follower Q0305

Transistor Q0305 is configured as voltage follower and gets its input voltage from the 5 volt regulator U0303. The output voltage 3V3_DIG is set to 3.3 volts by the reference voltage 3V3_FN from

U5321. Diode D0303 compensates the base to emitter voltage drop of Q0305. The voltage is used for the optional UART connected to J0570.

3V_DIG Linear Regulator U0305

Regulator U0305 gets its input voltage from the 5 volt regulator U0303. The output voltage 3V_DIG is set to 3 volts with resistors R0320 and R0317 and is mainly used in the controller section.

1.8 V Linear Regulator U0306

Regulator U0306 gets its input voltage from the 5 volt regulator U0303. The output voltage 1.8V is set to 1.8 volts with resistors R0319 and R0318 and is used in the controller section.

4.6V VSF Voltage

The fractional N synthesizer U5331 creates the 4.6 volts super filter voltage (VSF). This voltage is used for the main VCO.

Microprocessor

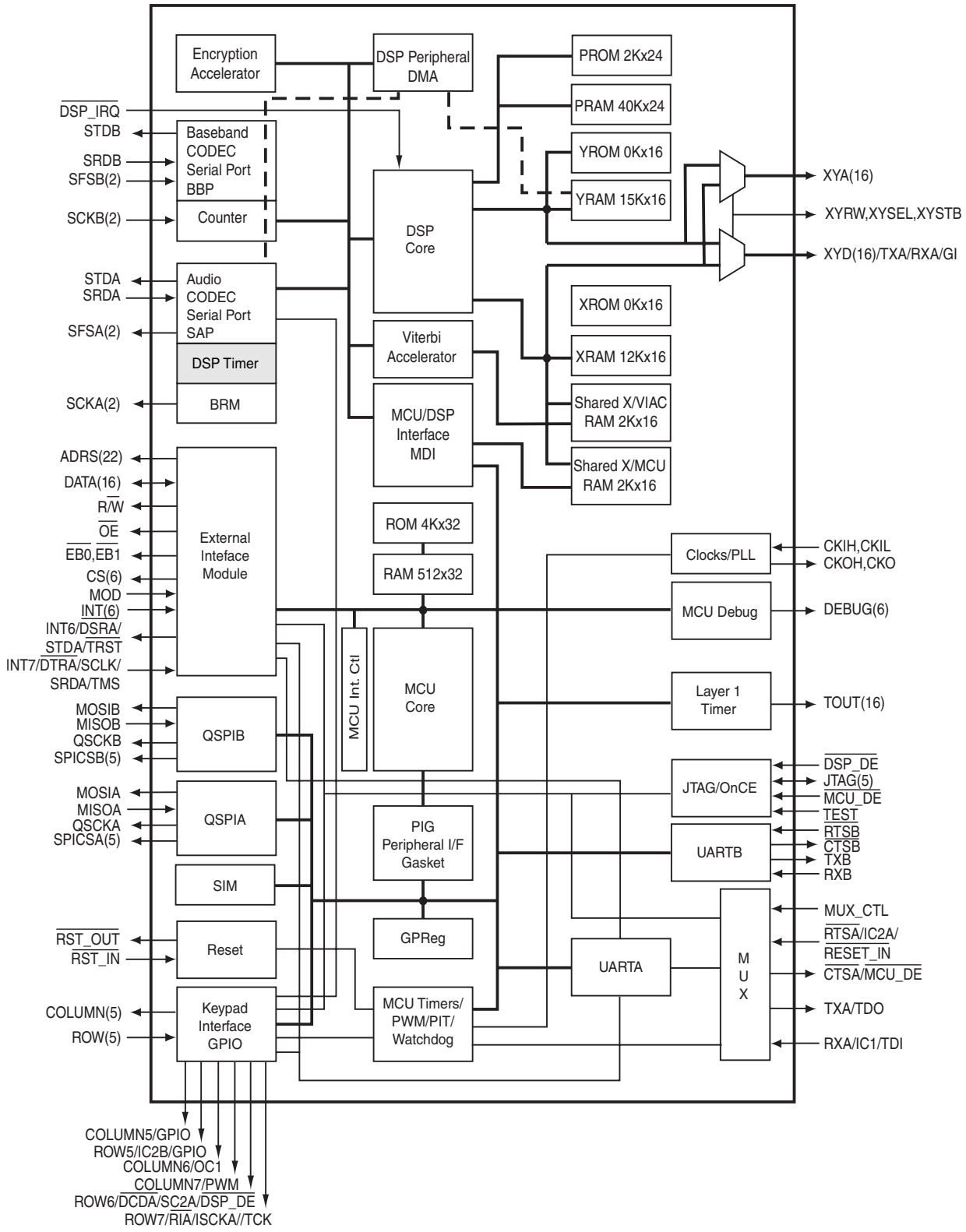

Figure 7 RedCap2 Block Diagram

The RedCap2 dual core (DSP / RISC) processor (U0100-1) located on the micro-controller sub-board controls the radio hardware, communicates via various interfaces with external equipment or accessories and performs digital signal processing. Beside its internal memory the RedCap2 uses the FLASH Memory and the SRAM also located on the sub-board. The RedCap2 exchanges digitized audio data with the CODEC via its Serial Audio Port (SAP). The RedCap2 sends digital baseband data to the ADDAG and receives digital baseband data from the ABACUS via its Baseband Port (BBP). To communicate with the RF IC's the RedCap2 uses its Queued Serial Peripheral Interface A (QSPIA). A second interface, QSPIB is used for communication with external equipment or accessories. The RedCap2 has 2 universal asynchronous receiver / transmitter ports (UARTA and UARTB) for communication with external equipment e.g. a control head or a control terminal (PC). UARTA communicates via SB9600 and RS232 protocol and UARTB communicates via SBEP protocol.

Host Memories

Flash Memory

The 4MByte FLASH Memory (U0102) located on the micro-controller sub-board contains the radio's Application Software and the Radio Code Plug. The Code Plug stores customer related information such as telephone numbers, addresses, etc. The RedCap2 accesses the data via a 22 bit wide address bus (A0-A21), a 16 bit wide data bus (DQ0-DQ15), and 6 control lines (EN_CE, EN_OE, EN_WE, EN_RP, EN_WP, VPP). When the FLASH Memory or the controller sub-board has been replaced or the software needs to be upgraded, the new Code Plug and application software must be programmed into the FLASH Memory.

SRAM Memory

The 512kByte SRAM (U0101) located on the micro controller sub-board stores data that can change very frequently, and which is generated and stored by the Application Software during its normal operation. The information is lost when the radio is turned off. The RedCap2 accesses the data via a 18 bit wide address bus (A0-A17), a 16 bit wide data bus (IO1-IO16), and 6 control lines (EN_CS, EN_CS2, EN_OE, EN_WE, LB, UB).

Serial Peripheral Interface (SPI)

The RedCap2 uses the SPI protocol to communicate with the RF IC's ABACUS, ADDAG, LNODCT, LVFRACN, ESCORT and PCIC. All these IC's are connected to the RedCap2's QSPIA module. The interface comprises the lines SPIA_MOSI(TX), SPIA_MISO(RX), SPIA_CS, and SPIA_CLK. The SPI bus is a synchronous bus, the timing clock signal CLK is sent while SPI data is transferred. Therefore, whenever there is activity on either MOSI or MISO, there should be a uniform signal on CLK.

The RedCap2 uses its module QSPIB to communicate with the DAC, the real time clock (RTC) U0100, the optional RS232 interface connected to the 7 pin connector P0701, and the external UART in the expansion head via the 40 pin connector J0500.

RS232, SB9600, SBEP Serial Interfaces

The RedCap2 uses three serial protocols to communicate with external devices: RS232, SB9600 and SBEP. The interface lines are available on the rear or front connectors, dependent on the interface. Not all interfaces can be used at the same time.

SBEP Serial Interface

The RedCap2 communicates with the standard control head via the SBEP serial interface. This interface comprises line BUS+ and is available on the 12 pin front connector J0550. Op-amps

U0102-1 and U0102-2 perform buffering and level shifting from 3 volts to 5 volts level. The RedCap2 uses its UARTB for the SBEP serial interface.

RS232 and SB9600 Serial Interfaces

The configuration of the RS232 and SB9600 serial interfaces depends on the radio setup. If no expansion head is connected to the radio, RedCap2 module UARTA provides either a 4-wire RS232 or an SB9600 interface on the 20 pin accessory connector J0400. If at power up pin BUSY_OUT on the accessory connector J0400 is connected to pin BUSY_IN, the RedCap2 assumes that SB9600 equipment is connected and configures UARTA for the SB9600 interface. If both pins are not connected to each other at power up, the UARTA will be configured for RS232 interface. The interface comprises lines RS232_TX, RS232_RX, RS232_CTS, RS232_RTS. These lines are not buffered and at 0 or 3 volts level.

An optional RS232 interface board can be fitted in the accessory connector J0400 when no expansion head is connected. This board provides a 4-wire RS232 interface with standard RS232 levels available on the 7 pin connector P0701. The RedCap2 uses its QSPIB module for this interface.

If an expansion head is connected to the radio, the serial interfaces on the 20 pin accessory connector J0400 can not be used. The UARTA is configured for an 8-wire RS232 interface, which is available on the 9 pin connector of the expansion head. This interface has standard RS232 levels and can be connected to an external data terminal. In addition, the RedCap2 configures its QSPIB module to provide either a 4-wire RS232 or SB9600 interface with 5 volts level on the 25 pin expansion head connector. If line MUX_CTRL_1 is at 0 volt, the interface is switched to RS232 mode. If line MUX_CTRL_1 is at 3 volts, the interface is switched to SB9600 mode. The interface comprises lines BUSY_IN, BUSY_OUT, RESET_OUT, and the QSPIB lines SPIB_MOSI, SPIB_MISO, SPIB_CLK, SPIB_CS1_UART and is available on the 40 pin front connector J0500 with signals at 3 volts high level. The RedCap2 uses the SB9600 interface to communicate with the motorcycle control head. If no motorcycle control head is connected, the interface can be used to control the radio via the SB9600 protocol with an external control terminal.

Radio Audio System

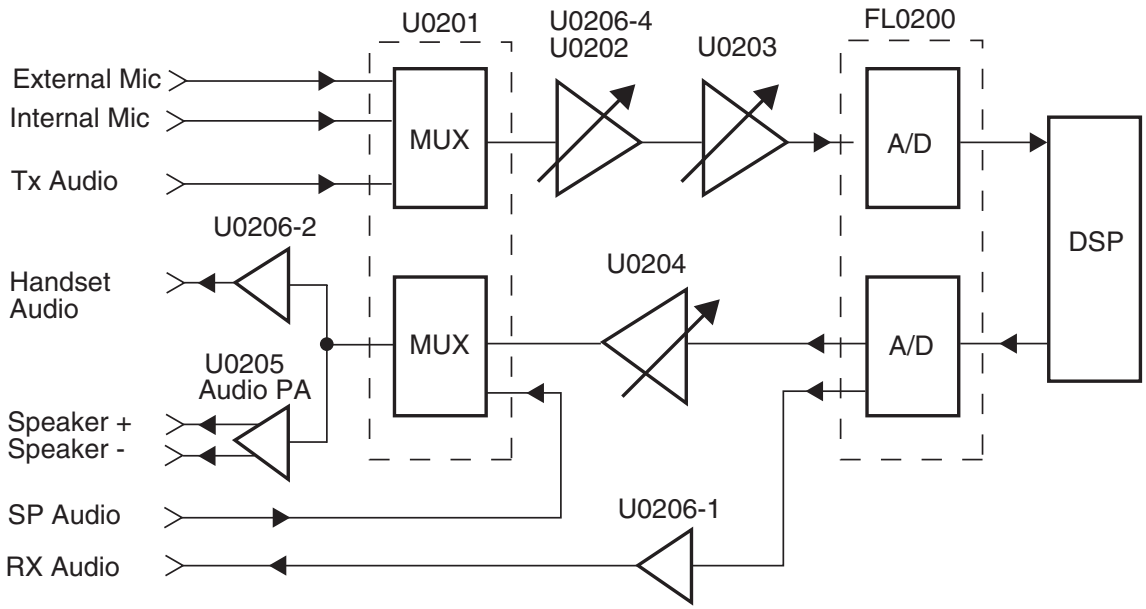

Figure 8 Audio Block Diagram

The Audio system consists of the following components:

- RX and TX path multiplexer
- RX and TX programmable potentiometer
- CODEC
- DSP
- Audio PA

TX Path

The speech audio is fed to the internal microphone input (INT_MIC), the external microphone input (EXT_MIC) or the TX audio input (TX_AUDIO). The internal and external microphone inputs have a DC bias prepared for connecting a microphone. The TX audio input has a DC blocking capacitor. Multiplexer U0201 selects one of the possible inputs and feeds the signal to amplifier U206-4. The gain of this amplifier is switchable via gate U0202. The programmable potentiometer U0203 attenuates the signal according to the radio mode of operation. Finally, the CODEC FL0200 converts the analog signal into digital format and transfers it to the DSP via the serial audio port (SAP). The DSP performs the functions of audio filtering, ACELP speech compression, digital modulation, and transfers the data to the RF section. When the radio is operating in the telephone interconnect mode, the DSP performs the required tasks such as echo and noise reduction.

RX Path

The receiver feeds the digital output signal via the baseband port (BBP) to the DSP which performs the functions of digital demodulation, ACELP speech de-compression, and audio filtering. After processing, the DSP feeds the signal via the serial audio port (SAP) to the CODEC FL0200. The CODEC converts the digital audio format to an analog signal. One of the CODEC's analog output signals is amplified by U0206-1 and then fed to the RX_AUDIO pin on the 20 pin accessory connector J0400. The second output signal from the CODEC is fed to the programmable potentiometer U0204 which attenuates the analog signal according to the radio mode of operation or the setting of the volume control. The multiplexer U0201 selects between the signal from the potentiometer or the signal SP_AUDIO from the 40 pin expansion head connector J500 and routes the audio to the audio power amplifier (PA) U0205 and the amplifier U0206-2. The amplified audio from U0206-2 is available on the HANDSET_AUDIO pins on the 20 pin accessory connector J0400 and the 40 pin expansion head connector J0500. The audio PA has one inverted and one non-inverted output that produces the differential audio output signals SPEAKER+ and SPEAKER-. Both signals are available on the 20 pin accessory connector J0400 and the 12 pin control head connector J0550.

CHAPTER 4.3

THEORY OF OPERATION (CONTROL HEADS)

This chapter contains the descriptions of the:

- Standard Control Head
- Expansion Head
- Remote Mount Head
- Motorcycle Control Head

Standard Control Head

The control head contains the on/off/volume knob, the microphone connector, several buttons to operate the radio, several indicator Light Emitting Diodes (LED) to inform the user about the radio status, and a Liquid Crystal Display (LCD) with 21 pre - defined symbols and a 32*96 dot matrix for graphical or alpha - numerical information e.g. channel number, select code, call address name. To control the LED's and the LCD, and to communicate with the host radio the controlhead uses the Motorola 68HC11K4 microprocessor.

Power Supplies

The power supply to the controlhead is taken from the host radio's FLT A+ voltage via connector J0801 pin 3. The voltage FLT A+ is at battery level and is used for the LED's, the back light, to power up the radio via on / off / volume knob and to supply the voltage regulator circuitry. The regulator circuitry provides the stabilized +5 volts which is used for the microprocessor circuitry, the display, the display driver and the keypad buttons. The regulated +5V taken from the host radio via connector J0801 pin 7 (line 5V SOURCE) is only used to switch on or off the voltage regulator in the controlhead.

Voltage Regulator Circuit

Voltage regulator U0861provides 5V for the controlhead. The supply voltage FLT A+ for the voltage regulator is fed via parallel resistors R0861/2 and dual diode D0861 to pin 8 of U0861. The +5 volt output is switched on and off by the host radios's 5 volt source via line 5V SOURCE and control transistor Q0866. When the host radio is switched off the voltage on line +5V SOURCE is at ground level and switches off transistor Q0866. Pull up resistor R0863 pulls input SHUTDOWN (pin 3) of the voltage regulator U0861 to FLT A+ level and switches off the output of U0861 (pin 1). When the host radio is switched on the voltage on line 5V SOURCE of about +5 volts switches on transistor Q0866 which in turn pulls input SHUTDOWN (pin 3) to ground and switches on the output of U0861. Input and output capacitors (C0861 / C0862 and C0864 / C0865) are used to reduce high frequency noise and provide proper operation during battery transients. Diode D0861 prevents discharge of C0862 by negative spikes on the FLT A+ voltage. This regulator provides a reset output (pin 5) that goes to 0 volts if the regulator output goes out of regulation. This is used to reset the microprocessor (U0871) and the display driver (J0821-5) to prevent improper operation.

The voltage USW 5V derived from voltage FLT A+ is stabilized using resistor R0855 and diode VR0855 This voltage is used to buffer the microprocessor's internal RAM. C0856 allows the battery

voltage to be disconnected for a couple of seconds without losing RAM parameters. Diode D0855 prevents radio circuitry from discharging this capacitor. The +5V at the second anode of D0855 speeds up charging of C0856, when the host radio is turned on by a high level at the ignition input while the supply voltage is applied to the radio. This prevents the microprocessor from accidently entering bootstrap mode.

Power On / Off

The On/Off/Volume knob when pressed switches the radio's and the controlhead's voltage regulators on by connecting line ON OFF CONTROL to line UNSW 5V via D0852. Additionally, 5 volts at the base of digital transistor Q0853 informs the controlhead's microprocessor about the pressed knob. The microprocessor asserts pin 8 and line CH REQUEST low to hold line ON OFF CONTROL at 5 volts via Q0852 and D0852. The high line ON OFF CONTROL also informs the host radio, that the controlhead's microprocessor wants to send data via SBEP bus. When the radio returns a data request message, the microprocessor will inform the radio about the pressed knob. If the radio was switched off, the radio's µP will switch it on and vice versa. If the On/Off/Volume knob is pressed while the radio is on, the software detects a low state on line ON OFF SENSE, the radio is alerted via line ON OFF CONTROL and sends a data request message. The controlhead µP will inform the radio about the pressed knob and the radio's µP will switch the radio off. If the radio is switched on either manually or automatically it's +5V source switches on the controlhead's voltage regulator U0861 via line 5 SOURCE and transistor Q0866 and the controlhead's microprocessor starts execution.

Microprocessor Circuit

The controlheadcontrolhead uses the Motorola 68HC11K4 microprocessor (uP) (U0871) to control the LED's and the LCD and to communicate with the host radio. RAM and ROM are contained within the microprocessor itself.

The microprocessor generates it's clock using the oscillator inside the microprocessor along with a 8 MHz ceramic resonator (U0873) and R0873.

The microprocessor's RAM is always powered to maintain parameters such as the last operating mode. This is achieved by maintaining 5V at µP pin 76. Under normal conditions, when the radio is off, USW 5V is formed by FLT A+ running to D0855. C0856 allows the battery voltage to be disconnected for a couple of seconds without losing RAM parameters. Diode D0855 prevents radio circuitry from discharging this capacitor.

There are 8 analogue to digital converter ports (A/D) on the µP. They are labeled within the device block as PE0-PE7. These lines sense the voltage level ranging from 0 to 5V of the input line and convert that level to a number ranging from 0 to 255 which can be read by the software to take appropriate action.

Pin VRH is the high reference voltage for the A/D ports on the µP. If this voltage is lower than +5V the A/D readings will be incorrect. Likewise pin VRL is the low reference for the A/D ports. This line is normally tied to ground. If this line is not connected to ground, the A/D readings will be incorrect.

The microprocessor can determine the used keypad type by reading the level at port PE5. Connections S0931 – S0935 are provided by the individual keypads.

The MODB / MODA input of the µP must be at a logic „1" for it to start executing correctly. The XIRQ and the IRQ pins should also be at a logic „1".

SBEP Serial Interface

The host radio (master) communicates to the controlhead µP (slave) through its SBEP bus. This bus uses only line BUS+ for data transfer. The line is bi-directional, meaning that either the radio or the controlhead µP can drive the line. The microprocessor sends serial data via pin 79 and D0872 and it reads serial data via pin 78. Whenever the microprocessor detects activity on the BUS+ line, it starts communication.

When the host radio needs to communicate to the controlhead µP, it sends data via line BUS+. Any transition on this line generates an interrupt and the µP starts communication. The host radio may send data like display information, LED and back light status or it may request the controlheadcontrolhead ID or the keypad ID.

When the controlhead µP wants to communicate to the host radio, the µP brings request line CH REQUEST to a logic „0" via µP pin 8. This switches on Q0852, which pulls line ON OFF CONTROL high through diode D0852. A low to high transition on this line informs the radio, that the controlhead requires service. The host radio then sends a data request message via BUS+ and the controlhead µP replies with the data it wanted to send. This data can be information like which key has been pressed or that the volume knob has been rotated.

The controlhead µP monitors all messages sent via BUS+, but ignores any data communication between host radio and CPS or Universal Tuner.

Keypad Keys

The controlhead keypad is a 25 - key keypad. All keys are configured as 2 analogue lines read by µP pins 49 and 48. The voltage on the analogue lines varies between 0 volts and +5 volts depending on which key has been pressed. If no key is pressed, the voltage at both lines will be 5 volts. The key configuration can be thought of as a matrix, where the two lines represent one row and one column. Each line is connected to a resistive divider powered by +5 volts. If a button is pressed, it will connect one specific resistor of each divider line to ground level and thereby reduce the voltages on the analogue lines The voltages of the lines are A/D converted inside the µP (ports PE 0 - 1) and specify the pressed button. To determine which key is pressed, the voltage of both lines must be considered.

An additional pair of analogue lines and A/D µP ports (PE 3 – 2) is available to support a keypad microphone, connected to the microphone connector J0811. Any microphone key press is processed the same way as a key press on the controlhead.

Status LED and Back Light Circuit

All the indicator LED's (red, yellow, green) are driven by current sources. To change the LED status the host radio sends a data message via SBEP bus to the controlhead µP. The controlhead µP determines the LED status from the received message and switches the LED's on or off via port PA 6 - 4. The LED status is stored in the µP's memory. The LED current is determined by the resistor at the emitter of the respective current source transistor.

The back light for keypad is controlled by the host radio the same way as the indicator LED's using µP port PH 3. This port is a Pulse Width Modulator (PWM) output. The output signal charges capacitor C0943 through R0945. By changing the pulse width under software control, the dc voltage of C0943 and thereby, the brightness of the back light can be changed in 16 steps. The keypad back light current is drawn from the FLT A+ source and controlled by transistor Q0941. The current flowing through the LED's cause a proportional voltage drop across the parallel resistors R0955, R0957. This voltage drop is amplified by the op-amp U0941-1. U0941-1 and Q0943 form a differential amplifier. The voltage difference between the base of Q0943 and the output of U0941-1 determines the current from the base of the LED control transistor Q0941 and in turn the brightness of the LED's.

The µP can control the LED's by changing the dc level at the base of Q0943. If the base of Q0943 is at ground level, Q0943 is switched off and no current flows through Q0941 and the LED's. If the base voltage of Q0943 rises a current flows through Q0943 and in turn through Q0941 causing the LED's to turn on and a rising voltage drop across R0955, R0957. The rising voltage causes the output of the op-amp to rise and to reduce the base to emitter voltage of Q0943. This decreases the current of Q0941 until the loop has settled.

The back light for the LCD module uses a similar circuitry. The only differences are that µP port PH2 controls the back light brightness and that the LED's are located on the LCD module which is connected via J0821. Control line BL A GREEN connects to the anodes and control line BL K GREEN connects to the cathodes of the LED's.

Liquid Crystal Display (LCD)

The LCD module consists of the display and the display driver and is connected via connector J0821. The display is a single layer super twist nematic (STN) LCD display. It has a dot matrix of 32 * 96 dots for displaying graphics and alpha - numerical information and a line with 21 pre - defined icons above the dot matrix

The driver contains a data interface to the µP, an LCD segment driver, an LCD power circuit, an oscillator, data RAM and control logic. At power up the driver's control logic is reset by a logic „0" via pin 5 of J0821. The driver's µP interface is configured to accept 8 bit parallel data input (J0821-D0-D7) from the controlhead µP (U0871 port PC0-PC7).

To write data to the driver's RAM the µP sets chip select (J0821-6) to logic „0" via U0871-26, RD (J0821-10) to logic „1" via (U0871-40) and WR (U0821-9) to logic „0" via U0871-33. With input A0 (J0821-8) set to logic „0" via U0871-34 the µP writes control data to the driver. Control data includes the RAM start address for the following display data. With input A0 set to logic „1" the µP then writes the display data to the display RAM. When data transfer is complete the µP terminates the chip select and the clock activities.

The display driver's power circuit provides the voltage supply for the display. This circuit consists of a voltage multiplier, voltage regulator and a voltage follower. The regulator output voltage for the display can be controlled electronically by a control command sent to the driver. The voltage level can be measured by one of the µP's analogue to digital converters (U0871-42) via J0821-21. To stabilize the display brightness over a large temperature range the µP measures the temperature via analogue to digital converter (U0871-43) using a temperature sensor on the module (J0821-4). Dependent on the measured temperature the µP adjusts the driver output voltage, and in turn the display brightness, via parallel interface.

Microphone Connector Signals

Signals BUS+, PTT IRDEC, HOOK, MIC, HANDSET AUDIO, FLT A+, +5V and 2 A/D converter inputs are available at the microphone connector J0811. Signal BUS+ (J0811-7) connects to the SBEP bus for communication with the CPS or the Universal Tuner. Line MIC (J0811-5) feeds the audio from the microphone to the radio's controller via connector J0801-4. Line HANDSET AUDIO (J0811-8) feeds the receiver audio from the controller (J0801-6) to a connected handset. FLT A+, which is at supply voltage level, and +5V are used to supply any connected accessory like a microphone or a handset.

The 2 A/D converter inputs (J0811-9/10) are used for a microphone with keypad. A pressed key will change the dc voltage on both lines. The voltages depend on which key is pressed. The µP determines from the voltage on these lines which key is pressed and sends the information to the host radio.

Line PTT IRDEC (J0811-6) is used to key up the radio's transmitter. While the PTT button on a connected microphone is released, line PTT IRDEC is pulled to +5 volts level by R0880. Transistor Q0871 is switched on and causes a low at µP port PA2. When the PTT button is pressed, signal PTT IRDEC is pulled to ground level. This switches off Q0871 and the resulting high level at µP port PA2 informs the µP about the pressed PTT button. The µP will inform the host radio about any status change on the PTT IRDEC line via SBEP bus.

When line PTT IRDEC is connected to FLT A+ level, transistor Q0851 is switched on through diode VR0851 and thereby pulls the level on line ON OFF CONTROL to FLT A+ level. This switches on the radio and puts the radio's µP in bootstrap mode. Bootstrap mode is used to load the firmware into the radio's flash memory (See controller sub section for more details).

The HOOK input (J0811-3) is used to inform the µP when the microphone´s hang-up switch is engaged. Dependent on the CPS programming the µP may take actions like turning the audio PA on or off. While the hang up switch is open, line HOOK is pulled to +5 volts level by R0883. Transistor Q0872 is switched on and causes a low at µP port PA1. When the HOOK switch is closed, signal HOOK is pulled to ground level. This switches off R0883 and the resulting high level at µP port PA1 informs the µP about the closed hang up switch. The µP will inform the host radio about any status change on the HOOK line via SBEP bus.

Electrostatic Transient Protection

Electrostatic transient protection is provided for the sensitive components in the controlhead by diodes VR0811 - VR0814. The diodes limit any transient voltages to tolerable levels. The associated capacitors provide Radio Frequency Interference (RFI) protection.

Expansion Head

Overview

The Expansion Head GMCE4053A is a hardware interface to the MTM700 TETRA mobile radio. It gives access to the radio via three front side connectors. The following interfaces and protocols are provided:

- 8-wire RS232 Interface (9-pin D-type connector)

- 4-wire RS232 Interface (25-pin D-type connector)

- SB9600 Interface (25-pin D-type connector)

- SBEP Interface (10-pin Telco connector)

- 14 pin JTAG port

General

The 25-pin D-type, the 9-pin D-type connector and the 10-pin Telco connector are mounted on the Connector Board that is screwed into the Expansion Head housing. The Milan Expansion Board is installed at expansion board position. The interconnection between the Connector Board and the Milan Expansion Board is accomplished by a 40-pin flex connector.

A 12-pin flex and a 40-pin flex achieve the connection between the Expansion Board to the main radio chassis. A remote mount control head can be connected in a remote mount configuration via the 10-pin Telco connector. External DCE(s) can be connected via the 25 pin and /or 9 pin D type connectors.

Circuit Description

The Expansion Head Interface consists of several circuits to provide interfaces for the MTM700 TETRA mobile radio and the „outside world“. The Expansion board has an onboard 3-Volt Regulator U1091 that is driven by 5-Volt supply from the main radio via the 12-pin flex.

There are several interfaces on the board but not all of them are available at the same time.

The 8 wire RS232 interface consists of the MAX3238 true RS-232 transceiver (U1065) that provides the EIA/TIA-232 and V.28/V.24 communications interface. This interface can be fully accessed through the 9-pin D-connector.

The circuit comprising ICs U1015, U1016 and U1010 interfaces the MTM700 SPIB bus to an asynchronous serial-data communication port RS232 that is the 4-wire RS232 interface (pins 2, 3, 4, 5). U1015 is a MAX3100 universal asynchronous receiver transmitter (UART) with a baud rate generator driven by a 3.6864 MHz crystal U1010. U1016 is a MAX3232 RS232 transceiver, translating the 3V logic levels to the RS232 levels.

The next interface is a SB9600 interface on the 25-pin connector (pins 8, 13, 15, 17) (SB9600_INTERFACE). The UART chip U1015 also generates the transmit/receive signals of this interface.

The SBEP interface is provided on the 10-pin Telco remote connector. All signals necessary to connect a remote mount controlhead are routed through this connector. Those signals are fed from the

radio via the 12-pin flex (J1001). The SBEP interface is always available on the Telco connector. The Expansion PTT signal on the Telco connector is routed though the Expansion Board via Q1083. This line signals the radio that PTT is coming from the Expansion Head and the audio paths are routed through the Expansion Head.

The JTAG port is provided on the back of the Expansion board. The pin layout of the connector is setup in a way that the JTAG connector used for software debugging can be directly connected to this port. A 14-pin m/m 90° adapter is needed to connect to the test equipment.

To select a specific configuration, pin 23 (SB9600_SW) on the 25 pin D-type connector can be used. Also the ACC3 pin on the 12-pin flex and pin 19 on the JTAG connector influence which interface is active in the Expansion Head at a specific time.

Default if nothing is connected to the radio is that the 8-wire RS232 interface and 4-wire RS232 interface are active.

A high voltage (12V) on pin 23 enables the 8-wire RS232 interface on the 9-pin D-type connector. At the same time the SB9600 interface on the 25-pin connector is enabled. A low voltage (0V = default) on pin 23 enables the 8 wire RS232 interface on the 9-pin connector and the 4 wire RS232 interface on the 25-pin connector.

If a device is connected to the accessory connector of the radio, the 8-wire RS232 interface in the Expansion Head is disabled. Also, if the JTAG port is used, a 3-Volt level is applied to pin 19 of the JTAG, the 8-wire RS232 interface is disabled.

Remote Mount Head

General

The remote mount head and the radio are connected via 10-pin TELCO connectors. A 12-pin flex connects the radio to one remote mount PCB and another 12-pin flex connects the other remote mount PCB to the control head.

Description

The remote mount board basically routs the signals necessary to drive a control head from the radio to the remote mount cable and to the control head. The signals (on/off control, supply voltage, microphone, BUS+, speaker) are directly routed from the flex connector J0911 to the TELCO connector J0921. VR921 – VR924 protect the boards against electrostatic discharge

Motorcycle Control Head

The Control Head forms the interface between the radio and the user. It includes an LCD display, an ON/OFF switch/volume control, and keypad and control keys.

The microprocessor-controlled Control Head interfaces with the radio control logic board's J650 (Model A), or J4 (Model B) via an 18-pin connector on the back of the unit. A handset or external microphone are connected to the Control Head via the front-mounted microphone connector, J2.

Power Supplies

Power supply A+ (pin 17) is routed directly from the radio battery and is used for LCD and keypad backlight LEDs and indicator LEDs.

Power supply SW_B+ (pin 18) is routed from the radio battery via the radio ON/OFF switch; it provides Vcc via regulator U9. It is also routed to J2 for handset power supply.

Volume Control / ON/OFF Switch

Front panel switch/potentiometer U5 controls the volume via A/D convertor PD0 (pin 14) in microcontroller (µC) U4. The centre of the potentiometer is a push button switch used for microphone input and power ON/OFF. When activated, the microphone line (pin 9) is connected to ground.

Microcontroller (U4)

Microcontroller U4 and data expander U6 control the operation of the Control Head. The µC exchanges data with the radio via the SB9600 bus (TD0 and RD1). In addition, keypad and LCD data is processed via ports A, B, and C. Both the µC and the expander are reset by undervoltage detector U7 when Vcc drops below 4.65 volts. Both devices can also be reset from the radio via the reset line (pin 3) and Q14.

Crystal Oscillator

The crystal oscillator is built using on-chip oscillator gates on the microprocessor. The crystal is a standard 4 MHz ceramic resonator.

LCD Display

The display (U1) is a double-layer, super-twist LCD display. It has two lines of 14 characters, and one line of 20 fixed symbols at the top of the display.

Backlight

The backlight consists of 48 LEDs. Light intensity is in four levels, including off, and is software-controlled by bus commands via expander U6 (Q2, Q15). A high-temperature condition in the Control Head overrides the software commands; if the temperature rises to 78ºC or above, the lowest light level, or off, will be selected.

Controller

LCD controller U2 contains the default character set. The controller is expanded by use of an LCD driver, U3. The LCD controller is connected the µC via data bus PA0-PA7, while the control and read/write (R/W) lines are connected via PB5 and PB7 respectively.

Power Supplies

The LCD bias voltage drives the display segments. The bias voltage is divided into five levels by resistors R52 through R56, and routed to the LCD controller and LCD driver under µC control via U10. The µC measures the bias voltage with respect to Vcc (TP3) at A/D port PD3.

Another function of the bias voltage is temperature, which is measured across R2 at A/D port PD7. The µC calculates the correction to the bias voltage and adjusts the duty cycle of the PLMA output to U10 accordingly.

Temperature Sensor

µC U4 measures the voltage on PD7, which is controlled by dividers R2 and R8. R8 is an NTC resistor that is placed in close proximity to the LCD display. The temperature sensor protects the backlight LEDs from failure, and is also used to compensate the LCD bias voltage, dependent on the LCD glass temperature. The protection temperature is 77º±6ºC.

Keypad

The keypad is a passive input-scanning matrix, with each key having three poles. When a key is pressed, a row and a column are connected to ground and sensed by the µC (PB0-PB4 and PC0-PC4).

Backlight

The backlight consists of 13 LEDs. It can be switched on/off by the radio software, controlled by the µC, TCMP1 and TCMP2. A high pulse on TCMP1 turns the backlight on, and a low pulse on TCMP2 turns it off. If the temperature in the Control Head rises above 78ºC, the µC turns the backlight off, using the Temperature Sensor input.

External Microphones and Speakers

External microphones and speakers are connected via the transceiver's rear accessory connector

Helmet

A helmet including a microphone, speaker and if required a PTT is connected via the 10pin TELCO connector at the EXPANSION HEAD.

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CHAPTER 5
PROGRAMMING THE RADIO

Programming of Software Features and Flashing of Radio Firmware

SETING UP THE HARDWARE

The programming cable interfaces between the radio and an IBM PC (or compatible computer) running the TETRA CPS. To perform the programming, proceed as follows:

1 Make sure the radio is turned off.

2 Connect the programming cable as illustrated on the following pages.

3 Turn the radio on. If your radio has only an expansion head without any control head, connect pin 6 to pin 14 on the 25 pin connector on the expansion head front to switch on the radio and to enter programming mode.

4 Run the Customer Programming Software (CPS) on your computer.

5 Select Tools/Options. Change the Communication setting according to the connection you are using for the programming cable.

6 Follow the instructions on your PC.

7 After programming, remove the programming cable and in case you connected pin 6 to pin 14 on the 25 pin connector, remove this connection again. If the radio does not switch on automatically or cannot be switched on using the On/Off knob or the Ignition input (pin 10 on the accessory connector), disconnect the radio from the battery for about 2 seconds to exit the programming mode.

Note: To program the radio, the following connector pins are used:

On the Accessory Connector	
Pin	**Description**
3	EXT PTT
6	Flash
7	Analog GND
8	Digital GND
13	SWB+
17	RS232 RTS (Radio Output)
18	RS232 CTS (Radio Input)
19	TX (Radio Output)
20	RX (Radio Input)

On the 9-Pin Connector	
Pin	**Description**
2	RX
3	TX
5	GND
7	RTS
8	CTS

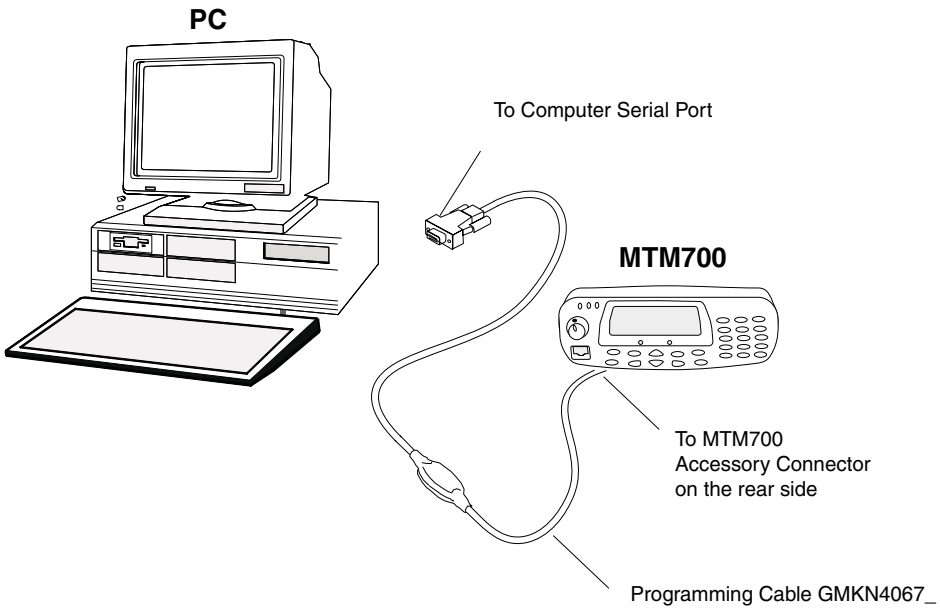

Figure 1 PROGRAMMING WITH STANDARD CONTROL HEAD

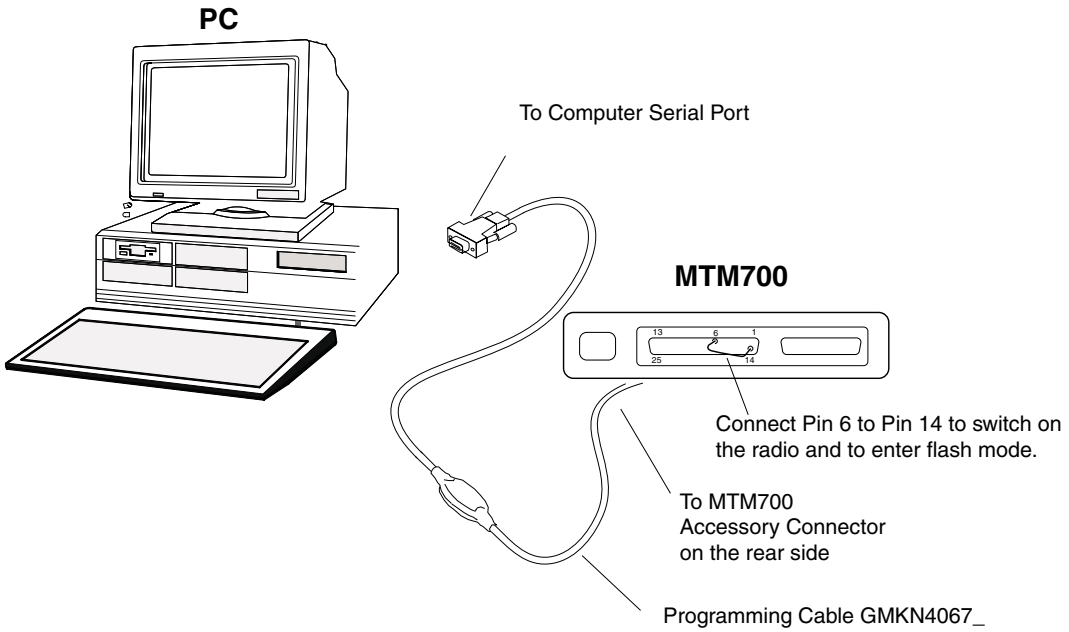

Figure 2 PROGRAMMING WITHOUT CONTROL HEAD VIA ACCESSORY CONNECTOR

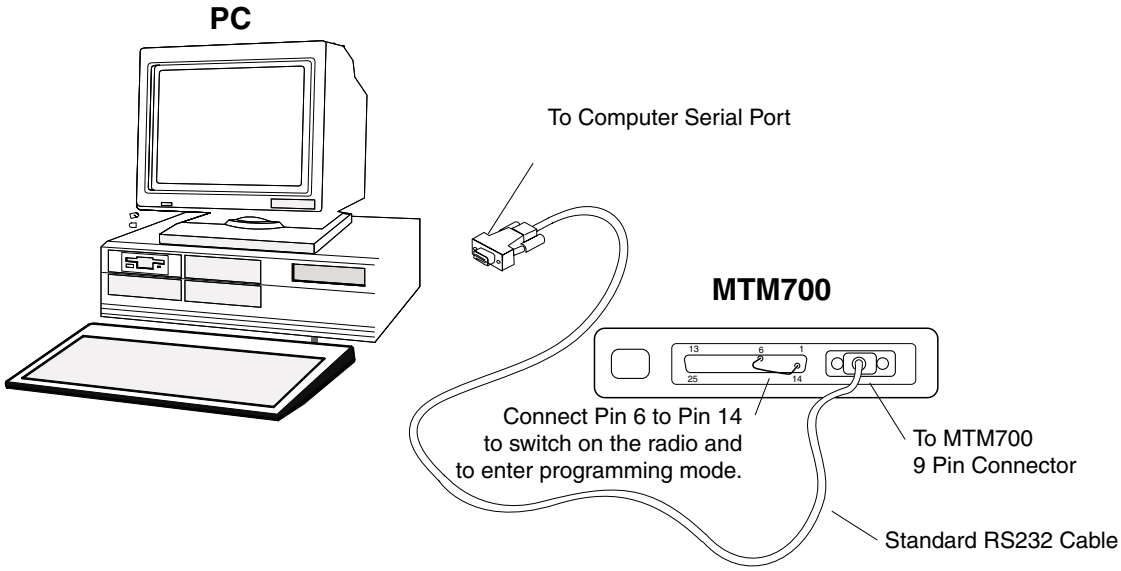

Figure 3 PROGRAMMING WITHOUT CONTROL HEAD VIA 9-PIN CONNECTOR

CodePlug Reading

1. Verify that the supply voltage for the radio is switched off.
2. Run the Customer Programming Software (CPS) on your computer.
3. Switch on the supply voltage for the radio. Verify that no display appears on the LCD screen.
4. Click the Toolbar “Read Phone” icon. *Refer to the CPS Application Window Screen in the CPS User Guide, Publication No. 68P02956C20.* The setup enters an initialization process that takes about 20 seconds. After that, a reading process starts.

A progress bar appears on the computer screen. After the reading process is finished, the radio Codeplug screen appears.

CodePlug Programming

1. On the menu bar, click “File” “Open”.
2. Browse for the required Codeplug file and open the file.
3. The Codeplug window appears on the screen.
4. Click the Toolbar “Write Phone” icon.

Note: The Codeplug is now being written into the radio. A progress bar is displayed on the computer screen showing the writing status.

After a successful writing, the message “The operation was successful” appears on the computer screen.

5. Press the OK button.

Frequency Programming

Carry out the following steps if you need to add or change the radio frequencies.

Note: Save your radio factory frequencies before you start programming by using (Menu Bar located on the CPS Application Window Screen) “File- Save as” (Your selected File name).

1. In the “Codeplug Tree” select “System Parameters”.
   - Click on “Frequency List”.
   - Click on “List No. 2”.
   - At the top of list 2, write the three frequencies which you have selected (the following frequencies are for example only):

For 380-430 MHz Radios

Rx 420.0125MHz (IFR 800)

Rx 425.0125MHz (IFR 1000)

Rx 429.9875MHz (IFR 1199)

For 806-870 MHz Radios

Rx 851.0125MHz (IFR 2040)

Rx 860.0125MHz (IFR 2400)

Rx 869.9875MHz (IFR 2799)

2. Press the write phone icon.
3. Disconnect the radio from the programming kit.

Note: The new programmed frequencies of the radio are now available to be tested with the IFR or for any other use.

List1 and 2 frequencies are saved in the CodePlug and may only be accessed by performing the following steps. When performing steps 4 thru 10, make sure that you press the radio keys sequentially (less then a second between every consecutive press):

4. Press the “Right” navigation key.
5. Press the “1” key, and “Menu” key.
6. Press the “2” key, and “Menu” key.
7. Press the “3” key.

Hereafter, there is no need for quick sequence of pressing the radio keys.

8. Press the “Down” navigation key to scoll to “Cell Lists”
9. Press the “Ok” key.
10. Scroll through the lists, select List1 and press the “Ok” key to view the frequencies.

Restore the Frequencies of the Radio from a File

To restore previously saved frequencies of the radio, perform the following steps:

1. After testing your radio on the IFR, connect the setup shown in Figure 1 or Figure 2.
2. Run the CPS software on your PC.
3. In the menu bar click “Tools”, “Copy Wizard”.

- Click on “Read from file”.
- Click on “Browse”.
- Open (Your selected File name) file.
- Click on “Next”.
- Click on “Select All”.
- Click on “Next”.
- Click on “Write”.
- Click on “Done”.

Note: Click on toolbar “Read Phone” to check whether the correct frequencies were entered into the radio.

Application Programming

Note: Login as “Administrator” to perform this task.

1. On the menu bar click “Tools”, “Write Software”.

Note: The CPS reads data from the radio. A progress bar is displayed on the computer screen showing the reading status. After a successful reading, the “Write Software To Phone” window appears on the computer screen.

2. Press the “Write” button.

Note: The application is now being written into the radio. A progress bar is displayed on the computer screen showing the writing status. After a successful writing, the message “The Operation Was Successful” appears on the computer screen.

3. Press the “OK” button.
4. Click the Toolbar “ R” (Reset) icon to put radio into normal operating mode.

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CHAPTER 6
TEST SETUP & TESTING

WARNING

Any level 3 repairs can deeply affect the performance of the MTM700 radio and may cause a new tuning procedure.
This tuning procedure can only be applied by certain authorized Motorola depots where the appropriate TEST&TUNE EQUIPMENT is available.
The appropriate TEST&TUNE EQUIPMENT is a special automated test equipment which is only available at some Motorola factories and Motorola repair centers.

Typical Test Setup

Before Testing

Carry out the following instructions before testing:

- Connect the DC cable to the DC connector on the radio.
- Connect the other side of the DC cable to the DC output connector on the power supply
- Connect an RF cable to the N-type RF Connector of the IFR.
- Connect the other side of the RF cable to the antenna connector on the radio.
- Set the DC voltage on the power supply to 13.2 Volts.
- Switch on the radio.

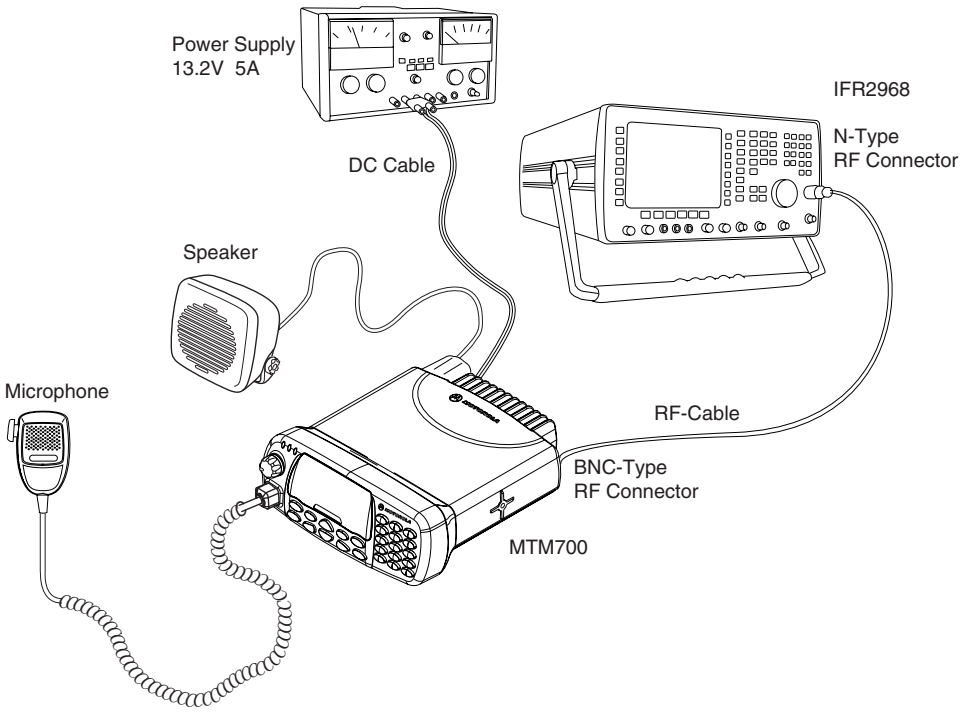

Figure 1 Typical Test Setup

Test Equipment

The table below lists the special test equipment required for servicing TETRA mobile radios.

Table 1 Test Equipment

Name	Part Number
Digital Multimeter	R1072_
220V Power Supply	R1011_/220V
TETRA SVC MON. MOBILES ONLY	WADN4161A
TETRA SVC MON. MOB.+ DIR.MODE	WADN4163A
TETRA SVC MON. MOB.+ BASE ST.	WADN4164A
TETRA SVC MON. MOB.+ BASE ST. + DIRECT MODE	WADN4173A
TETRA SVC MON. MOB.+ DIR.MODE + MPT1327/1343	WADN4233A

Test Check List

The following table summarises the required test setups.
(Values for 380-430 MHz radio in brackets [ ])

Table 2 Test setup

No.	Test Name	Test Setup	Radio Setup	Test Conditions	Limits
1.	Base Station Registration	Control Channel	For 800MHz radio: 851.0125MHz [*For 400MHz radio: 421.0125MHz*]	For 800MHz radio: 2040 [*For 400MHz radio: 840*]	
		Traffic Channel		For 800MHz radio: 2040 [*For 400MHz radio: 840*]	
		Time Slot		3	
		Country Code		262	
		Network Code		75	
		Base Color		1	
		Location Area		224	
		Min Rx Level			-120dBm
		Max Tx Level			35dBm (3.2W)
		Access Parameter		-53dBm	
		Mobile Power	35dBm (3.2W)		
		Burst Type		Normal	
2.	Receiver RSSI	RF Gen Level	4 Cells Info RSSI TRACE	-90dBm	
3.	Transmitter Tests	RF Gen Level	Range 1 Talk Group 1	-90dBm	
		Burst Power			33-37dBm
		Timing Error			<=0.25 Symbols
		Frequency Error			-/+ 80Hz
		Vector Error			Max 10% RMS, Max 30% Peak, Max 5% Residual
4.	Call Processing Talk Back	1KHz Test Signal Group Mode	Range 1 Talk Group 1	-90dBm	
5.	Call Processing Call to Mobile	Private Mode Private Call	Private Mode		
		RF Gen Level Burst Power		-90dBm	33-37dBm
		Timing Error			<=0.25 Symbols

Table 2 Test setup

No.	Test Name	Test Setup	Radio Setup	Test Conditions	Limits
		Frequency Error			-/+ 80Hz
		Vector Error			Max 10% RMS, Max 30% Peak, Max 5% Residual
6.	Digital Duplex Test (Tx)	RF Gen Level	Private Mode	-50dBm	
		Burst Power			18-22dBm
		Timing Error			<=0.25 Symbols
		Frequency Error			-/+ 80Hz
		Vector Error			Max 10% RMS, Max 30% Peak, Max 5% Residual

Receiver Tests

1. Simulate Base Station (registration)
2. RSSI Test

Transmitter Tests

1. Power Profile
2. Power Burst (Control Range)
3. Tx Burst Timing Error
4. Tx Frequency Error
5. Vector Error RMS, Peak and Residual

Call Processing Tests

1. Talk Back
2. Call to Mobile

Duplex Test

1. Digital Duplex Test (Tx)

Measurement Capabilities:

Bar chart display for Tx Power, Frequency Error, Vector Error RMS, Power Analyer, Spectrum Analyzer, Vector Analyer, Vector Diagrams.

Configuration of the IFR 2968 System Setup

The setup depends on the firmware version of the IFR 2968, the firmware version of the radio and the customer programming of the radio.
>>The following table should be taken only as an example of how to proceed for setup.<<
Perform the following steps to configure the IFR 2968 System Setup with the radio settings. **Note:** Terms for 380-430 MHz radio in brackets [ ]:

1. Turn ON the IFR.
2. Press the “Systems” Mode Key (wait until the digital system is initialised).
3. Press the “Tetra Mobile” soft key.
4. Press the “Setup” soft key and enter the System Parameters Screen.
5. Press the “Channel Plan” or “System Type” soft key.
6. Press the “More” soft key if “User Defined” [“Tetra 410 MS”] cannot be seen.
7. Press the “User Defined” [“Tetra 410MS”] soft key.

   Note: Press the “More” soft key, if any of the following keys is not displayed.

8. For 380-430MHz continue with step 9,
   For 806-870MHz only, perform the following steps to setup the system parameters.

   a. Press the “User Defined” soft key.
   b. Press the “Frequency Band” soft key and press the “8 (800MHz)” soft key.
   c. Press the “Offset” soft key and press the “3 (12.5kHz)” soft key.
   d. Press the “Duplex Spacing” soft key and press the “1 (45MHz)” soft key.
   e. Press the “Reverse Operation” soft key and press the “0 (Normal)” soft key.
   f. Press the “Channel Block 1” soft key.
   g. Press the “Channel Block” soft key and press the “Include” soft key.
   h. Press the “Lowest Channel” soft key and enter “2040” using the data keys followed by the “Lowest Channel” soft key.
   i. Press the “Highest Channel” soft key and enter “2800” using the data keys followed by the “Highest Channel” soft key.
   j. Press the “Lowest Tx Freq” soft key and enter “806.0125” using the data keys followed by the “MHz” key
   k. Press the “Duplex Offset” soft key and enter “45” using the data keys followed by the “MHz” key
   l. Press the “Channel Spacing” soft key and enter “25” using the data keys followed by the “kHz” key
   m. Press the “Return” soft key.
   n. Verify that channel block 2 to 8 are excluded.
   o. Press the “Return” soft key.

9. Press the "Control Channel" soft key and enter "2040" ["840"] using the data keys followed by the "Control Channel" soft key.

10. Press the "Traffic Channel" soft key and enter "2040" ["840"] using the data keys. Press the "Traffic Channel" soft key again and check that the marker goes to Timeslot. Press data key "3" followed by the "Traffic Channel" soft key, to change to Timeslot "3".

11. Press the "Country Code" soft key.
Enter "262" and press the "Country Code" soft key.

12. Press the "Network Code" soft key.
Thereafter, enter "75" and press the "Network Code" soft key.

13. Press the "Base Color" soft key.
Thereafter, enter "1" and press the "Base Color" soft key.

14. Press the "Location Area" soft key.
Thereafter, enter "224" and press the "Location Area" soft key.

15. Press the "Min Rx Level" soft key.
Thereafter, enter "-120dBm" and press the "Min Rx Level" soft key.

16. Press the "Max Tx Level" soft key.
Thereafter, enter "35dBm (3.2W)" and press the "Max Tx Level" soft key.

17. Press the "Access Parameter" soft key.
Thereafter, enter "-53dBm" and press the "Access Parameter" soft key.

18. Press the "Test Mode" soft key. Press the "Enable" soft key.

19. Press the "Base Service" soft key.

20. Press the "Suport" soft key if it is displayed
or verify that the following values are displayed:

POWER ON REGISTRATION:	**REQUIRED**
POWER OFF DE-REGISTRATION:	**REQUIRED**
PRIORITY CELL:	**YES**
MINIMUM MODE SERVICE:	**NEVER USED**
MIGRATION:	**SUPPORTED**
SYSTEM WIDE SERVICE:	**NORMAL MODE**
TETRA VOICE SERVICE:	**SUPPORTED**
CIRCUIT MODE DATA SERVICE:	**SUPPORTED**
(RESERVED):	**NOT AVAILABLE**
SNDCP SERVICE:	**NOT AVAILABLE**
AIR INTERFACE ENCRYPTION:	**NOT AVAILABLE**
ADVANCED LINK:	**NOT SUPPORTED**

Note: The displayed values are factory defaults and should not be changed.

21. Press the "Return" soft key.

22. Press the "Neighbr Cell" soft key.

23. Verify that the following values are displayed:

NEIGHBOUR CELL BROADCAST:	**NOT REQUIRED**
BROADCAST INTERVAL:	**10s**
NEIGHBOUR CELL CHANNEL:	**0000**
NEIGHBOUR CELL LOCATION AREA:	**00001**
NEIGHBOUR CELL IDENTIFIER:	**01**
SLOW RE-SELECT THRESHOLD:	**10dB**
SLOW RE-SELECT HYSTERESIS:	**10dB**
FAST RE-SELECT THRESHOLD:	**10dB**
FAST RE-SELECT HYSTERESIS:	**10dB**

Note: The displayed values are factory defaults and should not be changed.

24. Press the “Return” soft key.
25. Verify that “Trunking Type” is set to “Message”.
26. Press the “Call Type” soft key to enter the “Call Type” screen.
27. Press the “Private Call” soft key.
28. Press the “Simplex Duplex” soft key and “Simplex Call” soft key.
29. Press the “Signal Type” soft key and “Direct set –up” soft key.
30. Press the “Priority” soft key. Thereafter, enter “00” and press the “Priority” soft key.
31. Leave “Calling Party SSI” setting to default value
32. Press the “Return” soft key.
33. This completes the System Setup configuration

Configuration of the IFR 2968 Manual Test Screen

The setup depends on the firmware version of the IFR 2968, the firmware version of the radio and the customer programming of the radio. The following procedure is only an example.

Note: Terms for 380-430 MHz radio in brackets [ ].

1. To enter “Manual test” screen, press the “Manual” soft key.
2. Press the “Control Channel” soft key. Thereafter, enter “2040” [“840”] and press the “Control Channel” soft key (IFR “2040” = Rx 851.0125MHz) [IFR “840” = Rx 421.0125MHz].
3. Press the “Traffic Channel” soft key. Enter “2040” [“840”] and press the “Traffic Channel” soft key. The marker goes to Timeslot. Enter “3” and press the “Traffic Channel” soft key. (Note that the Traffic Channel number changes automatically after entering the Control Channel number).
4. Press the “RF Gen Level” soft key. Thereafter, enter “-90” and press “dBm” data keys followed by “RF Gen Level” soft key.
5. Press the “Mobile Power” soft key, enter “35 dBm/3.2W“, using soft key.
6. Press the “Burst Type” soft key and “Normal” soft key.
7. This completes the Manual test equipment configuration setup.

Note: The System Setup Configuration Data is saved even after the power is turned off. However, the Manual Test Setup is not saved.

RF Tests

Receiver Tests

Simulate Base Station (registration)

1. Turn the radio ON
2. Check that registration and “ITSI: ---/----/01490199” (as example only) is displayed on the IFR “Manual Test” screen.

   Note: The number “01490199“ is the radio ID (ISSI) which is displayed when the radio is switched on.

RSSI Test

Before carrying out the following steps, record the Insertion loss (dB) of the cable loss value - (X) dB.

1. In the IFR Manual Test Mode, press the “RF Gen Level” Soft Key and enter -90 dBm.
2. Before testing, the radio should be configured to RSSI mode using the following sequence. When performing steps 3 through 6*,* make sure that you press the control head keys sequentially (less than a second between every consecutive press).
3. Press the “Right” navigation key. 
4. Press the “ 1 “ key, and “Menu” key.
5. Press the “ 2 “ key, and “Menu” key.
6. Press the “ 3 “ key.

Hereafter, there is no need for quick sequence of pressing the control head keys.

7. Press the “Down” navigation key  to scroll to “4 Cells Info”.
8. Press “OK” using the Right (soft) key. 
9. Press the “Down” navigation key  to scroll to the RSSI monitoring screen.
10. Press “Trace” using the Right (soft) key. 

    Note: RSSI results will flash on the screen every few seconds.
    The display shows: **SERV: E0**
    RSSI: -90
    SQE: 39
    Disregard the “SERV” and “SQE” results.

Actual RSSI measured
=IFR RF Gen Level - Cable insertion loss +/- other stray losses.

Range of Actual RSSI measured
= -90dBm - XdB (cable) +/- 1 dB.

Radio RSSI result should be within the range of Actual RSSI.

To stop the “Trace” process, perform the following. When performing steps 11 trough 14, make sure that you press the control head keys sequentially (less than a second between every consecutive press):

11. Press the “Right” navigation key. 
12. Press the “ 1 “ key, and “Menu” key.
13. Press the “ 2 “ key, and “Menu” key.
14. Press the “ 3 “ key.

Hereafter, there is no need for quick sequence of pressing the control head keys.

15. Press “OK“ using the right (soft) key. 
16. Press “Stop” using the Right (soft) key. 
17. Press “Back” using the Left (soft) key twice. 

Transmitter Tests

1. Press the “Mode” key on the radio until “Range 1” is displayed.
2. Change to one of the available groups using the “Down” navigation key. 
3. In the IFR Manual Test Mode press the “RF Gen Level” soft key. Enter “-90dBm” by pressing the data keys and “RF Gen Level” key.
4. Press the “PTT” of the radio and monitor the IFR “Manual Test” screen which displays the Power Profile, Burst Power, Timing Error, Frequency Error and Vector Error.

   Note: You have to hold the PTT in the pressed position long enough to enable you to read the results.

- Power Profile:	**Passed.**
- Burst Power Required Results:	**33-37dBm.**
- Timing Error:	**≤ 0.25 symbols.**
- Vector Error:	**Max 10% RMS, Max 30% Peak, Max 5% Residual.**
- Frequency Error:	**+/- 80Hz.**

5. Press the “Clear Down” soft key, to proceed with other tests.

Call Processing Test

Before you start these tests, make sure that radio and test equipment are configured the same as given in the Transmitter Test.

Talk Back

1. Press the "Mode" key on the radio until "Range 1" is displayed.
2. Change to one of the available groups using the "Down" navigation key. 
3. In the IFR Manual Test Mode press the "RF Gen Level" soft key. Enter "-90dBm" by pressing the data keys and "RF Gen Level" key.
4. Press the "PTT", press the "Talk Back" soft key on the IFR and speak into the mic of the radio for at least 3sec, then release "PTT". You will hear from the radio speaker the last three seconds of the speech frames before the "PTT" is released.
5. Press the "Test Sound" soft key to provide the 1kHz signal to the radio speaker.
6. Press the "Silence" soft key to mute the 1KHz audio signal of the speaker.
7. Press the "Clear Down" soft key and check that the "Cleardown Complete" status appear on the IFR "Manual Test" screen.

Call to Mobile

1. Press the "Mode" key on the radio until "Private Mode" is displayed.
2. In the IFR Manual Test Mode press the "RF Gen Level" soft key. Enter "-90dBm" by pressing the data keys and "RF Gen Level" key.
3. Press the "Call Mobile" soft key and select "Private Call" on the IFR. Verify that two beeps are heard from the radio speaker.
4. Press the "Abort Call" soft key.

Duplex Test (Phone/Private Mode)

Digital Duplex Test (Tx)

1. In the IFR Manual Test Mode press the "RF Gen Level" soft key. Enter "-50dBm" by pressing the data keys and "RF Gen Level" key.
2. Press the "Mode" key of the radio and select "Phone" mode.
3. Dial a random 4 digit number (eg "9359") using the Alphanumeric keys of the radio and press the "Send" Key. 

   The following results are displayed on the IFR "Manual Test" Screen

   - Power Profile: Passed

   - Burst Power Required Results: 18-22dBm

   - Timing Error: ≤ 0.25 Symbols.

- Frequency Error: **-/+ 80Hz**

- Vector Error: **Max 10% RMS,**
Max 30% Peak.
Max 5% Residual.

4. Press the “Talk Back” soft key.
5. Speak into the radio microphone and hear your speech (after a short delay) from the radio loudspeaker.

   Note: If you need more details, press the “Duplex Test” mode key.

6. Press the “duplex test (Tx)” soft key. The “Digital Duplex test” results will be displayed on the IFR screen providing you with either one of the following:

   - bar charts measurement capabilities showing Tx Power, Frequency Error and Vector RMS in one screen
   - Tx Power (more details in Power Analyser)
   - Frequency Error (more details in Spectrum Analyser)
   - Vector RMS (more details in Vector Analyser)

For Power Analyser Graph:

7. Press “power ana” soft key.
8. Check that the power frame falls within the limits.

For Spectrum Analyser Graph:

9. Press “spec ana” soft key.
10. Monitor the Tx frequency.

For Vector Analyser Diagram:

11. Press the “vector ana” soft key.
12. Monitor the diagram for the following:

    - press “vector error” soft key for vector error.
    - press “mag error” soft key for magnitude error.
    - press “phase error” soft key for phase error.
    - Vector Error
    - Magnitude Error
    - Phase Error

For Vector Diagram:

13. Press the “vector diagram” soft key.
14. View the following:

    - press “symbol constel” soft key for graphical symbol constellation.
    - press “rotated vector” soft key to zoom in on the constellation.
    - press “phase traject” soft key to view trajectory of the constellation.

15. Press the radio “End” key.

Service Flow Chart (Board Level)

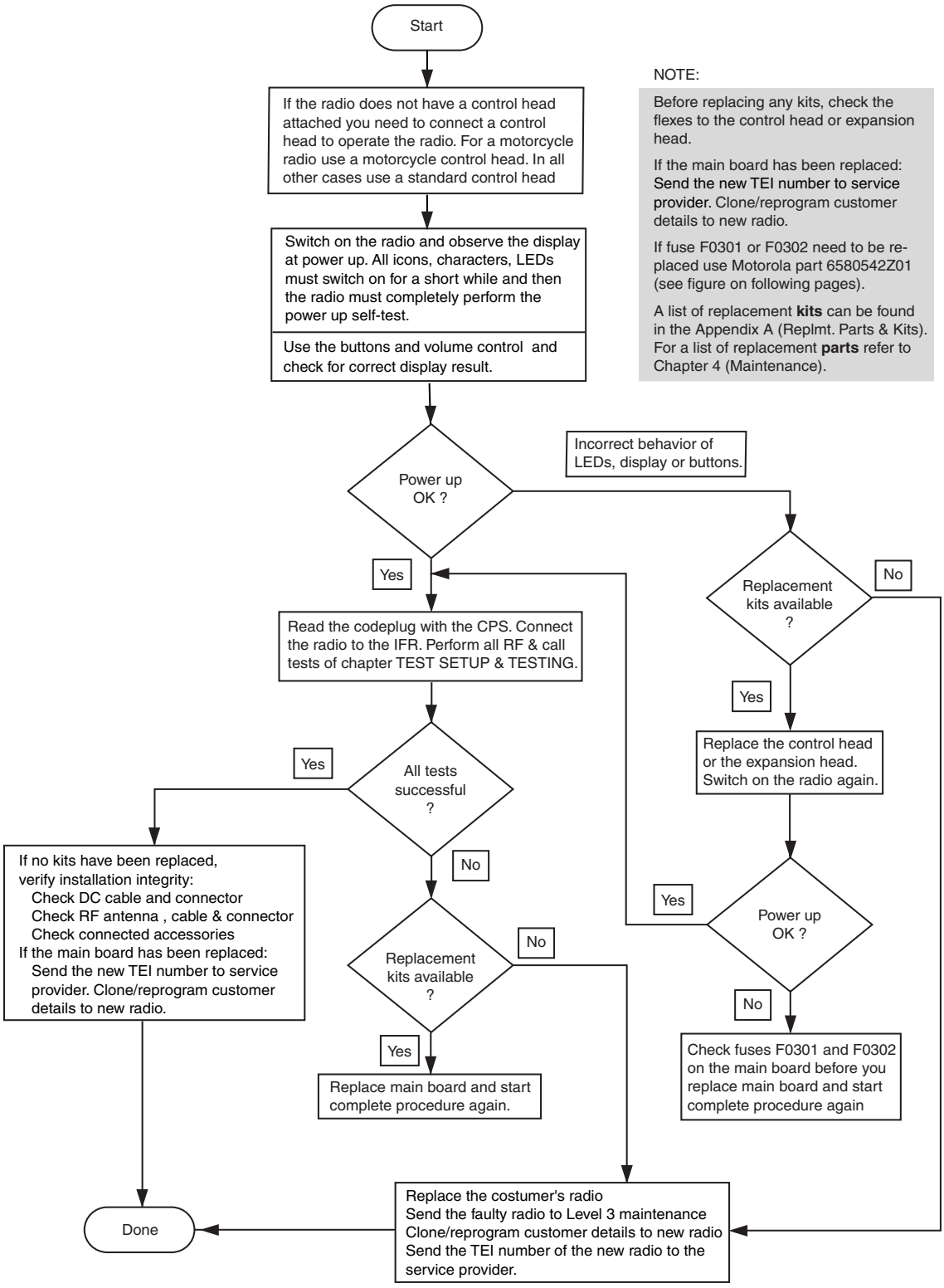

Figure 2 Servicing the MTM700

Self Check (Error & Fail Codes)

Table 1 lists the possible self check error (non fatal) codes for MTM700 Mobile Radios. No corrective action is required.

Table 3 Self Check Error (Non-Fatal) Codes

Message	Cause
Error00001	A non-fatal error was logged during operation
Error00002	Code Plug error log validity error

Table 2 lists the possible self check fail (fatal) codes for MTM700 Mobile Radios. The radio is inoperatable, the user should return the radio to Depot.

Table 4 Self Check Error (Non-Fatal) Codes

Message	Cause
Fail00100	Old CodePlug version failure
Fail00200	New CodePlug version failure
Fail00400	CodePlug model failure
Fail00800	CodePlug validity error
Fail00801	CP-Unknown block
Fail00802	CP-Unknown field
Fail00803	CP-Unknown flag
Fail00804	CP-Unknown format
Fail00805	CP-Invalid pointer
Fail00806	CP-Invalid path
Fail00807	CP-Invalid handler
Fail00808	CP-Invalid length
Fail00809	CP-Invalid index
Fail0080A	CP-Invalid offset
Fail0080B	CP-Invalid header pointer
Fail0080C	CP-Invalid block header
Fail0080D	CP-Initialization failed
Fail0080E	CP-Recovery failed
Fail0080F	CP-Write failure
Fail00810	CP-Corrupted block

Table 4 Self Check Error (Non-Fatal) Codes

Message	Cause
Fail00811	CP-Corrupted codeplug
Fail00812	CP-Radio operation system error
Fail00813	CP-Lower layer error
Fail00814	CP-Too many arguments
Fail00815	CP-Log overflow
Fail00816	CP-Invalid checksum
Fail00817	CP-Not initialized
Fail00818	CP-Ambiguous code
Fail00819	CP-Invalid start entry
Fail0081A	CP-Duplicate data
Fail0081B	CP-Invalid version number
Fail01000	Flash checksum error
Fail02000	A fatal error was logged during operation
Fail10000	Handset communication error
FailF4000	Ergo pre-selftest CodePlug error
FailF8000	Ergo pre-selftest invalid device error

Fuses on the Mainboard

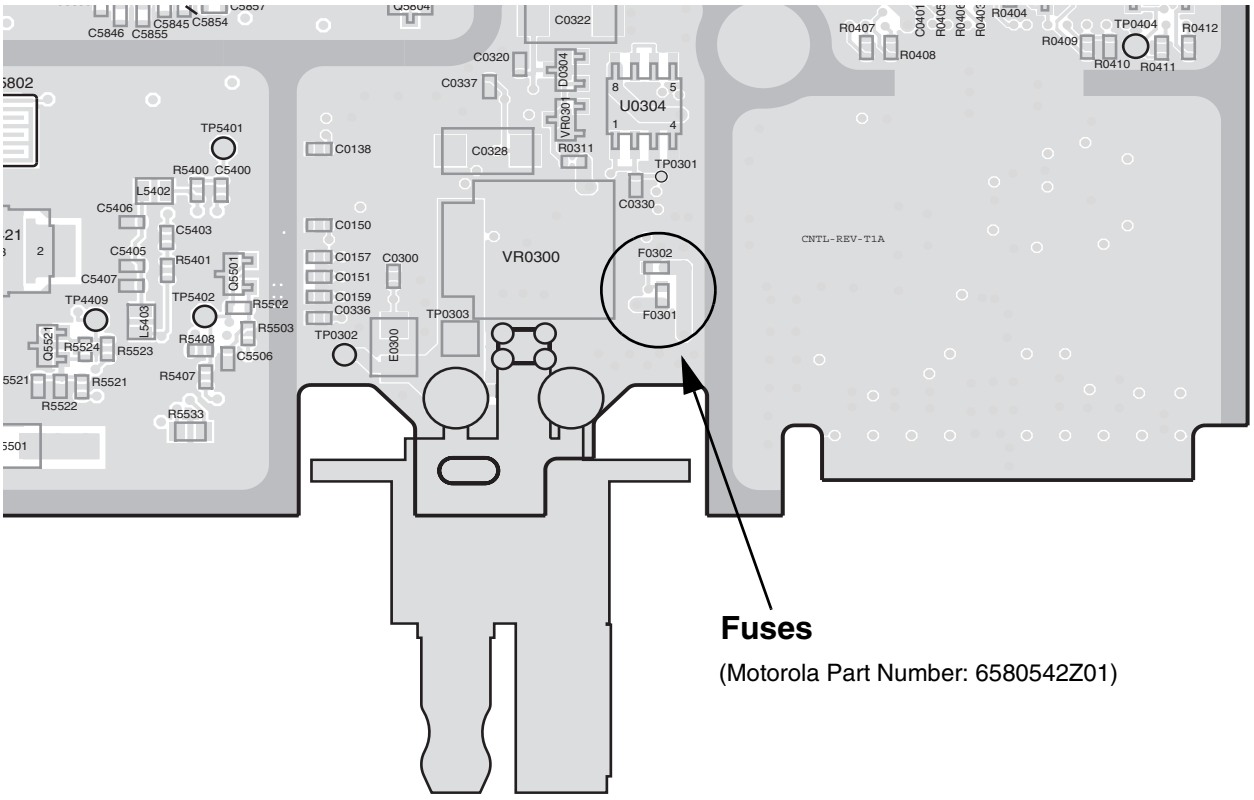

Figure 3 Position of Fuse F0301 and F0302 (PCB Mainboard - Bottom View)

CHAPTER 7
MAINTENANCE

Introduction

This chapter provides details about the following:

- Preventive maintenance (inspection and cleaning).
- Safe handling of CMOS and LDMOS devices.
- Repair procedures and techniques.
- Disassembly and reassembly of the radio.
- Exploded views and parts lists

Preventive Maintenance

The radios do not require a scheduled preventive maintenance program; however, periodic visual inspection and cleaning is recommended.

Inspection

Check that the external surfaces of the radio are clean, and that all external controls and switches are functional. It is not recommended to inspect the interior electronic circuitry.

Cleaning

The following procedures describe the recommended cleaning agents and methods to be used when cleaning the external and internal surfaces of the radio. External surfaces should be cleaned whenever a periodic visual inspection reveals the presence of smudges, compound, or grime. Internal surfaces (circuit boards and components) should be cleaned only when the radio is disassembled for servicing or repair.

The only recommended agent for cleaning external radio surfaces is a 0.5% solution (one teaspoon of detergent per gallon of water) of mild dishwashing detergent in water. The internal surfaces should be cleaned only with isopropyl alcohol (70% by volume).

NOTE: **Internal surfaces should be cleaned only when the radio is disassembled for service or repair.**

CAUTION: The effects of certain chemicals and their vapors can have harmful results on certain plastics. Avoid using aerosol sprays, tuner cleaners, and other chemicals.

Cleaning External Plastic Surfaces

Apply the 0.5% detergent-water solution sparingly with a stiff, non-metallic, short-bristled brush to work all loose dirt away from the radio. Use a soft, absorbent, lintless cloth or tissue to remove the solution and dry the radio. Make sure that no water remains entrapped near the connectors, cracks, or crevices.

Cleaning Internal Circuit Boards and Components

Isopropyl alcohol (70%) may be applied with a stiff, non-metallic, short-bristled brush to dislodge embedded or caked materials located in hard-to-reach areas. The brush stroke should direct the dislodged material out and away from the inside of the radio. Make sure that controls or tunable components are not soaked with alcohol. Do not use high-pressure air to hasten the drying process since this could cause the liquid to collect in unwanted places. After completing of the cleaning process, use a soft, absorbent, lintless cloth to dry the area. Do not brush or apply any isopropyl alcohol to the frame, front cover, or back cover.

NOTE: **Always use a fresh supply of alcohol and a clean container to prevent contamination by dissolved material (from previous usage).**

Safe Handling of CMOS and LDMOS Devices

Complementary metal-oxide semiconductor (CMOS) devices are used in this family of radios, and are susceptible to damage by electrostatic or high voltage charges. Damage can be latent, resulting in failures occurring weeks or months later. Therefore, special precautions must be taken to prevent device damage during disassembly, troubleshooting, and repair. Handling precautions are mandatory for CMOS circuits and are especially important in low humidity conditions. DO NOT attempt to disassemble the radio without first referring to the following CAUTION statement.

CAUTION: This radio contains static-sensitive devices. Do not open the radio unless you are properly grounded. Take the following precautions when working on this unit:

- **Store and transport all CMOS devices in conductive material so that all exposed leads are shorted together. Do not insert CMOS devices into conventional plastic "snow" trays used for storage and transportation of other semiconductor devices.**
- **Ground the working surface of the service bench to protect the CMOS device. We recommend using the Motorola Static Protection Assembly (part number 0180386A82), which includes a wrist strap, two ground cords, a table mat, and a floor mat.**
- **Wear a conductive wrist strap in series with a 100k resistor to ground. (Replacement wrist straps that connect to the bench top covering are Motorola part number RSX4015_).**
- **Do not wear nylon clothing while handling CMOS devices.**
- **Do not insert or remove CMOS devices with power applied. Check all power supplies used for testing CMOS devices to be certain that there are no voltage transients present.**
- **When straightening CMOS pins, provide ground straps for the apparatus used.**
- **When soldering, use a grounded soldering iron.**
- **If at all possible, handle CMOS devices by the package and not by the leads. Prior to touching the unit, touch an electrical ground to remove any static charge that you may have accumulated. The package and substrate may be electrically common. If so, the reaction of a discharge to the case would cause the same damage as touching the leads.**

Repair Procedures and Techniques - General

Parts Replacement and Substitution

When damaged parts are replaced, identical parts should be used. If the identical replacement part is not locally available, check the parts list for the proper Motorola part number and order the part from the nearest Motorola Communications parts center listed in the “SUPPORT CENTRES” section of this manual.

Disassembling and Reassembling the Radio - General

Since these radios may be disassembled and reassembled with the use of only six (board to casting) screws, it is important to pay particular attention to the snaps and tabs, and how parts align with each other.

The following tools are required for disassembling the radio:

- Small flat blade screwdriver
- Dismantling Tool (Motorola Part No.: 6686119B01)
- TORX™ T screwdriver

NOTE: If a unit requires more complete testing or service than is customarily performed at the basic level, send this unit to a Motorola Authorized Service Center (refer to Appendix A: Support Centers).

The following described disassembly procedures should be performed only if necessary**.**

Radio Disassembly and Reassembly - Detailed

The procedure to remove and replace a Control Head, Top Cover or Transceiver Board is similar for all models of radio. A typical procedure is therefore shown followed by specific disassembly procedures for Control Heads or Expansion Heads on radio models

Control Head Removal

1. Insert the dismantling tool in the groove between the control head and the radio assembly as shown in the Figure.
2. Press on the dismantling tool until the snap connectors on the side of the control head release from the radio assembly.
3. Pull the control head away from the radio assembly as shown below.

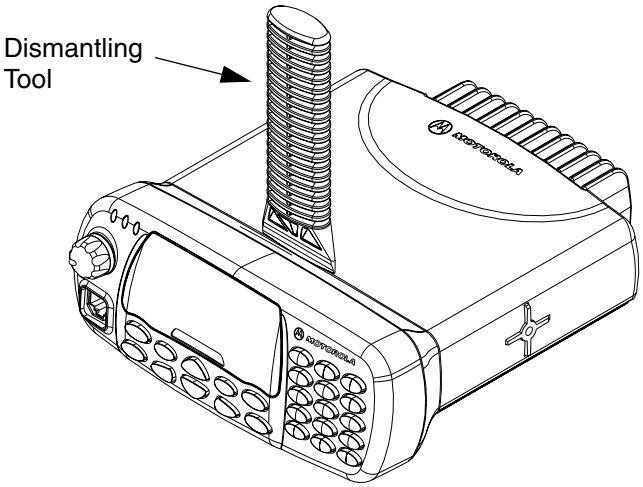

Figure 1 Typical Control Head Removal

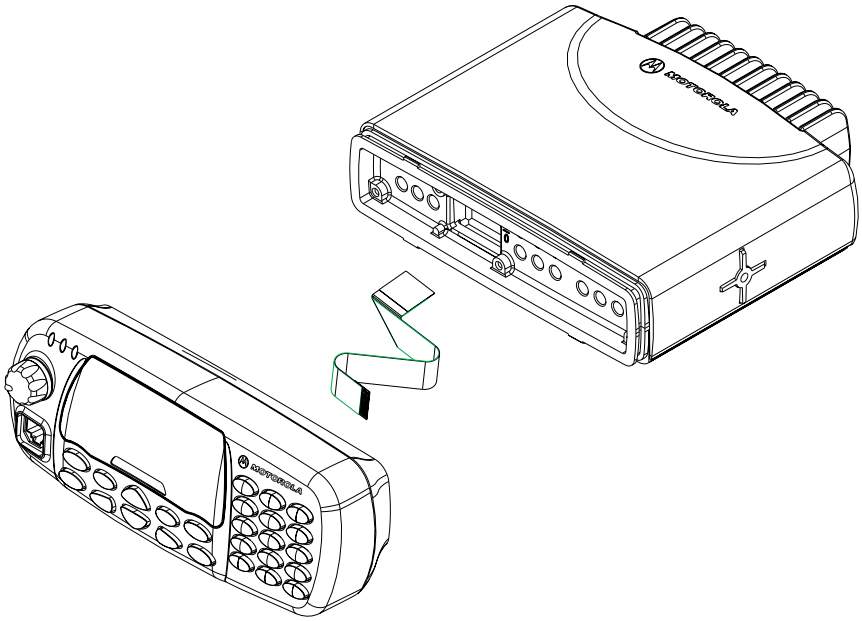

Figure 2 Flexible Connection Removal

4. Remove the flexible connection from the socket on the control head board.

Top Cover Removal

1. Insert the dismantling tool in the middle of the radio assembly side groove as shown in Figure 6 - 3.
2. Press on the dismantling tool until the snap connectors on the side of the cover release from the radio chassis.
3. Lift the top cover from the chassis.

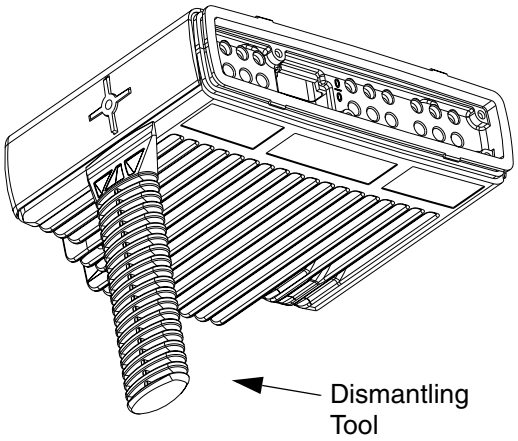

Figure 3 Top Cover Removal.

Transceiver Board Removal

1. Remove six screws from the diecast cover using the T20 TORX™ driver as shown in Figure 6 - 4.
2. Lift the cover from the chassis.

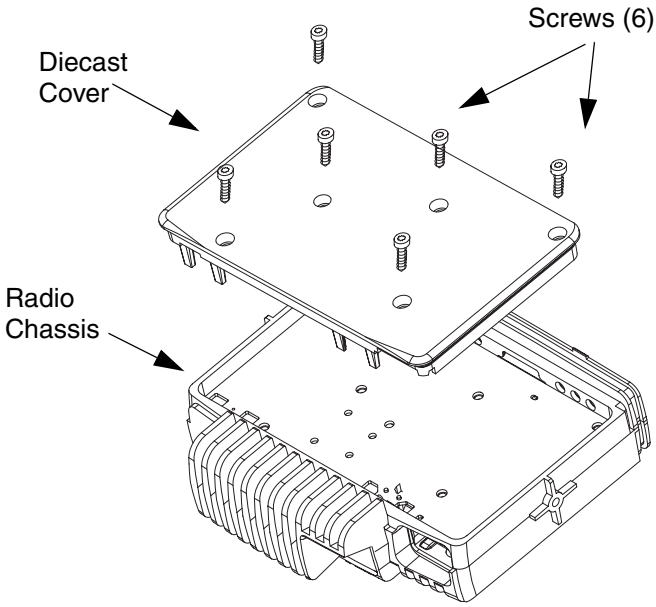

Figure 4 Diecast Cover Removal.

3. Slowly lift the transceiver board on the edge at the front of the radio (the edge that mates with the control head) and pull gently toward the front of the radio as shown in Figure 6 - 5. Take care to slide the antenna connector and power connector out of the chassis towards the front.

CAUTION: The thermal pad can act as an adhesive and cause the leads of the heat dissipating devices to be over stressed if the board is lifted too quickly.
If the board can't be easily lifted, the chassis must be heated up to 55 degree Celsius.

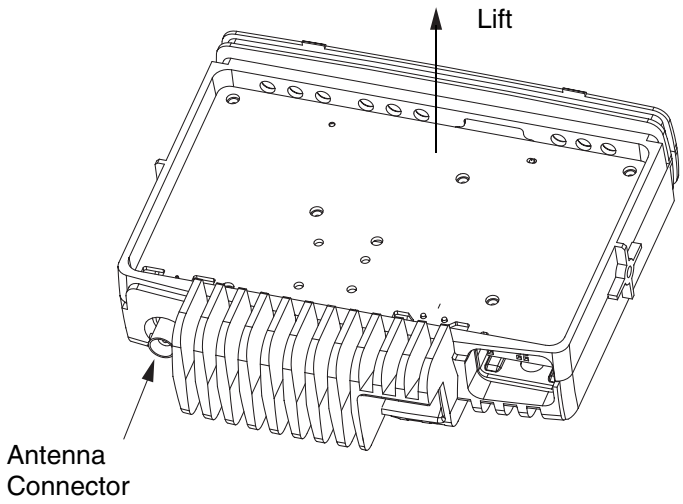

Figure 5 Transceiver Board Removal

Reassembly the Radio Chassis And Transceiver Board

1. Inspect the transceiver board and ONLY if the surface of the thermal pads show signs of damage, remove the thermal pads and apply thermal grease to the heatsink area on the chassis and heat dissipating devices.
2. Insert the transceiver board at an angle (approximately 30°) into the chassis taking care to slide the antenna connector and accessory connector into their cut-outs in the chassis.
3. Lower the transceiver board onto the chassis and align the two locating holes in the board with the locating pins in the chassis.
4. Secure the cover to the chassis with the six screws previously removed.
5. Torque the six screws to 1.9 NM (17 in lbs) using the T20 TORX™ driver. Begin with screw 6 followed by 5 to 1. Since the screws usually take a set, torque the screws a second time (1.9 NM) in the same order.
6. Refit the top cover over the assembled radio chassis. Press the cover down until it snaps into place.

Control Head Fitting

1. Align the **'dot'** or **'O'** marking on the flex with the **'O'** mark on the chassis to the socket on the radio assembly as shown in Figure 2.
2. Check that the back housing o-ring seal is undamaged and fitted in the groove. Replace the seal if it is damaged (refer to the exploded view diagrams and parts list).
3. Fit the back housing to the control head. Ensure that the tags on the back housing align with the snap catch grooves on the control head. Press the back housing into place until it snaps into place.
4. Check that the radio chassis o-ring seal is undamaged and fitted in the groove on the chassis assembly. Replace the seal if it is damaged.

Standard Control Head - Disassembly

1. To dismount the control head housing from the back housing, insert the dismantling tool in the groove between the two housings as shown in the following Figure.

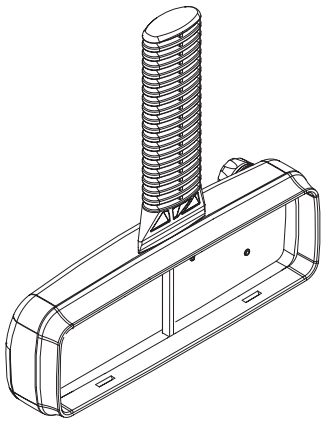

Figure 6 Control Head Back Housing Removal

2. Press the dismantling tool until the snap connectors on the side of the back housing release from the control head.

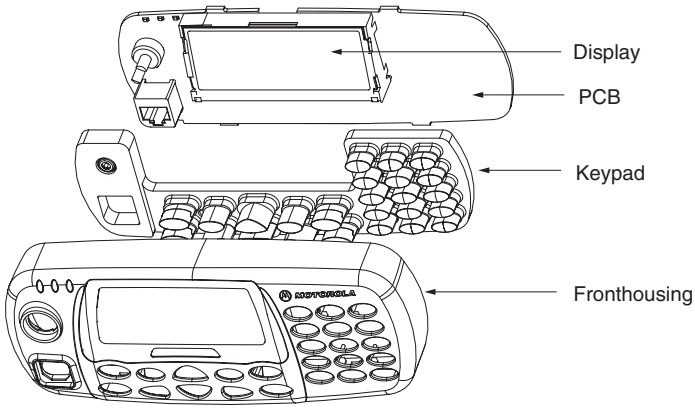

Figure 7 Control Head Board Removal

3. Remove the board from the control head housing by stretching the control head housing and pulling up on the board as shown in the Figures.
4. Remove the keypad from the control head housing by lifting up the rubber keypad.

NOTE **Care should be taken not to touch or contaminate the conductive pads on the under side of the keypad or the conductive contacts on the printed circuit board.**

Standard Control Head - Reassembly

1. Fit the rubber keypad onto the board ensuring that the on/off control and on the board locate correctly with the cut-outs in the keypad.
2. On the board, rotate the on/off control spindle fully counter-clockwise.
3. Also, rotate the volume knob on the front housing fully counter-clockwise.
4. Align the board with the control head, inserting the on/off control spindle and connector through the holes in the control head.

Ensure that the keypad, on/off control spindle and microphone connector are aligned with the control head then press the board into place until it clicks.

Remote Mount Head - Disassembly

CAUTION: The radio must be disconnected from the power supply before commencing any disassembly. The Installation Manual should be referred to for more detailed information on warnings and safety.

To Disassemble the Radio from the Control Head

1. Remove the Control Head from the Transceiver by inserting the dismantling tool (Motorola part number 6686119B01) in the recess between the Control Head and the Transceiver.
2. Split the Controlhead into Front and Back housings by inserting the dismantling tool in the recess between them.

NOTE: **To minimize cosmetic damage disassemble from the bottom side (label side).**

3. Remove the flex.

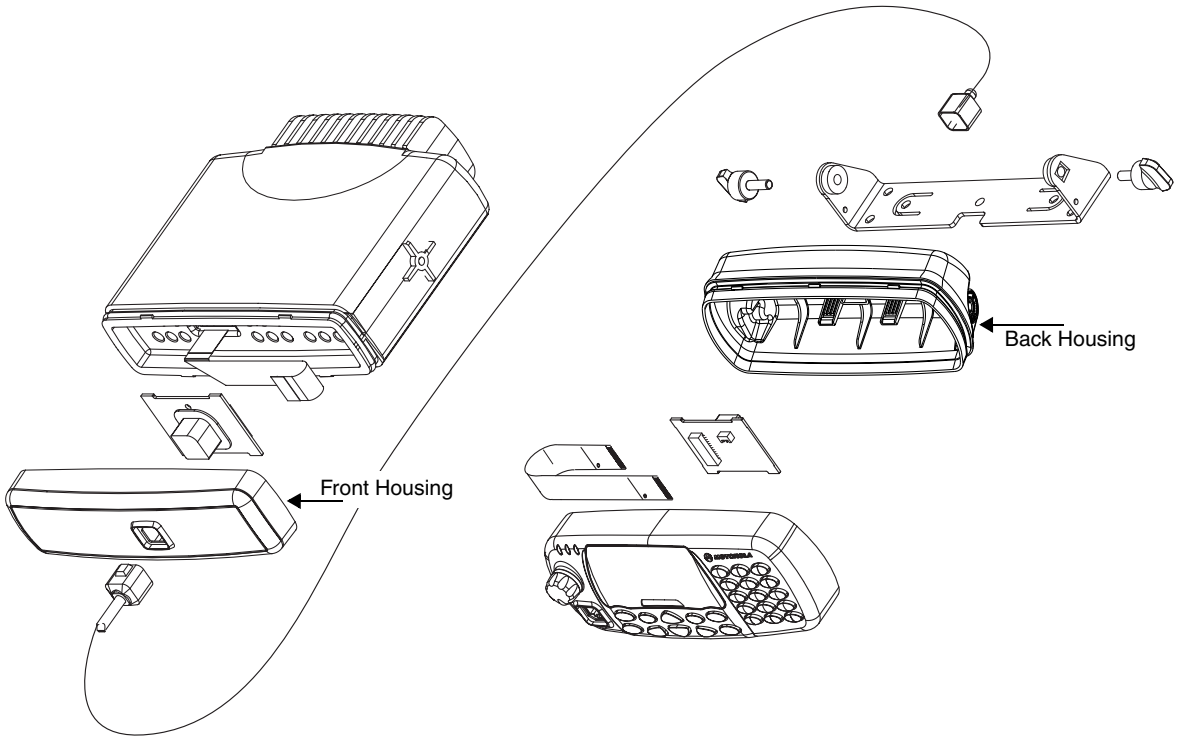

Figure 8 Remote Mount Head

Remote Mount Head - Reassembly

To Reassemble the Remote Front Housing:

1. Connect the flex from the Remote Front Housing to the top small connector in the Transceiver.

NOTE: **For correct orientation of the flex in the Transceiver, the "plastic" tab should be up, contacts facing down. Align the 'dot' or 'O' marking on the flex with the 'O' mark on the Transceiver. The flex must be pushed into the connector until it meets the stop.**

2. Press the Remote Front Housing onto the Transceiver chassis until the chassis tabs snap into place.

To Reassemble the Remote Back Housing

1. Connect the flex from the Remote Back PCB to the Controlhead.

NOTE: **For correct orientation of the flex align the 'dot' or 'O' marking on the flex with the 'O' mark on the PCB.**

2. Depending on the arrangement, orientate the Controlhead in the Back Housing
3. Press the Controlhead onto the Remote Back Housing until **ALL** 6 tabs snap into place.

NOTE: **The flex is not designed for continuous insertion, replace after several uses.**

Expansion Head - Disassembly

CAUTION: The radio must be disconnected from the power supply before commencing any disassembly. The Radio Installation Manual should be referred to for more detailed information warnings and safety.

To Disassemble the Expansion Head from the Radio

1. Remove the expansion head from the transceiver by inserting the dismantling tool (Part No. 6686119B01) in the recess between the expansion head and the transceiver.

NOTE: To minimize cosmetic damage disassemble from the bottom side, (label side).

2. Remove the two flexes from the radio.

To Disassemble the Expansion Board from Expansion Head Housing

1. Remove the board from the expansion head housing by levering the expansion head housing and pulling up on the expansion board.

NOTE: The 40 pin connector has a top latch that needs to be lifted before the flex is inserted and closed after flex insertion.

2. Lift the top latch and remove the 40-Pin flex from connector board.

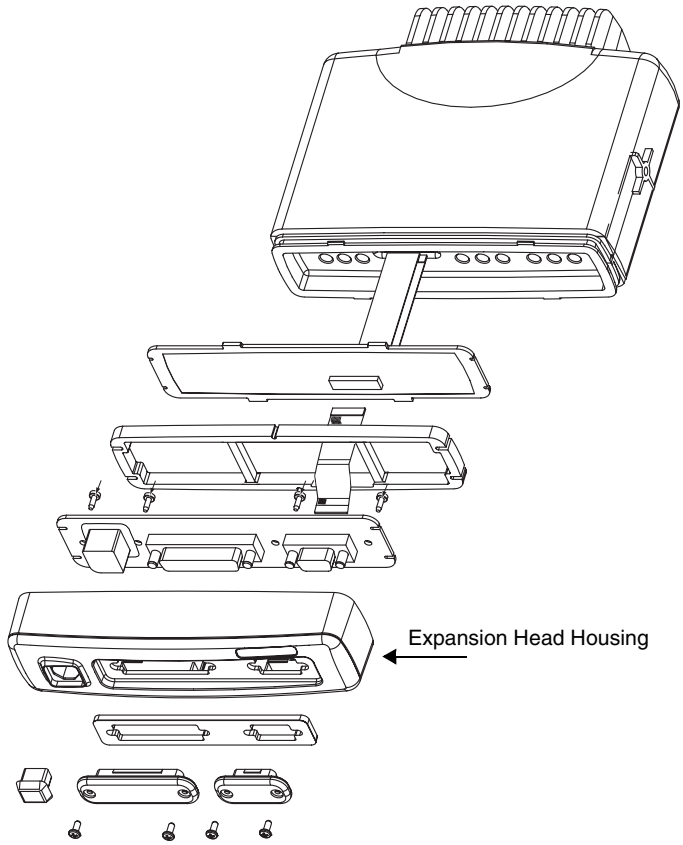

Figure 9 Expansion Head Exploded View

To Disassemble the Connector Board from Expansion Head Housing

1. Remove the silicon rubber frame
2. Remove the four screws from the connector board.
3. Remove all the protection caps on the front of the expansion head housing.
4. Lift the connector board from the expansion head housing.

Expansion Head - Reassembly

To Reassemble the Expansion Head

1. Insert the connector board into the expansion head housing.
2. Secure the connector board with the four screws previously removed.
3. Insert the rubber frame
4. Insert the 40 pin flex from the connector board to the Expansion board, ensuring that the top latch is firmly closed.
5. Snap the Expansion board into the expansion head housing
6. Connect the 12 line flex to the Radio, top small connector.
7. Connect the 40 line flex to the Radio, bottom large connector

NOTE: For correct orientation of the flex align the 'dot' or 'O' marking on the flex with the 'O' mark on the PCB.

8. Close the top latch after flex insertion
9. Push the expansion head housing onto the Transceiver until all 4 tabs snap firmly into place.
10. Connect modem cable and sophisticated remote mount controlhead (if applicable).

NOTE: The Expansion Head has a protection grade of IP54. To maintain IP54 sealing when connecting a RS232 data cable make sure to use a IP54 specified cable. (example: ROLINE AT-Modem cable ST-BU 1,8m order no. 11.01.4518)

NOTE: The flex is not designed for continuous insertion, replace after several uses.

Motorcycle Control Head - Disassembly

For disassembly of the Motorcycle version control head, use the following tools:
Parker's screwdriver, a pair of tweezers.

1. Unscrew the wing screws of the control head trunnion and remove the control head from the trunnion.
2. Unscrew the two screws that hold the connector bracket. Remove the bracket, the cable connector (not shown) and the gasket.
3. Unscrew the screws of the back housing and pull straight off.
4. The housing gasket may fall off when the back housing is removed. Note its location for reassembly. Refer to the exploded view for positioning.
5. The lock plate is aligned with one of the housing sides. Slide the lock plate the other direction and lift straight off. Note its placement for reassembly.
6. Remove the PCB support.
7. Carefully lift the PCB board assembly out holding the socket of the connector for the flexible PCB.
8. Remove the Insert from the Light Guide.
9. Unscrew all the screws of the Light Guide and carefully lift it out. This step is only required to gain access to the keypad.
10. With the light guide removed, the keypad can be pulled from the front housing. Take care not to touch or get contaminants on the conductive pads on the underside of the keypad.
11. Remove the Internal Spacer using a pair of tweezers. From inside the control head carefully press in two of the tabs of the Volume Knob so that the tabs deflect out and disengage from the control head Housing. Pull the Volume Knob straight out.
12. The External Spacer may fall out. Note its location for reassembly. Refer to the exploded view for positioning.

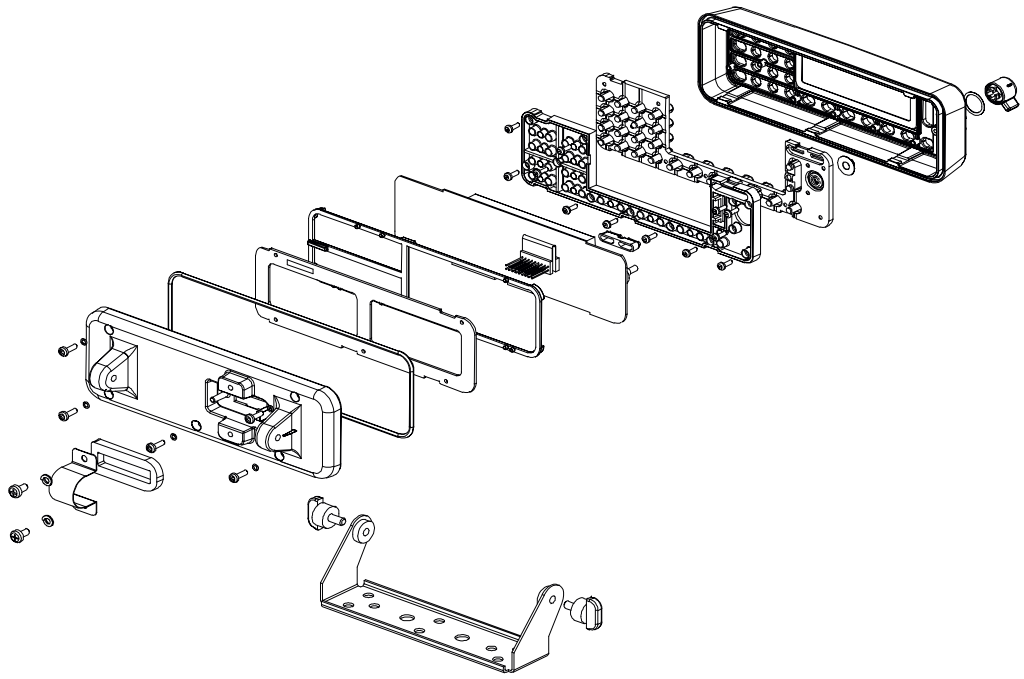

Figure 10 Motorcycle Control Head Exploded View

Motorcycle Control Head - Reassembly

1. Place the volume knob assembly into the opening.
2. Place the keypad into the front housing.
3. Place the light guide into the housing and fasten it with the screws. Be sure that all screws are fastened properly.
4. Make sure that both the volume know and potentiometer are in the fully counterclockwise position before inserting the board assembly into the font housing.
5. Snap the board assembly into the front housing and verify that the volume know turns clockwise and counterclockwise, and that when you push on it, it sounds a sound.
6. Place the PCB support - see the exploded view for proper direction.
7. Slide the Lock Plate into place.
8. Install the black gasket into the back housing and fasten the back housing to the front housing with the screws.
9. Place the gasket, insert the cable connector and mount the connector bracket with the screws.

NOTE: Use only the black gasket (Mot.Part.No. 3202113U01) to achieve full IP 57 protection

Service Aids

The following table lists the service aids recommended for working on the radio. While all of these items are available from Motorola, most are standard workshop equipment items, and any equivalent item capable of the same performance may be substituted for the item listed.

Table 16 Service Aids

Motorola Part No.	Description	Application
6666500A01	Housing Eliminator	Test Fixture used to bench test the radio pcb
6686119B01	Dismantling Tool	Assists in the removal of radio control head
0180320B16 6680321B81 6680321B56	Torx Screw Driver Kit (T6,8,10,15,25) Torx Bit Insert Bit extra long	
T-20 TORX (or equivalent)	Screwdriver with torque meter	

EXPLODED VIEWS & PARTS LISTS

NOTE: **For optimum performance, all replacement parts, diodes, transistors and integrated circuits must be ordered by Motorola part numbers.**

Transceiver - Exploded View and Parts List

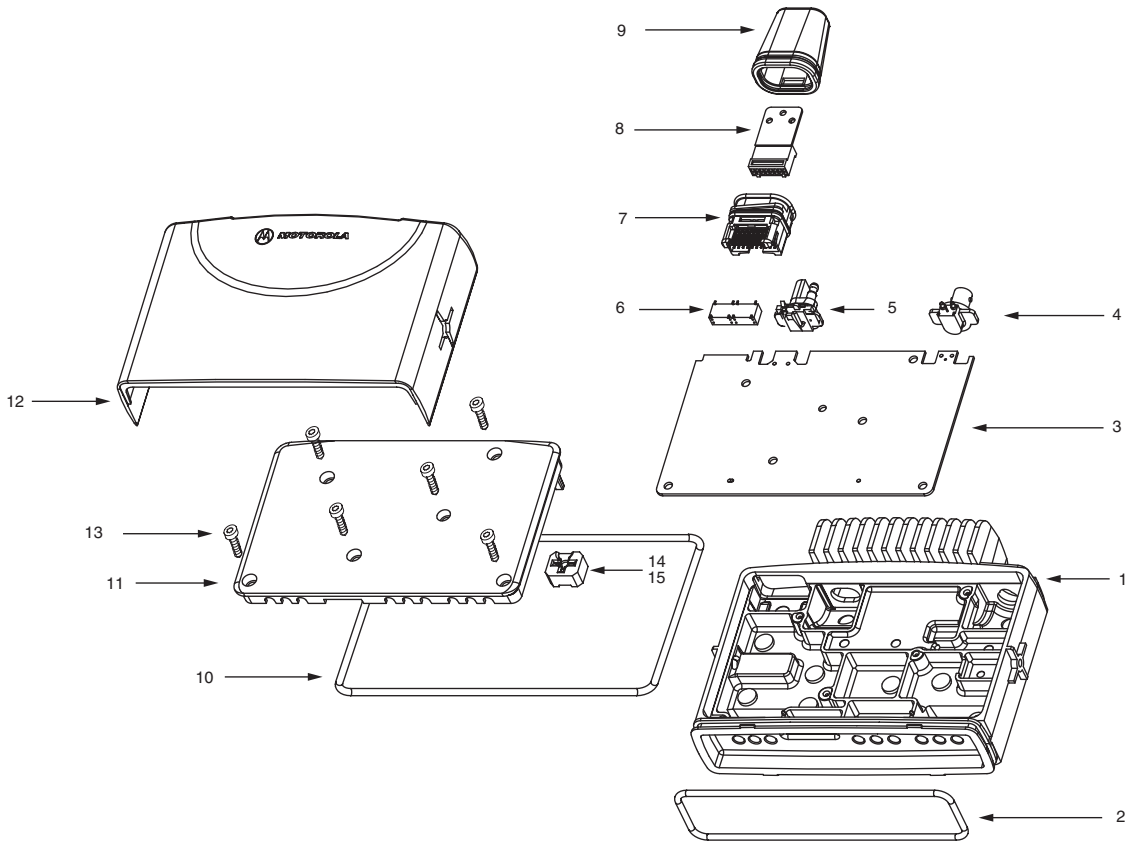

Figure 11 Transceiver Exploded View

Table 17 Transceiver Parts List

Item No.	Description	Part Number
1	Chassis	2766521A02
2	Gasket, Controlhead	3202620Y01
3	Main PCB (items 4, 5 and 6 included)	refer to Appendix B: Service Kits
4	Antenna Connector	0986166B01
5	Power Connector	0986165B01

Table 17 Transceiver Parts List

Item No.	Description	Part Number
6	Connector 20 Pos.	1586184B01
7	Connector Assembly	2886122B02
8	Connector Housing 16Pos.	1580922V01
9	Gasket Accessory Connector	3202606Y02
10	Gasket Cover	3286095B01
11	Cover	1566511A02
12	Cover, Plastic	1586170B01
13	Screw T20, 6x (M4)	0310911A30
14	Silicon Pressurepad for UHF only	7566500A01
15	Silicon Pressurepad for 800MHz only	7566502A01

Standard Control Head - Exploded View and Parts List

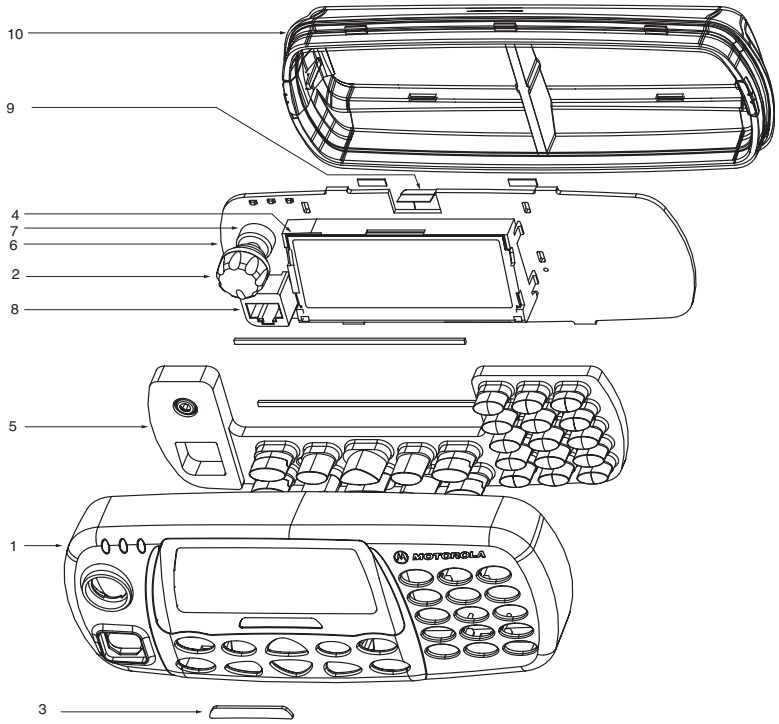

Figure 12 Standard Control Head - Exploded View

Table 18 Standard Control Head - Parts List

Item No	Description	Part No
1	Housing Front, including:Gasket, Lens, Lightguide	0164000B29
2	Knob, Volume	3686098B02
3	Label MTM700	5464311B09
4	LCD Module	7266501A01
5	Keypad, (including Buttons 3886134_)	7564314B03
6	PCB Kit	GLN7354_
7	Potentiometer	1805911V02
8	10 PIN Microphone Jack	2864287B01
9	Flex, Position connector	8464346B02
10	Backhousing, including: Back housing O-ring Grounding Clip, left Grounding Clip, right	0108499X02
(not shown)	Flex, 12 Position Connector	8486127B01

Expansion Head - Exploded View and Parts List

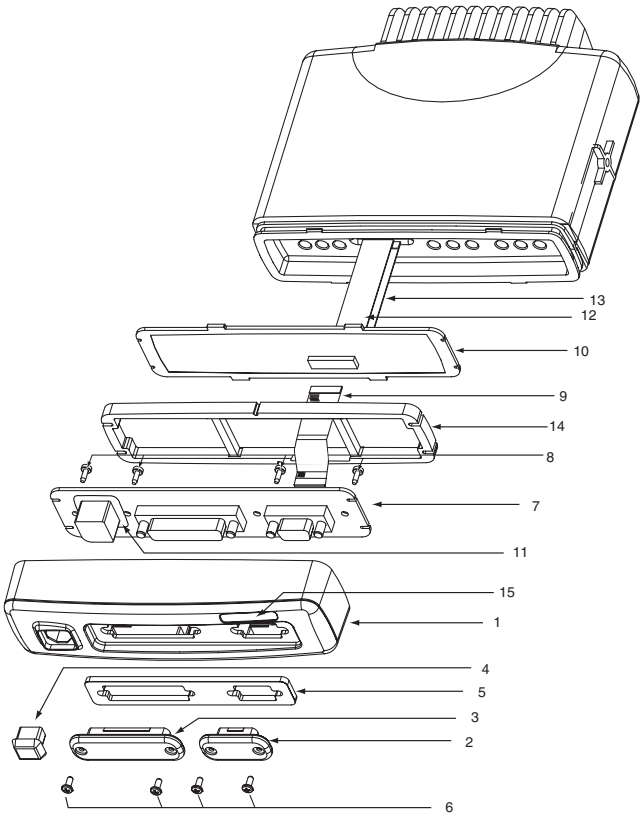

Figure 13 Expansion Head - Exploded View

Table 19 Expansion Head - Parts List

Item No	Description	Part No
1	Expansion Head Housing	1564290B01
2	Cover 9 Sub-D	3864326B01
3	Cover 25 Sub-D	3864326B02
4	Protection Caps/Bung, Telco	GLN7306_
5	Seal, Expansion Head	3264325B01
6	Screw, Protection Caps/Bung (4 required)	0305137Q02
7	Connector Board	0104010J79
8	Screw, Connector PCB (4 required)	0385944A02
9	Flex 40 Pin	8480475Z03
10	Expansion Board, not part of Housing Kit	0166502N67
11	Seal for 10 Pin Telco on PCB	3264291B01
12	Flex 12 Pin	8486127B01
13	Flex 40Pin	8466543A01
14	Silicone Pressure Pad	3264337B01
15	Label	5464344B06

Remote Mount Head - Exploded View and Parts List

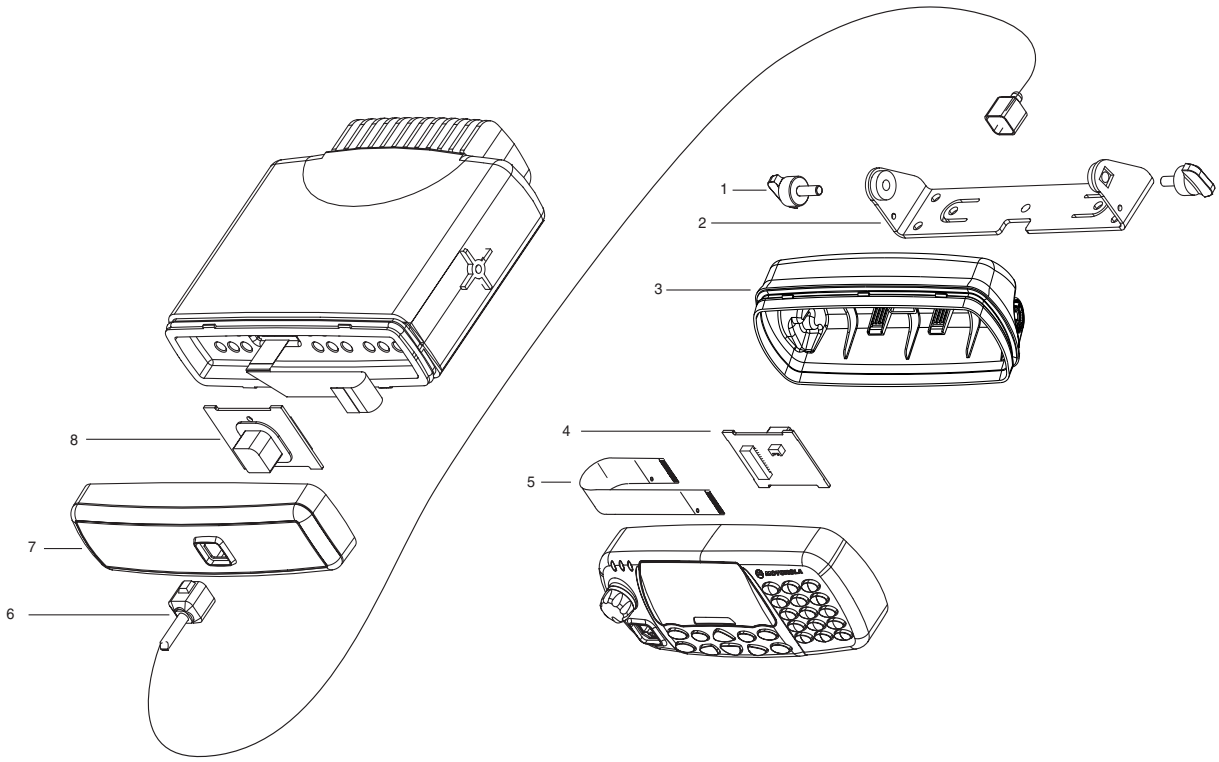

Figure 14 Remote Mount Head - Exploded View

Table 20 Remote Mount Head - Parts List

Item No	Description	Part No
1	Wingscrews	0305760W02
2	Remote Bracket	0708426X02
3	Remote Back Housing	1566508A01
4	Remote PCB (Back Housing)	GLN7362_
5	Flex	8486127B01
6	Cable 3m Cable 5m Cable 7m	RKN4077_ RKN4078_ RKN4079_
7	Remote Mount Front Housing	1564270B01
8	Remote PCB (Front Housing)	GMLN4086_

Motorcycle Control Head - Exploded View and Parts List

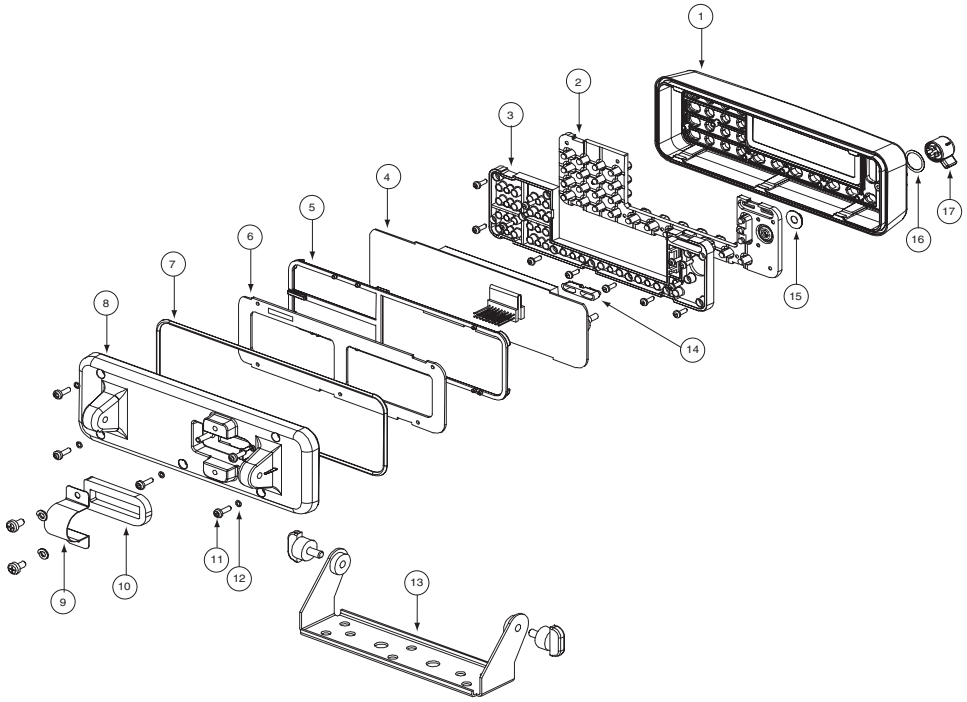

Figure 15 Motorcycle Control Head - Exploded View

Table 21 Motorcycle Control Head - Parts List

Item No.	Description	Part No.
1	Front Housing	1502119U02
2	Keypad	7502102U01
3	Light Guide	6102102U01
4	Control Head Board, includes Flexible PCB 8408133Y01	FLN9434_
5	PCB Support	0702110U01
6	Lock Plate	0702108U01
7	Housing Gasket	3202111U01
8	Back Housing	1502120U01
9	Connector Bracket	0702109U01
10	Gasket, black (for IP 57 protection - refer to “M’cycle Reassembly”)	3202113U01
11	Screws M3 (5 pcs)	0302102U01
12	O-Ring (5 pcs)	3202112U01
13	Trunnion	0780127N02
14	Insert	4302586Y01
15	Internal Spacer	4302104U012
16	External Spacer	0402102U01
17	Volume Knob	3602104U01

CHAPTER 8

SCHEMATICS, PCBS AND PARTS LISTS

Any level 3 repairs can deeply affect the performance of the MTM700 radio and may cause a new tuning procedure.
This tuning procedure can only be applied by certain authorized Motorola depots where the appropriate TEST&TUNE EQUIPMENT is available.
The appropriate TEST&TUNE EQUIPMENT is a special automated test equipment which is only available at some Motorola factories and Motorola repair centres.

Section Introduction

This Chapter contains the following Sections:

NOTE: **For optimum performance, all replacement parts, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.**

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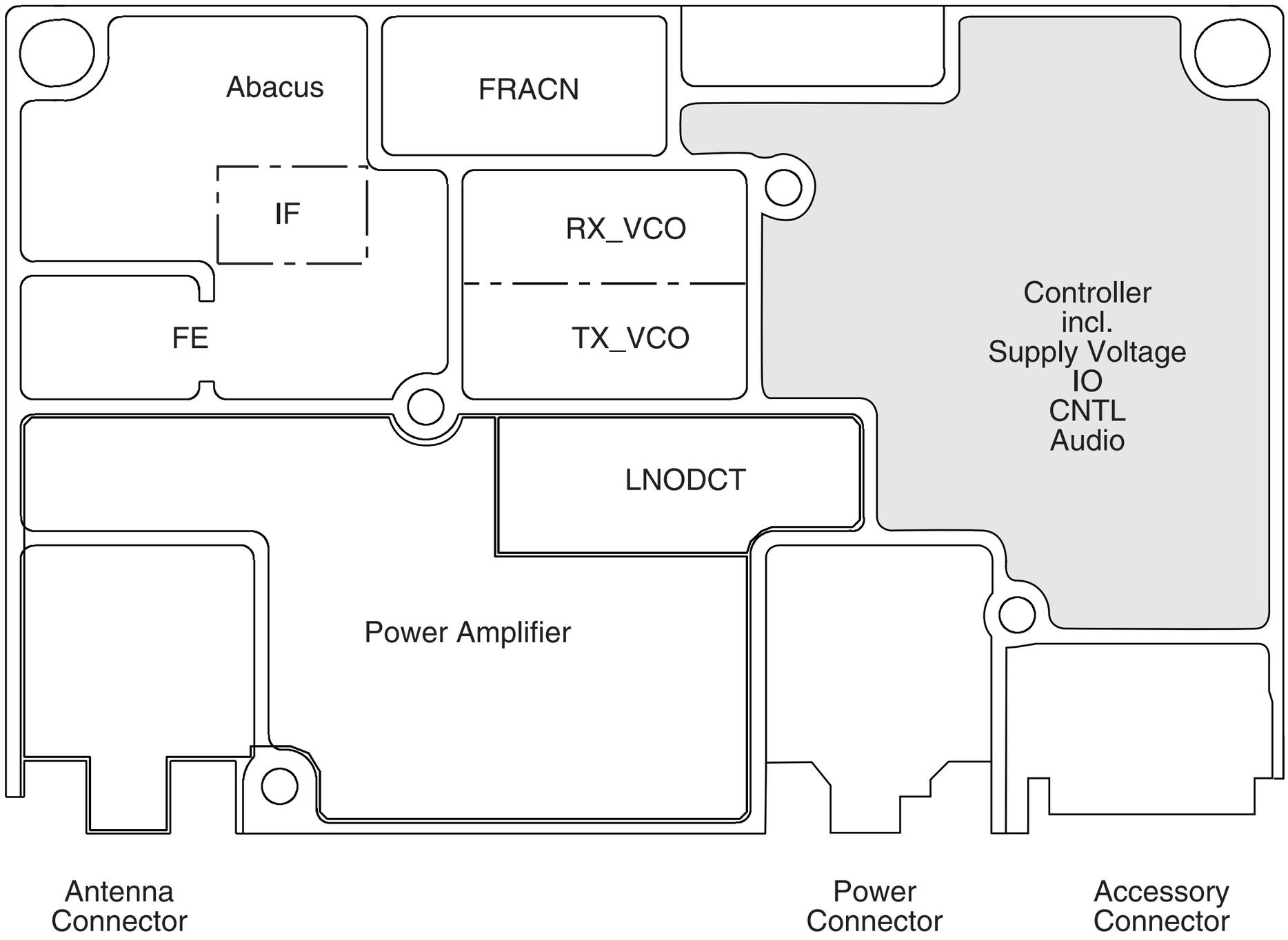
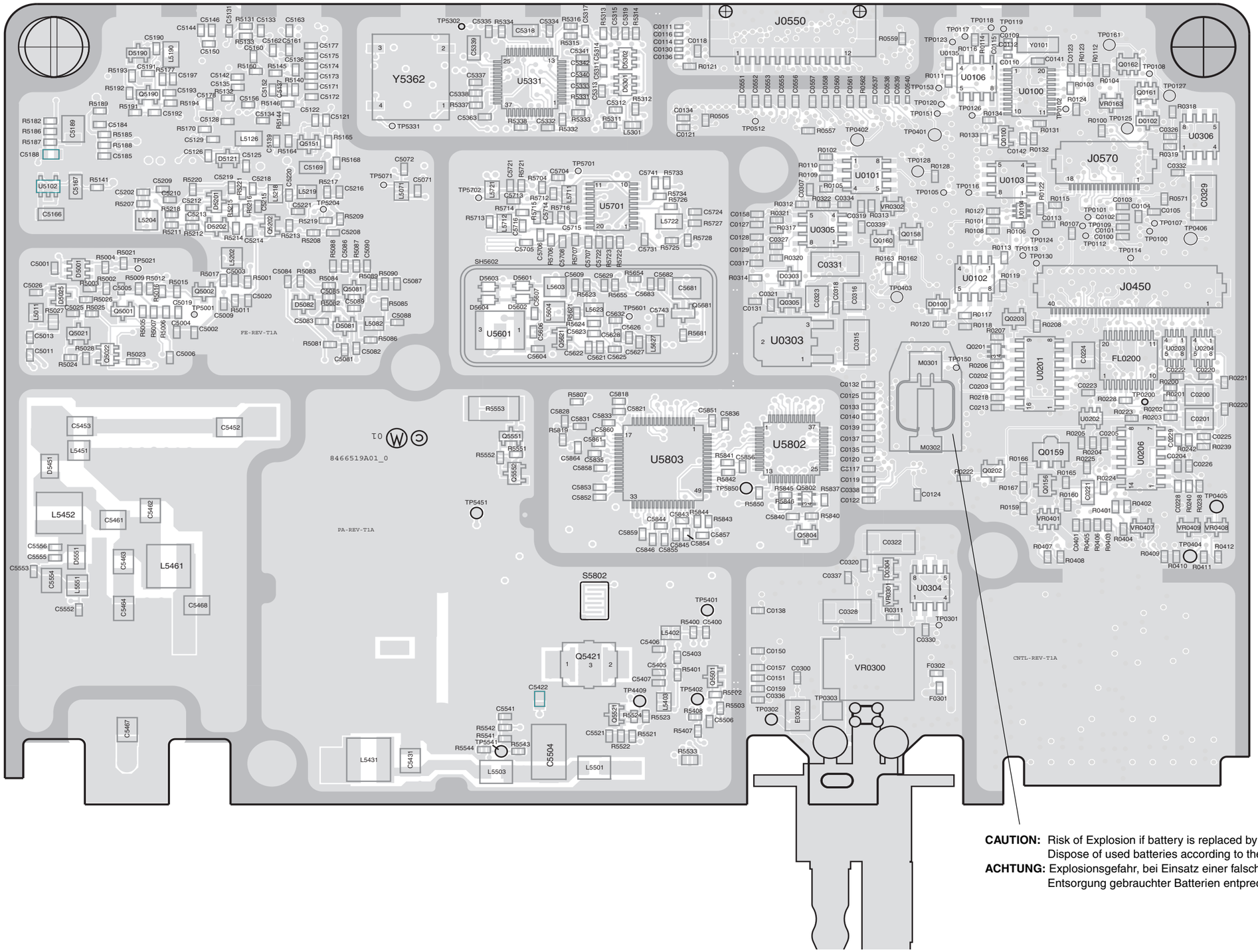
CHAPTER 8.1.1

Transceiver 400MHz (PCB No. 8466519A01_O): SCHEMATICS, PCBs and PARTS LISTS

SCHEMATICS and PCBS



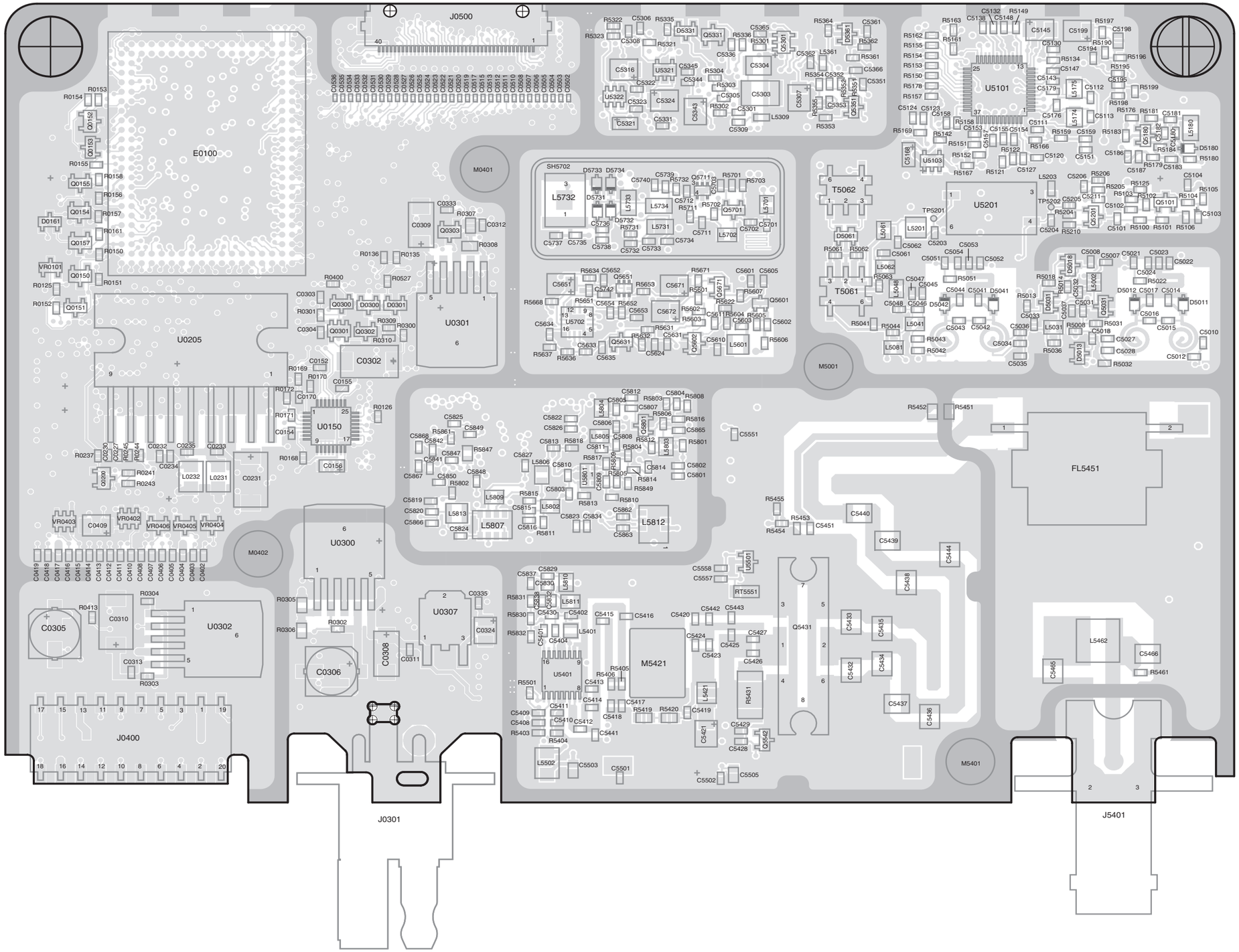
CHASSIS_OVERVIEW TRANSCEIVER



CAUTION: Risk of Explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
ACHTUNG: Explosionsgefahr, bei Einsatz einer falschen Ersatzbatterie. Entsorgung gebrauchter Batterien entprechend Vorschrift.

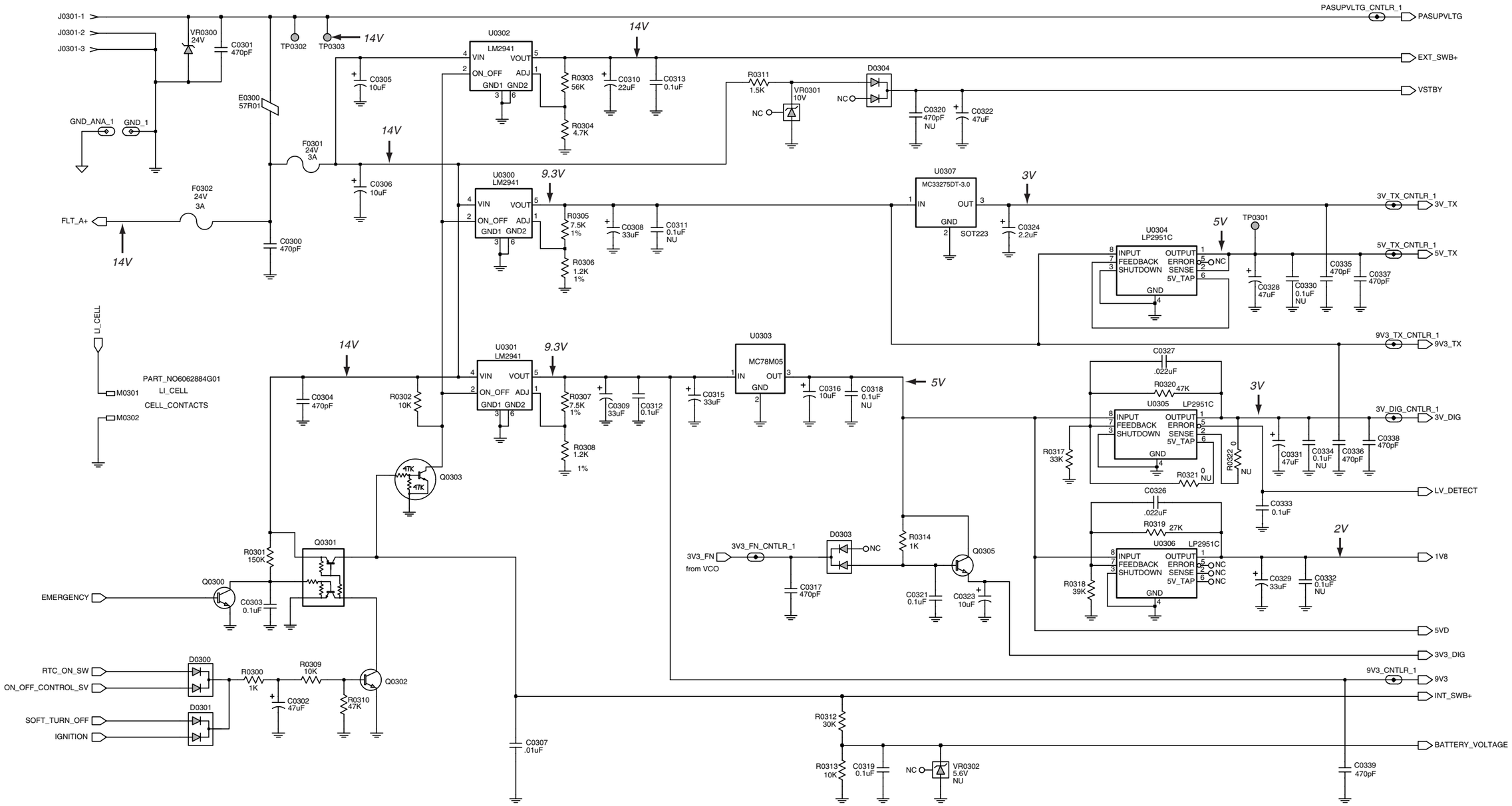
ZWG0130860-O

PCB / Main Board 8466519A01_O / BOTTOM SIDE



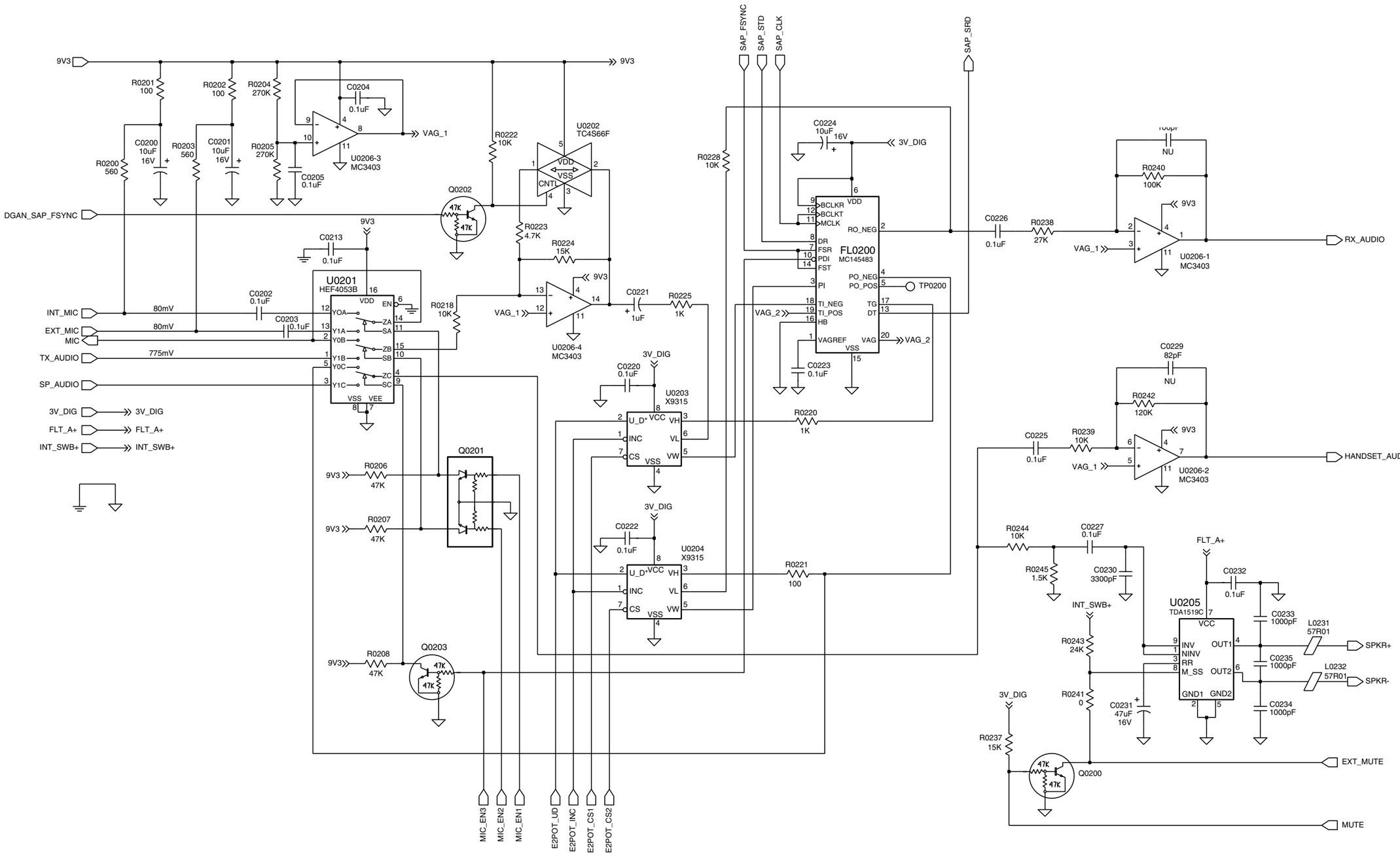
ZWG0130859-O

PCB / Main Board 8466519A01_O / TOP SIDE



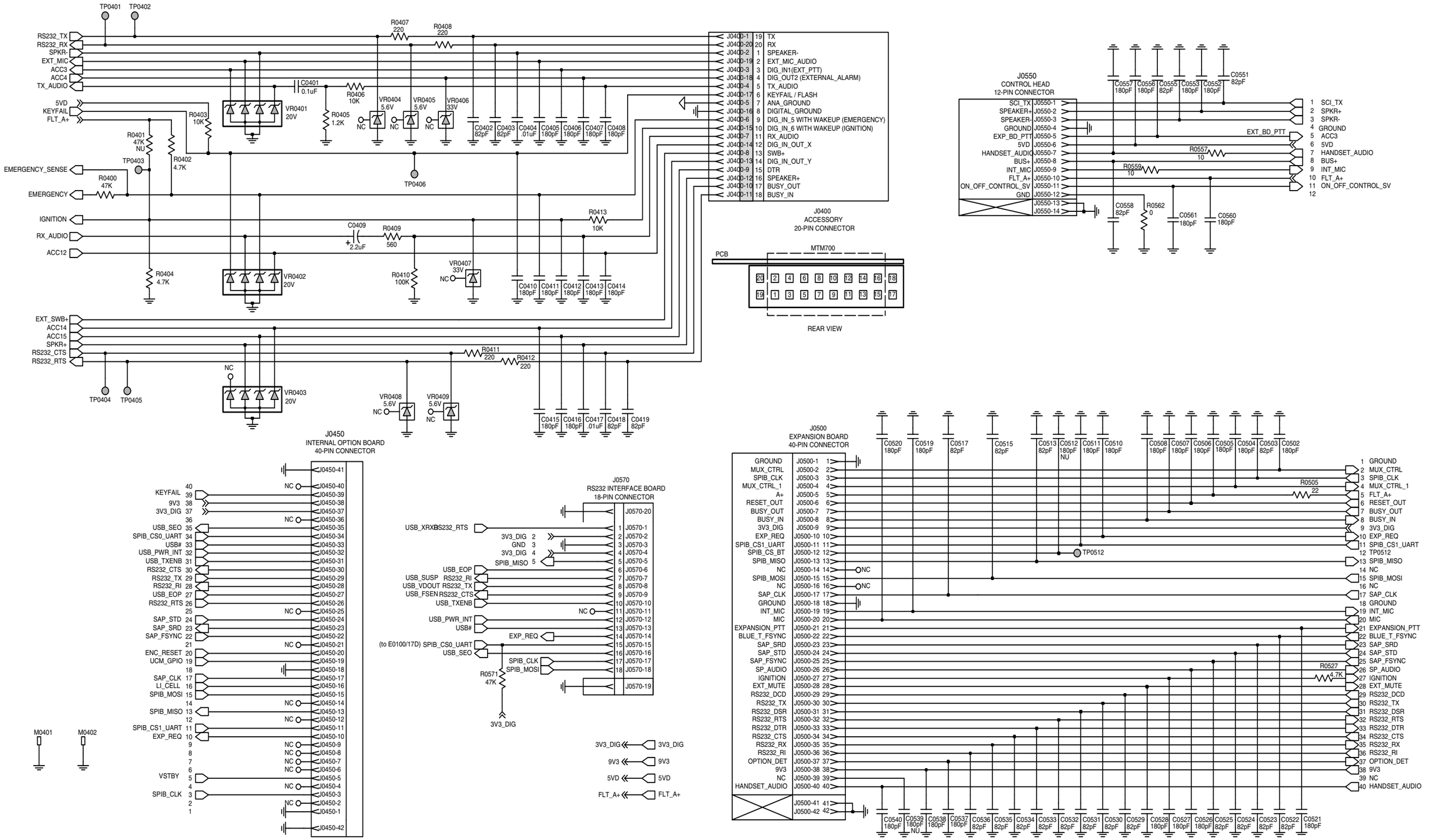
ZWG0130874-O

Main Board 8466519A01_O / CNTRL_SUPPLY_VOLTAGE



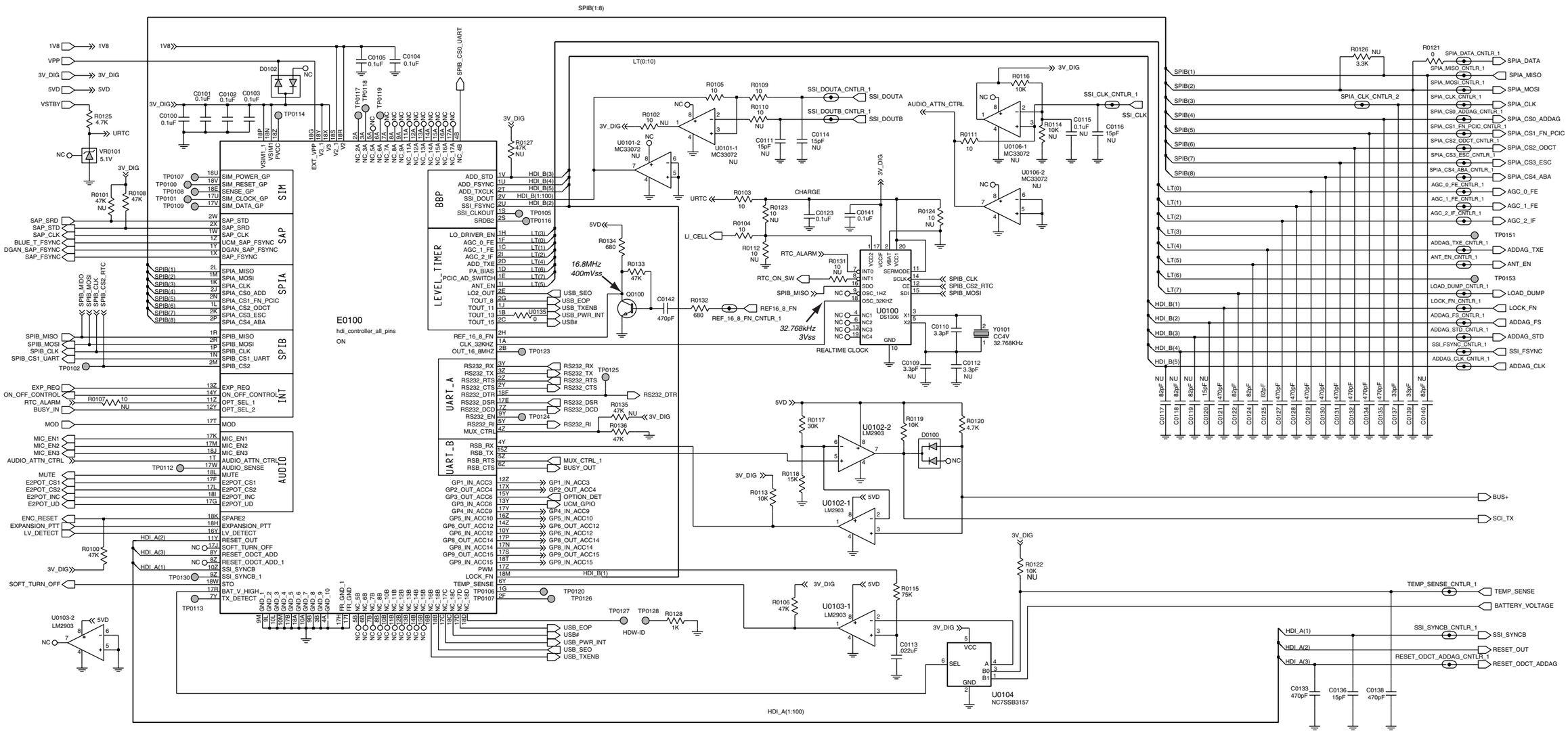
ZWG0130870-O

Main Board 8466519A01_O / CNTRL_AUDIO_POWER_AMPLIFIER

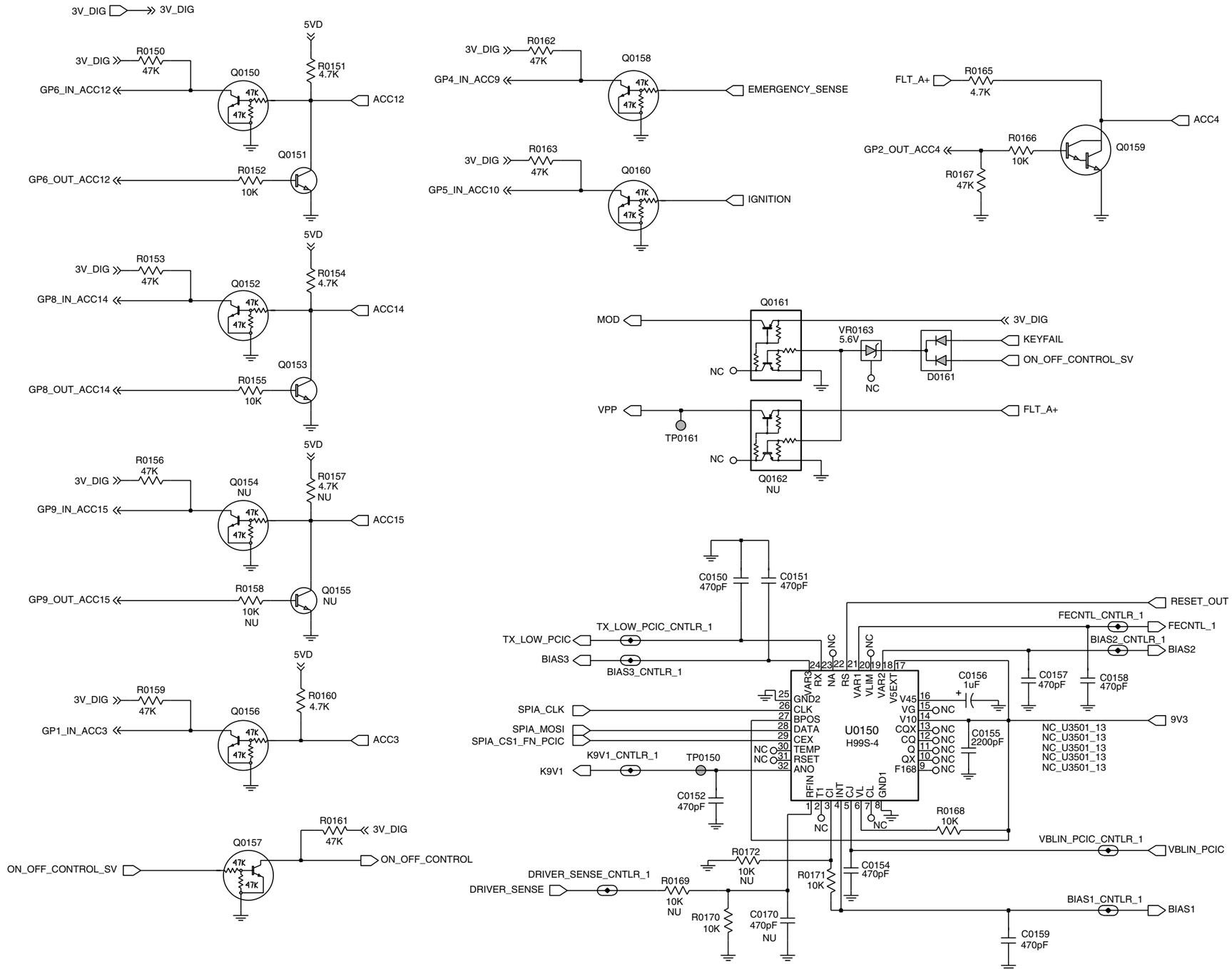


ZWG0130873-O

Main Board 8466519A01_O / CNTRL_I/O

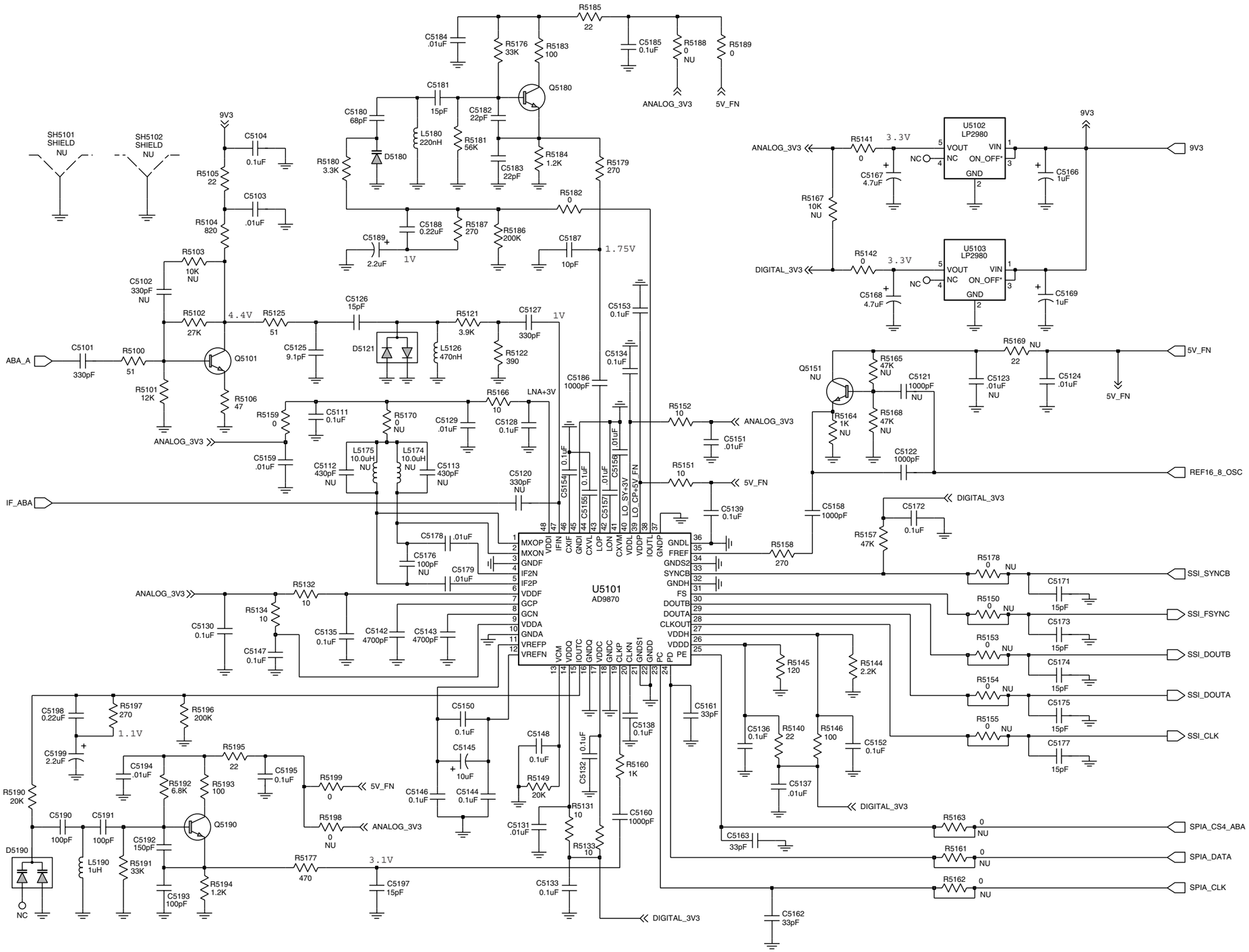


Main Board 8466519A01_O / CNTRL_CNTL (Sheet1)



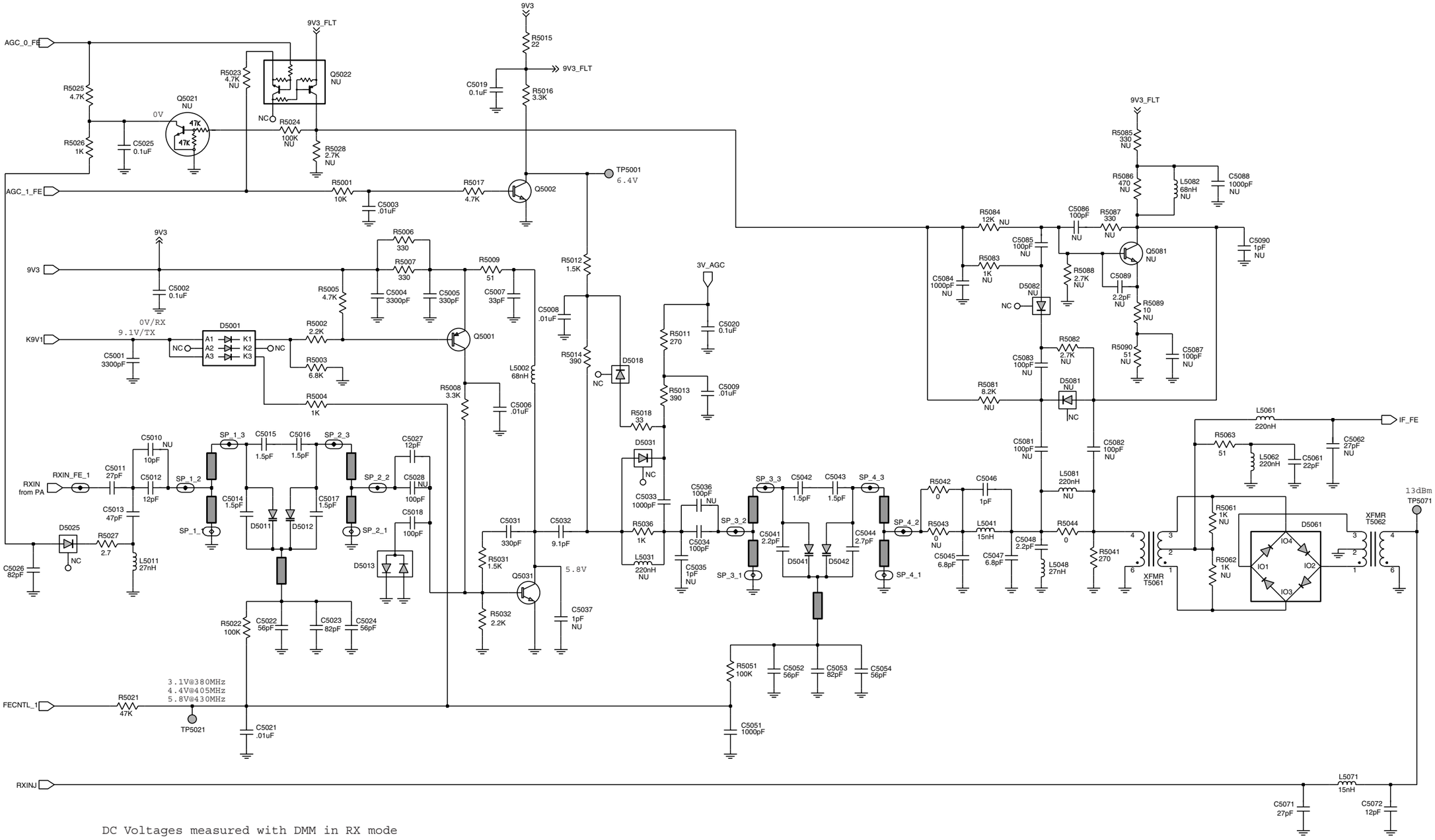
ZWG0130872-O

Main Board 8466519A01_O / CNTRL_CNTL (Sheet 2)



ZWG0130861-O

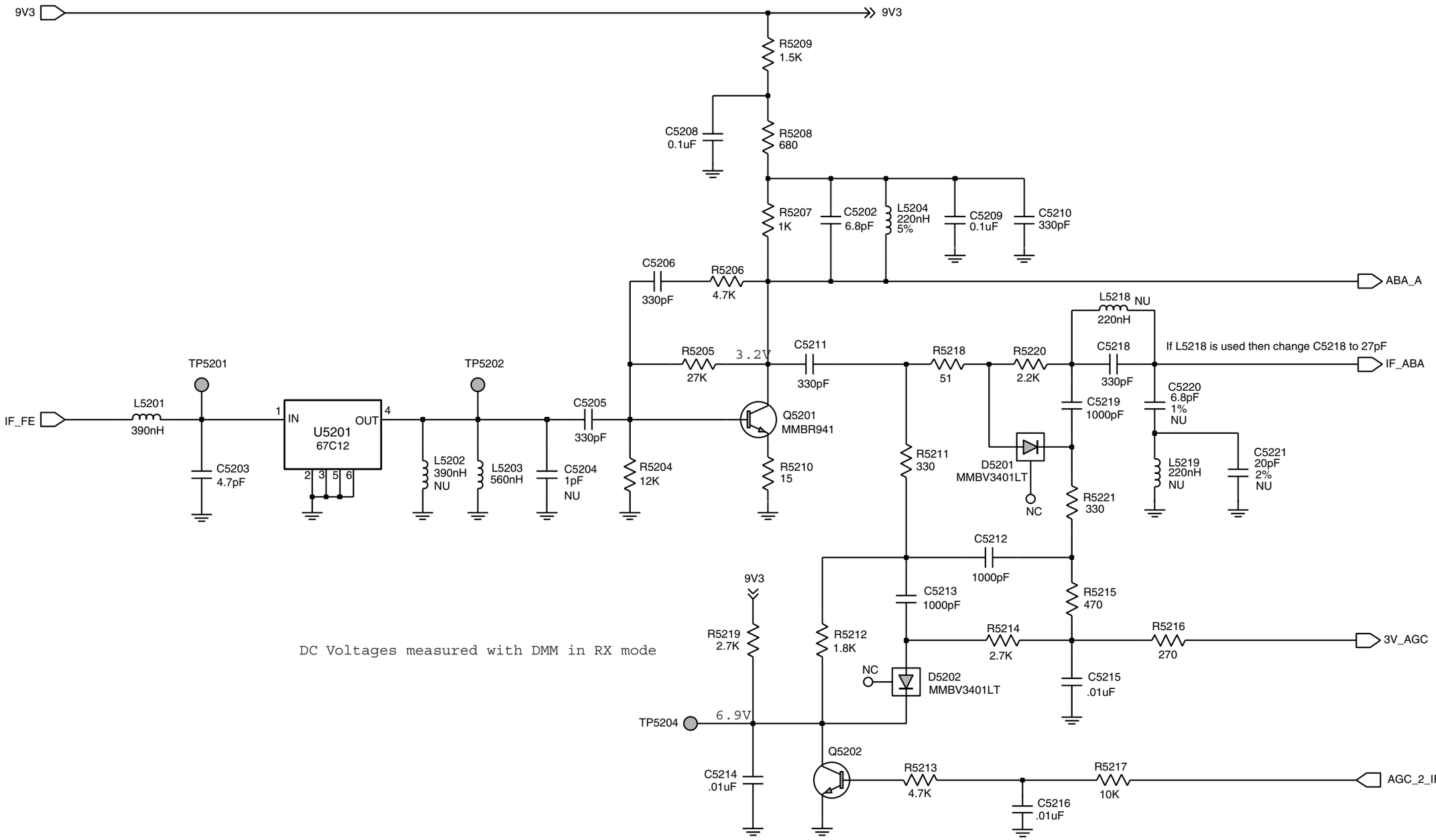
Main Board 8466519A01_O / RF_ABACUS



DC Voltages measured with DMM in RX mode

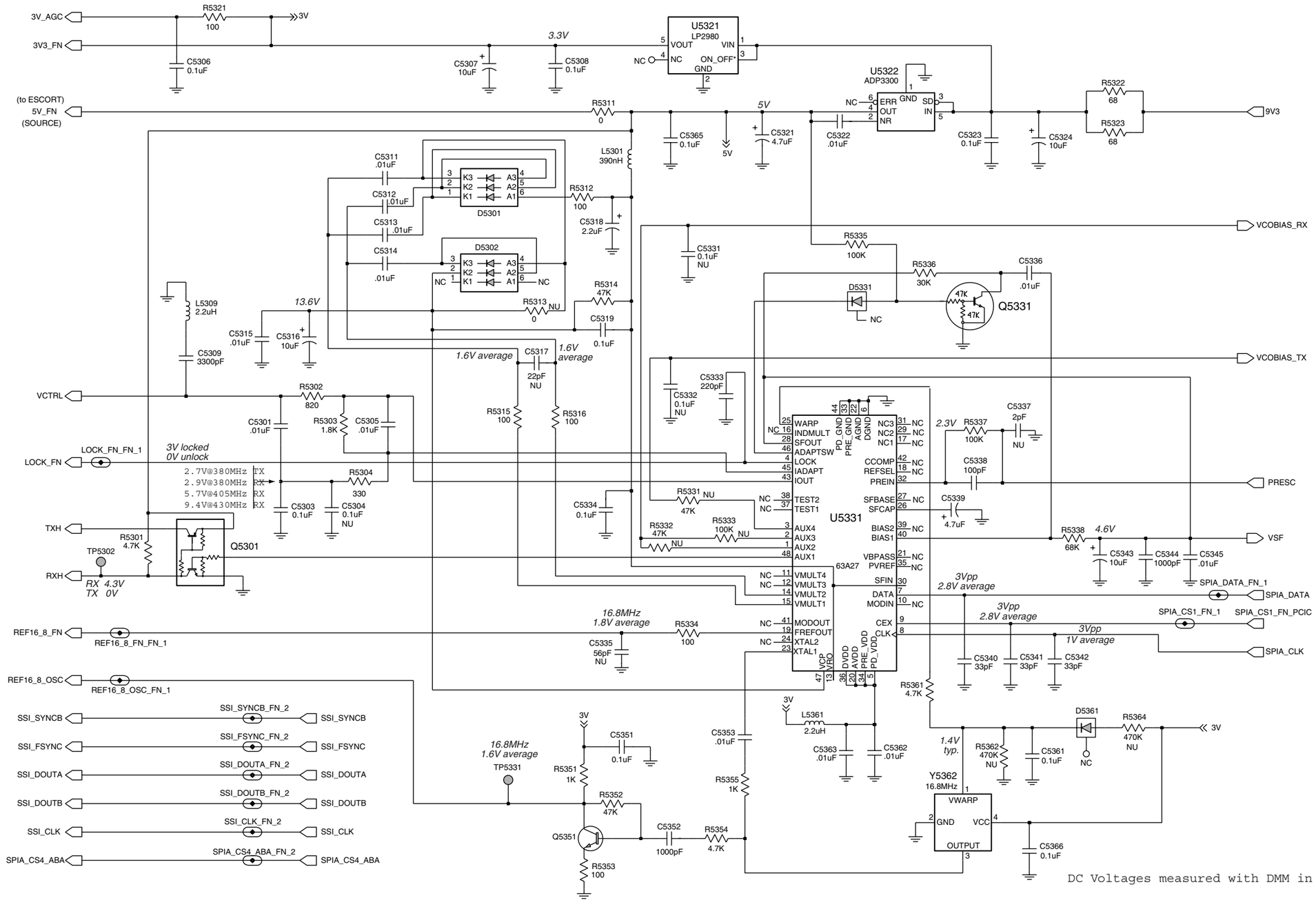
ZWG0130863-O

Main Board 8466519A01_O / RF_Front_End



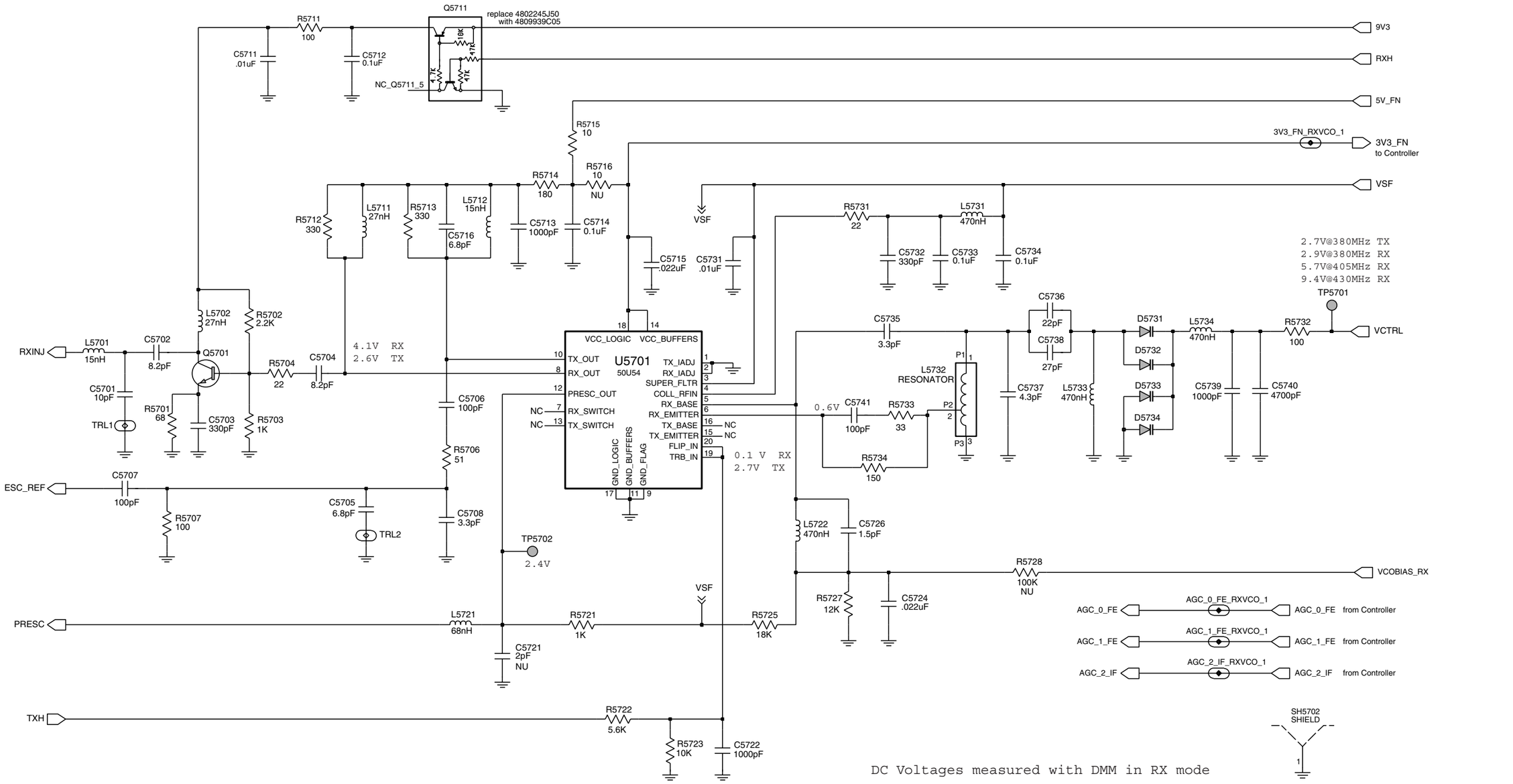
ZWG0130865-O

Main Board 8466519A01_O / RF_IF



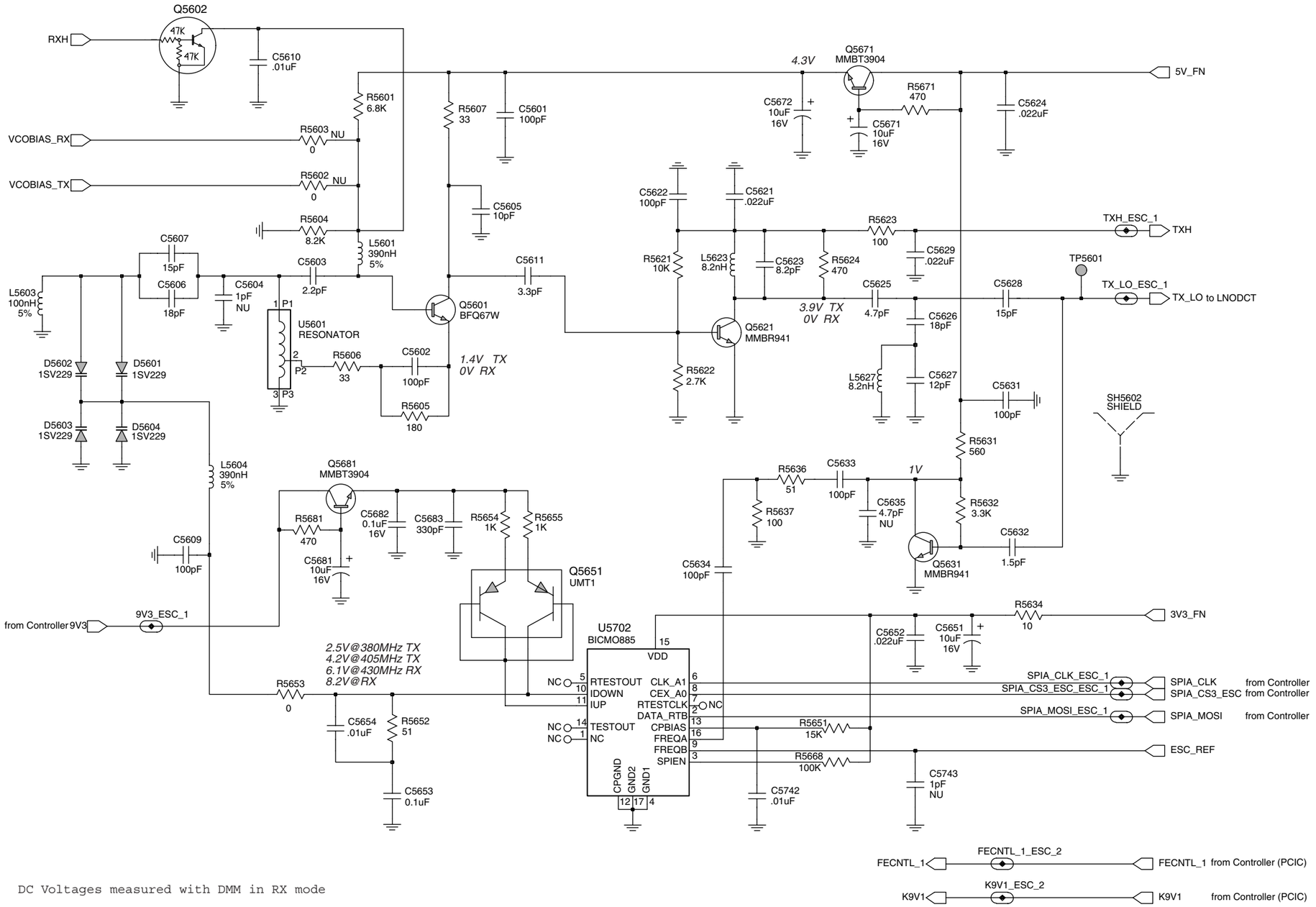
ZWG0130864-O

Main Board 8466519A01_O / RF_FRACN



ZWG0130866-O

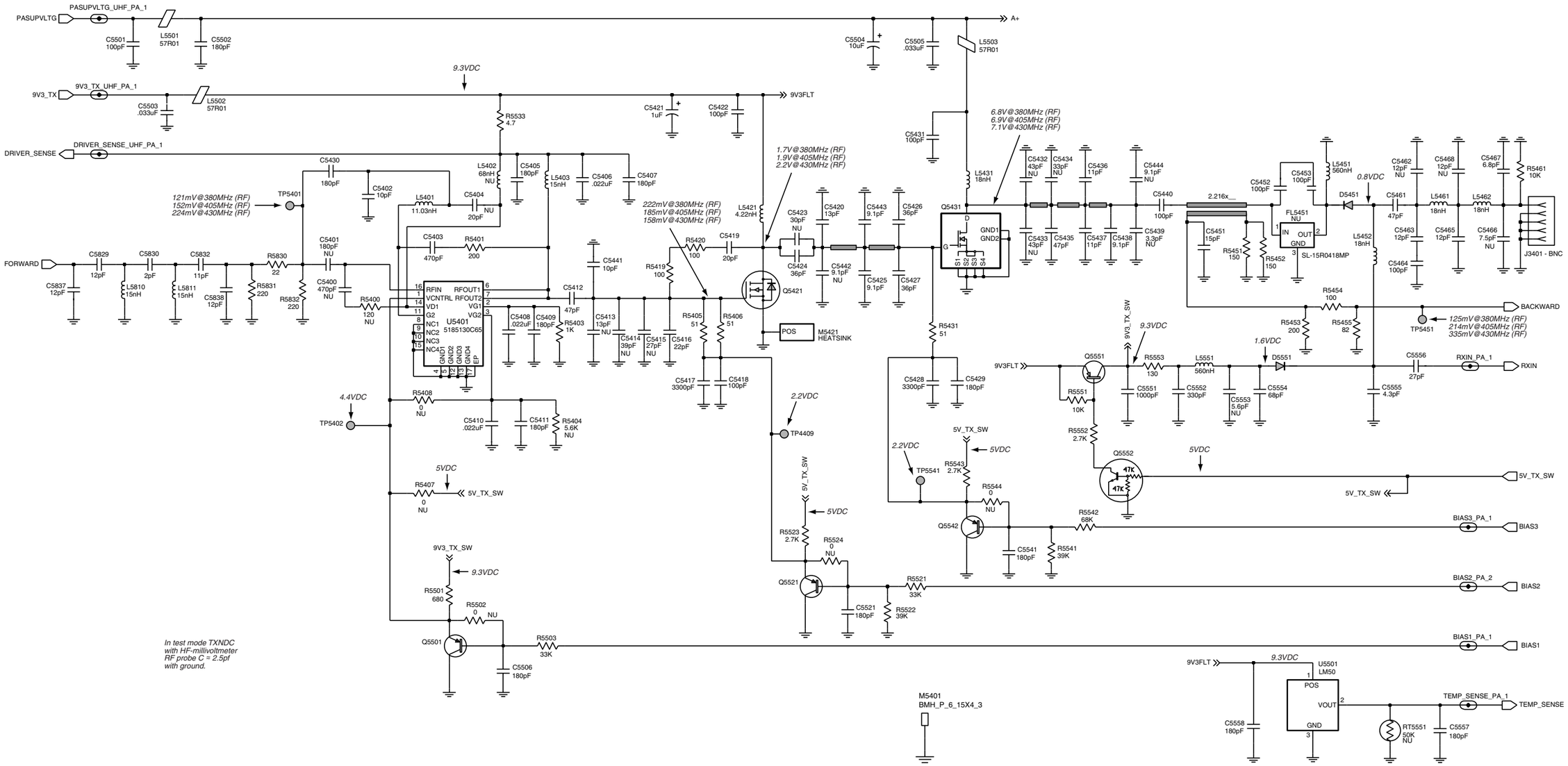
Main Board 8466519A01_O / RF_RX_VCO



DC Voltages measured with DMM in RX mode

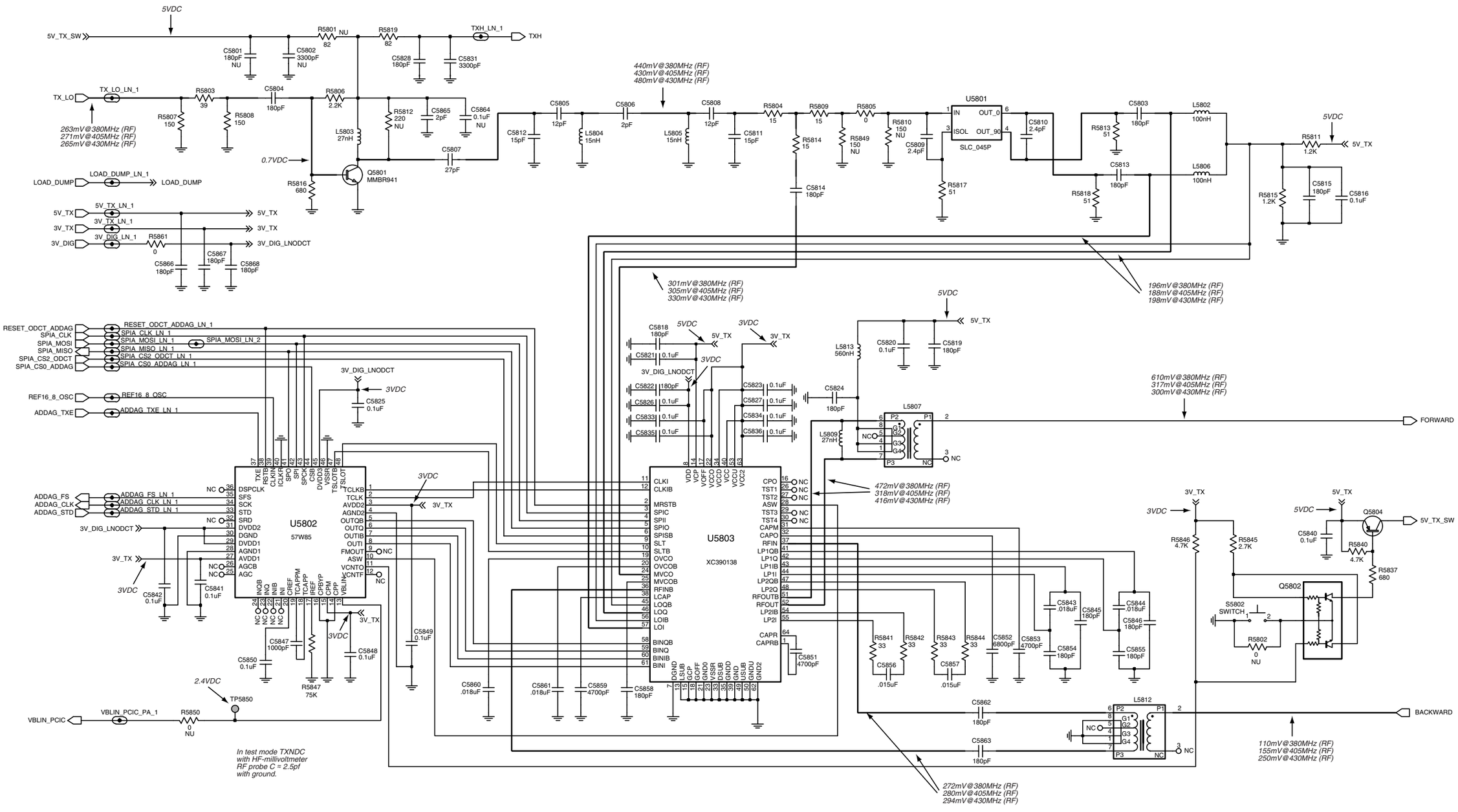
ZWG0130867-O

Main Board 8466519A01_O / RF_TX_VCO



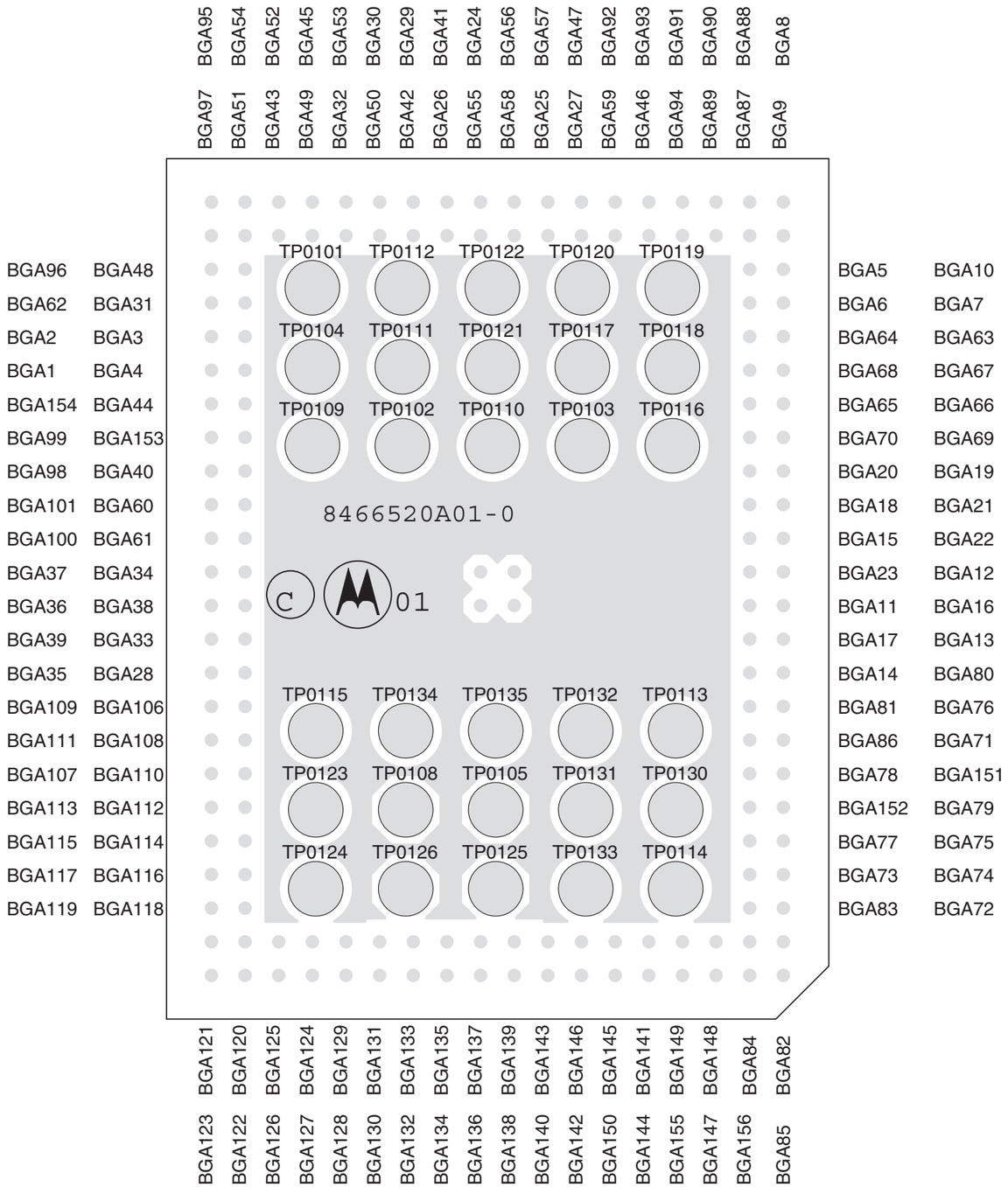
ZWG0130869-O

Main Board 8466519A01_O / POWER_AMPLIFIER__PA

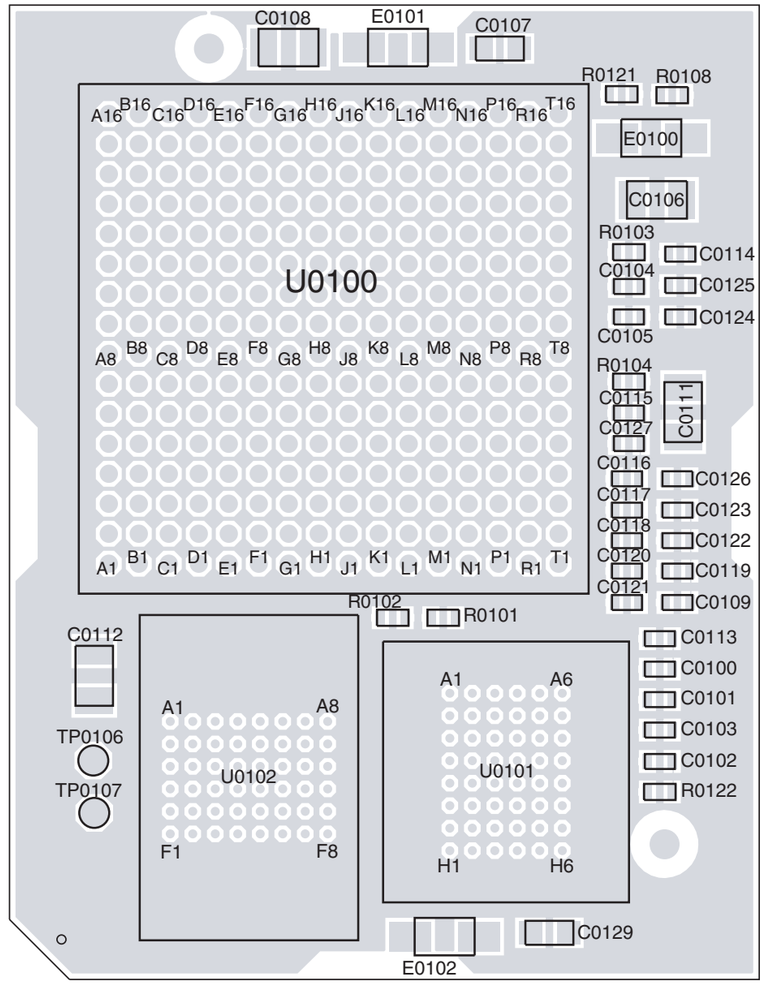


ZWG0130868-O

Main Board 8466519A01_O / POWER_AMPLIFIER_LNODCT

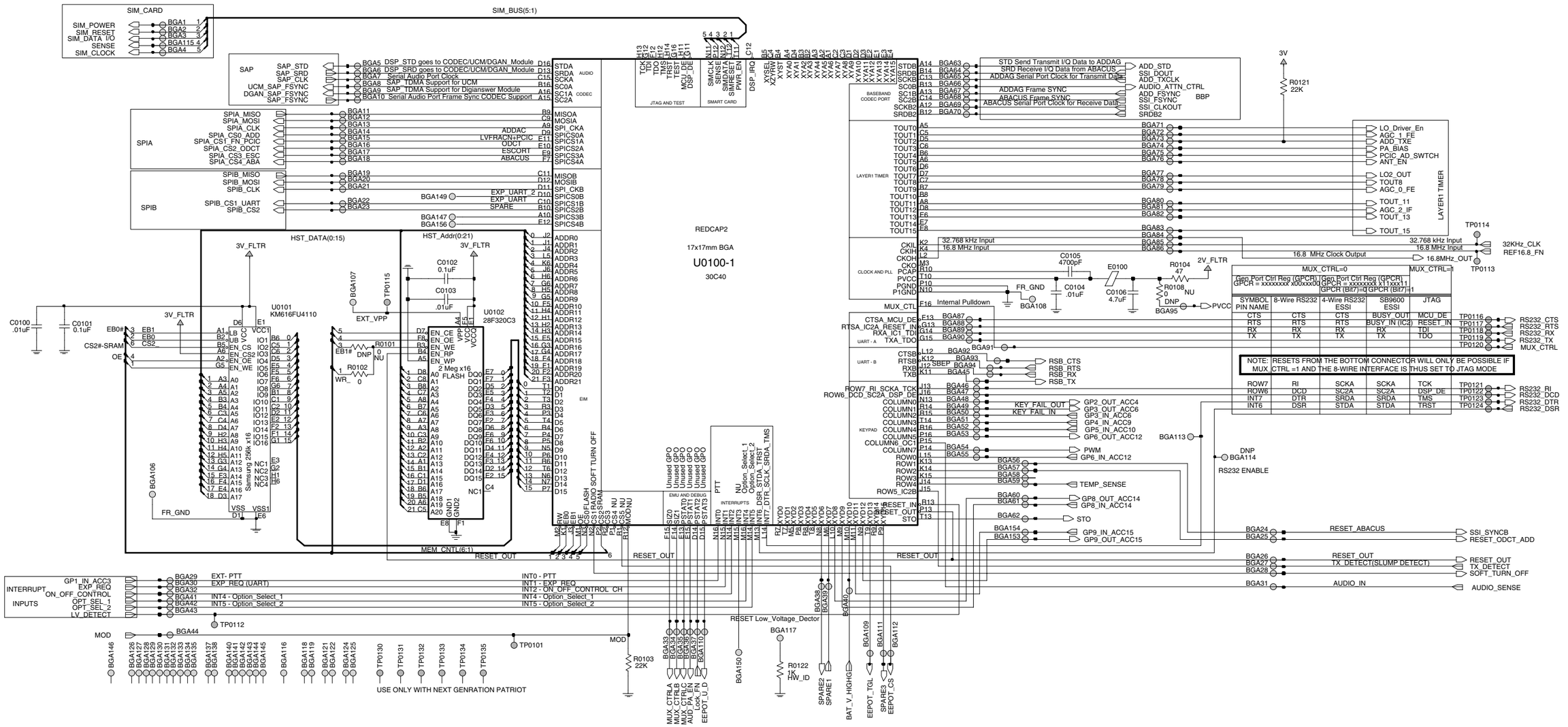


ZWG0130876-O



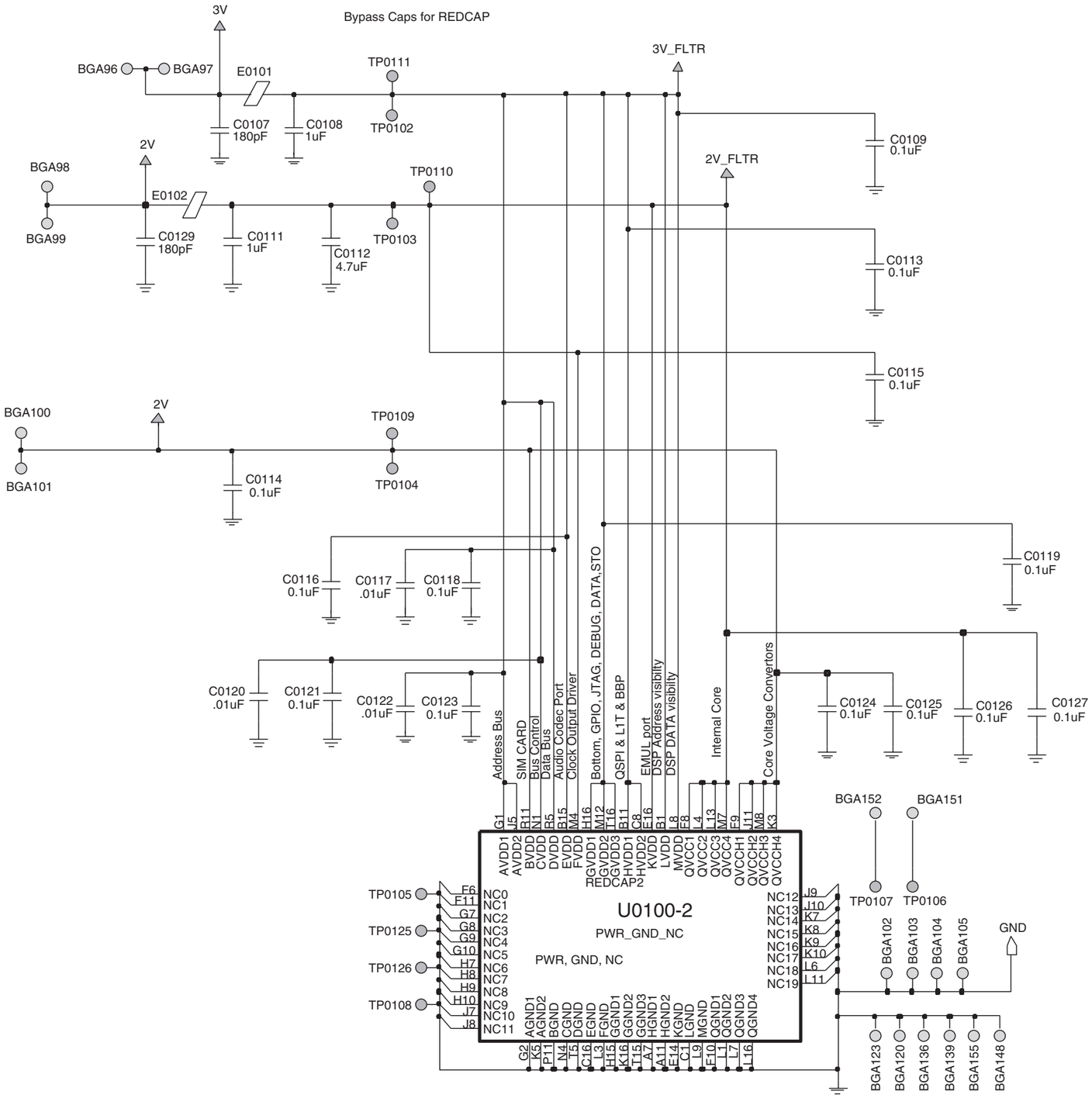
ZWG0130875-O

PCB / HDI_Controller 8466520A01_O / BOTTOM & TOP SIDE



ZWG0130877-O

HDI_Controller 8466520A01_O (Sheet 1)



ZWG0130878-O

HDI_Controller 8466520A01_O (Sheet 2)

PARTS LISTS

RF Parts on the Mainboard

Reference	Motorola PN	Value
C5001	2113741F37	3.3nF 50V
C5002	2113743E20	100nF 16V
C5003	2113741F49	10nF 50V
C5004	2113741F37	3.3nF 50V
C5005	2113741F13	330pF 50V
C5006	2113741F49	10nF 50V
C5007	2113740F39	33pF 5% 50V
C5008	2113741F49	10nF 50V
C5009	2113741F49	10nF 50V
C5011	2113740F37	27pF 5% 50V
C5012	2113740F29	12pF 5% 50V
C5013	2113740F43	47pF 5% 50V
C5014	2113740F07	1.5pF 5% 50V
C5015	2113740F07	1.5pF 5% 50V
C5016	2113740F07	1.5pF 5% 50V
C5017	2113740F07	1.5pF 5% 50V
C5018	2113740F51	100pF 5% 50V
C5019	2113743E20	100nF 16V
C5020	2113743E20	100nF 16V
C5021	2113741F49	10nF 50V
C5022	2113740F45	56pF 5% 50V
C5023	2113740F49	82pF 5% 50V
C5024	2113740F45	56pF 5% 50V
C5025	2113743E20	100nF 16V
C5026	2113740F49	82pF 5% 50V
C5027	2113740F29	12pF 5% 50V
C5031	2113741F13	330pF 50V
C5032	2113740F26	9.1pF 5% 50V
C5033	2113741F25	1nF 50V
C5034	2113740F51	100pF 5% 50V
C5041	2113740F11	2.2pF 5% 50V
C5042	2113740F07	1.5pF 5% 50V
C5043	2113740F07	1.5pF 5% 50V
C5044	2113740F13	2.7pF 5% 50V
C5045	2113740F23	6.8pF 5% 50V
C5046	2113740F03	1pF 5% 50V
C5047	2113740F23	6.8pF 5% 50V
C5048	2113740F11	2.2pF 5% 50V
C5051	2113741F25	1nF 50V
C5052	2113740F45	56pF 5% 50V
C5053	2113740F49	82pF 5% 50V
C5054	2113740F45	56pF 5% 50V
C5061	2113740F35	22pF 5% 50V
C5071	2113740F37	27pF 5% 50V
C5072	2113740F29	12pF 5% 50V
C5101	2113740F63	330pF 5% 50V
C5103	2113741F49	10nF 50V
C5104	2113743E20	100nF 16V
C5111	2113743E20	100nF 16V
C5122	2113741F25	1nF 50V
C5124	2113741F49	10nF 50V
C5125	2113740F26	9.1pF 5%
C5126	2113740F31	15pF 5%
C5127	2113740F63	330pF 5%
C5128	2113743E20	100nF 16V
C5129	2113741F49	10nF 50V
C5130	2113743E20	100nF 16V
C5131	2113741F49	10nF 50V
C5132	2113743E20	100nF 16V
C5133	2113743E20	100nF 16V
C5134	2113743E20	100nF 16V
C5135	2113743E20	100nF 16V
C5136	2113743E20	100nF 16V
C5137	2113741F49	10nF 50V
C5138	2113743E20	100nF 16V
C5139	2113743E20	100nF 16V
C5142	2113741F41	4.7nF 50V
C5143	2113741F41	4.7nF 50V
C5144	2113743E20	100nF 16V
C5145	2311049A57	TANT CP 10uF
C5146	2113743E20	100nF 16V
C5147	2113743E20	100nF 16V
C5148	2113743E20	100nF 16V
C5150	2113743E20	100nF 16V
C5151	2113741F49	10nF 50V
C5152	2113743E20	100nF 16V
C5153	2113743E20	100nF 16V
C5154	2113743E20	100nF 16V
C5155	2113743E20	100nF 16V
C5156	2113741F49	10nF 50V
C5157	2113741F49	10nF 50V
C5158	2113741F25	1nF 50V
C5159	2113741F49	10nF 50V
C5160	2113741F25	1nF 50V
C5161	2113740F39	33pF 5% 50V
C5162	2113740F39	33pF 5% 50V
C5163	2113740F39	33pF 5% 50V
C5166	2311049A07	TANT CP 1uF 10% 16V
C5167	2311049A56	TANT CP 4.7uF 20% 10V
C5168	2311049A56	TANT CP 4.7uF 20% 10V
C5169	2311049A07	TANT CP 1uF 10% 16V
C5171	2113740F31	15pF 5% 50V
C5172	2113743E20	100nF 16V
C5173	2113740F31	15pF 5% 50V
C5174	2113740F31	15pF 5% 50V
C5175	2113740F31	15pF 5% 50V
C5177	2113740F31	15pF 5% 50V
C5178	2113741F49	10nF 50V
C5179	2113741F49	10nF 50V
C5180	2113740F47	68pF 5% 50V
C5181	2113740F31	15pF 5% 50V
C5182	2113740F35	22pF 5% 50V
C5183	2113740F35	22pF 5% 50V
C5184	2113741F49	10nF 50V
C5185	2113743E20	100nF 16V
C5186	2113741F25	1nF 50V
C5187	2113740F27	10pF 5% 50V
C5188	2113743A23	220nF 16V
C5189	2311049A09	TANT CP 2.2uF 10% 20V
C5190	2113740F51	100pF 5% 50V
C5191	2113740F51	100pF 5% 50V
C5192	2113740F55	150pF 5% 50V
C5193	2113740F51	100pF 5% 50V
C5194	2113741F49	10nF 50V
C5195	2113743E20	100nF 16V
C5197	2113740F31	15pF 5% 50V
C5198	2113743A23	220nF 16V
C5199	2311049A09	TANT CP 2.2uF 10% 20V
C5202	2113740F23	6.8pF 5% 50V
C5203	2113740F19	4.7pF 5% 50V
C5205	2113740F63	330pF 5% 50V
C5206	2113740F63	330pF 5% 50V
C5208	2113743E20	100nF 16V
C5209	2113743E20	100nF 16V
C5210	2113740F63	330pF 5% 50V
C5211	2113740F63	330pF 5% 50V
C5212	2113741F25	1nF 50V
C5213	2113741F25	1nF 50V
C5214	2113741F49	10nF 50V
C5215	2113741F49	10nF 50V
C5216	2113741F49	10nF 50V
C5218	2113740F63	330pF 5% 50V
C5219	2113741F25	1nF 50V
C5301	2113741F49	10nF 50V
C5303	0804533C37	METAL/POLY FILM 0.1
C5305	2113741F49	10nF 50V
C5306	2113743E20	100nF 16V
C5307	2311049A57	TANT CP 10uF 10% 16V
C5308	2113743E20	100nF 16V
C5309	2113741F37	3.3nF 50V
C5311	2113741F49	10nF 50V
C5312	2113741F49	10nF 50V
C5313	2113741F49	10nF 50V
C5314	2113741F49	10nF 50V
C5315	2113741F49	10nF 50V
C5316	2311049A57	TANT CP 10uF 10% 16V
C5318	2311049A40	TANT CP 2.2uF 10% 10V
C5319	2113743E20	100nF 16V
C5321	2311049A56	TANT CP 4.7uF 20% 10V
C5322	2113741F49	10nF 50V
C5323	2113743E20	100nF 16V
C5324	2311049A57	TANT CP 10uF 10% 16V
C5333	2113740F59	220pF 5% 50V
C5334	2113743E20	100nF 16V

Reference	Motorola PN	Value
C5336	2113741F49	10nF 50V
C5338	2113740F51	100pF 5% 50V
C5339	2311049A56	TANT CP 4.7uF 20% 10V
C5340	2113740F39	33pF 5% 50V
C5341	2113740F39	33pF 5% 50V
C5342	2113740F39	33pF 5% 50V
C5343	2311049A57	TANT CP 10uF 10% 16V
C5344	2113741F25	1nF 50V
C5345	2113741F49	10nF 50V
C5351	2113743E20	100nF 16V
C5352	2113741F25	1nF 50V
C5353	2113741F49	10nF 50V
C5361	2113743E20	100nF 16V
C5362	2113741F49	10nF 50V
C5363	2113741F49	10nF 50V
C5365	2113743E20	100nF 16V
C5366	2113743E20	100nF 16V
C5402	2113740F27	10pF 5% 50V
C5403	2113740F67	470pF 5% 50V
C5405	2113740F57	180pF 5% 50V
C5406	2113743E07	22nF 16V
C5407	2113740F57	180pF 5% 50V
C5408	2113743E07	22nF 16V
C5409	2113740F57	180pF 5% 50V
C5410	2113743E07	22nF 16V
C5411	2113740F57	180pF 5% 50V
C5412	2113740F43	47pF 5% 50V
C5416	2113740F35	22pF 5% 50V
C5417	2113741F37	3.3nF 50V
C5418	2113740F51	100pF 5% 50V
C5419	2113740F34	20pF 5% 50V
C5420	2113740F30	13pF 5% 50V
C5421	2311049A08	TANT CP 1uF 10% 35V
C5422	2113740A55	100pF 5% 50V
C5424	2113740F40	36pF 5% 50V
C5425	2113740F26	9.1pF 5% 50V
C5426	2113740F40	36pF 5% 50V
C5427	2113740F40	36pF 5% 50V
C5428	2113741F37	3.3nF 50V

Reference	Motorola PN	Value
C5429	2113740F57	180pF 5% 50V
C5430	2113740F57	180pF 5% 50V
C5431	2111078B42	HQ 100pF 5%
C5435	2111078B34	HQ 47pF 5%
C5436	2111078B14	RF 11 5
C5437	2111078B14	RF 11 5
C5438	2111078B12	HQ 9.1pF 5%
C5440	2111078B42	HQ 100pF 5%
C5441	2113740F27	10pF 5% 50V
C5443	2113740F26	9.1pF 5% 50V
C5451	2113740F31	15pF 5% 50V
C5452	2111078B42	HQ 100pF 5%
C5453	2111078B42	HQ 100pF 5%
C5461	2111078B34	HQ 47pF 5%
C5463	2111078B15	HQ 12pF 5%
C5464	2111078B42	HQ 100pF 5%
C5465	2111078B15	HQ 12pF 5%
C5467	2111078B09	HQ 6.8pF 5%
C5501	2113740F51	100pF 5% 50V
C5502	2113740F57	180pF 5% 50V
C5503	2113741A57	33nF 50V
C5504	2311049A45	TANT CP 10uF 10% 35V
C5505	2113741A57	33nF 50V
C5506	2113740F57	180pF 5% 50V
C5521	2113740F57	180pF 5% 50V
C5541	2113740F57	180pF 5% 50V
C5551	2113741F25	1nF 50V
C5552	2113740F63	330pF 5% 50V
C5554	2111078B38	HQ 68pF 5%
C5555	2113740F18	4.3pF 5% 50V
C5556	2113740F37	27pF 5% 50V
C5557	2113740F57	180pF 5% 50V
C5558	2113740F57	180pF 5% 50V
C5601	2113740F51	100pF 5% 50V
C5602	2113740F51	100pF 5% 50V
C5603	2113740F11	2.2pF 5% 50V
C5605	2113740F27	10pF 5% 50V
C5606	2113740F33	18pF 5% 50V
C5607	2113740F31	15pF 5% 50V
C5609	2113740F51	100pF 5% 50V

Reference	Motorola PN	Value
C5610	2113741F49	10nF 50V
C5611	2113740F15	3.3pF 5% 50V
C5621	2113743E07	22nF 16V
C5622	2113740F51	100pF 5% 50V
C5623	2113740F25	8.2pF 5% 50V
C5624	2113743E07	22nF 16V
C5625	2113740F19	4.7pF 5%
C5626	2113740F33	18pF 5% 50V
C5627	2113740F29	12pF 5% 50V
C5628	2113740F31	15pF 5% 50V
C5629	2113743E07	22nF 16V
C5631	2113740F51	100pF 5% 50V
C5632	2113740F07	1.5pF 5% 50V
C5633	2113740F51	100pF 5% 50V
C5634	2113740F51	100pF 5% 50V
C5651	2311049A57	TANT CP 10uF 10% 16V
C5652	2113743E07	22nF 16V
C5653	2113743E20	100nF 16V
C5654	2113741F49	10nF 50V
C5671	2311049A57	TANT CP 10uF 10% 16V
C5672	2311049A57	TANT CP 10uF 10% 16V
C5681	2311049A57	TANT CP 10uF 10% 16V
C5682	2113743E20	100nF 16V
C5683	2113740F63	330pF 5% 50V
C5701	2113740F27	10pF 5% 50V
C5702	2113740F25	8.2pF 5% 50V
C5703	2113741F13	330pF 50V
C5704	2113740F25	8.2pF 5% 50V
C5705	2113740F23	6.8pF 5% 50V
C5706	2113740F51	100pF 5% 50V
C5707	2113740F51	100pF 5% 50V
C5708	2113740F15	3.3pF 5% 50V
C5711	2113741F49	10nF 50V
C5712	2113743E20	100nF 16V
C5713	2113741F25	1nF 50V
C5714	2113743E20	100nF 16V
C5715	2113743E07	22nF 16V
C5716	2113740F23	6.8pF 5% 50V

Reference	Motorola PN	Value
C5722	2113741F25	1nF 50V
C5724	2113743E07	22nF 16V
C5726	2113740F07	1.5pF 5% 50V
C5731	2113741F49	10nF 50V
C5732	2113740F63	330pF 5% 50V
C5733	2113743E20	100nF 16V
C5734	2113743E20	100nF 16V
C5735	2113740F15	3.3pF 5% 50V
C5736	2113740F35	22pF 5% 50V
C5737	2113740F18	4.3pF 5% 50V
C5738	2113740F37	27pF 5% 50V
C5739	2113741F25	1nF 50V
C5740	2113741F41	4.7nF 50V
C5741	2113740F51	100pF 5% 50V
C5742	2113741F49	10nF 50V
C5803	2113740F57	180pF 5% 50V
C5804	2113740F57	180pF 5% 50V
C5805	2113740L20	12 PF 50V 2.0%
C5806	2113740L01	2.0PF+0.1PF
C5807	2113740F37	27pF 5% 50V
C5808	2113740F29	12pF 5% 50V
C5809	2113740L03	2.4PF +0.1PF
C5810	2113740L03	2.4PF +0.1PF
C5811	2113740F31	15pF 5% 50V
C5812	2113740F31	15pF 5% 50V
C5813	2113740F57	180pF 5% 50V
C5814	2113740F57	180pF 5% 50V
C5815	2113740F57	180pF 5% 50V
C5816	2113743E20	100nF 16V
C5818	2113740F57	180pF 5% 50V
C5819	2113740F57	180pF 5% 50V
C5820	2113743E20	100nF 16V
C5821	2113743E20	100nF 16V
C5822	2113740F57	180pF 5% 50V
C5823	2113743E20	100nF 16V
C5824	2113740F57	180pF 5% 50V
C5825	2113743E20	100nF 16V
C5826	2113743E20	100nF 16V
C5827	2113743E20	100nF 16V
C5828	2113740F57	180pF 5% 50V
C5829	2113740L20	12 PF 50V 2.0%

Reference	Motorola PN	Value
C5830	2113740L01	2.0PF+0.1PF
C5831	2113741F37	3.3nF 50V
C5832	2113740F28	11pF 5% 50V
C5833	2113743E20	100nF 16V
C5834	2113743E20	100nF 16V
C5835	2113743E20	100nF 16V
C5836	2113743E20	100nF 16V
C5837	2113740F29	12pF 5% 50V
C5838	2113740L20	12 PF 50V 2.0%
C5840	2113743E20	100nF 16V
C5841	2113743E20	100nF 16V
C5842	2113743E20	100nF 16V
C5843	2113743E05	18nF 16V
C5844	2113743E05	18nF 16V
C5845	2113740F57	180pF 5% 50V
C5846	2113740F57	180pF 5% 50V
C5847	2113741F25	1nF 50V
C5848	2113743E20	100nF 16V
C5849	2113743E20	100nF 16V
C5850	2113743E20	100nF 16V
C5851	2113741F41	4.7nF 50V
C5852	2113741F45	6.8nF 50V
C5853	2113741F41	4.7nF 50V
C5854	2113740F57	180pF 5% 50V
C5855	2113740F57	180pF 5% 50V
C5856	2113743E03	15nF 16V
C5857	2113743E03	15nF 16V
C5858	2113740F57	180pF 5% 50V
C5859	2113741F41	4.7nF 50V
C5860	2113743E05	18nF 16V
C5861	2113743E05	18nF 16V
C5862	2113740F57	180pF 5% 50V
C5863	2113740F57	180pF 5% 50V
C5865	2113740L01	2.0PF+0.1PF
C5866	2113740F57	180pF 5% 50V
C5867	2113740F57	180pF 5% 50V
C5868	2113740F57	180pF 5% 50V
D5001	4802233J09	TRIPLE SOT143-RH
D5011	4862824C01	VARACTOR CHIP
D5012	4862824C01	VARACTOR CHIP

Reference	Motorola PN	Value
D5013	4880154K03	DUAL SCHOTTKY SOT23
D5018	4880142L01	PIN
D5025	4880142L01	PIN
D5031	4880142L01	PIN
D5041	4862824C01	VARACTOR CHIP
D5042	4862824C01	VARACTOR CHIP
D5061	4886143B01	MIXER CROSSOVER
D5121	4880154K03	DUAL SCHOTTKY SOT23
D5180	4862824C01	VARACTOR CHIP
D5190	4805649Q13	VCTR 1SV228 SOT23
D5201	4880142L01	PIN
D5202	4880142L01	PIN
D5301	4802233J09	TRIPLE SOT143-RH
D5302	4802233J09	TRIPLE SOT143-RH
D5331	4813825A05	30V HOT CARRIER MMBD301L WM
D5361	4813825A05	30V HOT CARRIER MMBD301L WM
D5451	4802482J02	PIN MA/COM
D5551	4802482J02	PIN MA/COM
D5601	4862824C01	VARACTOR CHIP
D5602	4862824C01	VARACTOR CHIP
D5603	4862824C01	VARACTOR CHIP
D5604	4862824C01	VARACTOR CHIP
D5731	4862824C01	VARACTOR CHIP
D5732	4862824C01	VARACTOR CHIP
D5733	4862824C01	VARACTOR CHIP
D5734	4862824C01	VARACTOR CHIP
J5401	0986166B01	RF CONN BNC
L5002	2462587V32	CHIP IND 68NH 5%
L5011	2462587V27	CHIP IND 27 NH 5%
L5041	2462587V24	CHIP IND 15NH 5%
L5048	2462587V27	CHIP IND 27 NH 5%
L5061	2462587V38	IND CHIP 220 NH 5%
L5062	2462587V38	IND CHIP 220 NH 5%
L5071	2462587V24	CHIP IND 15NH 5%
L5126	2462587T23	COIL CHIP 470nH
L5180	2462587T19	IND CHIP 220NH 5% LOW PRO
L5190	2462587T30	COIL CHIP 1uH
L5201	2462587N60	CHIP IND 390 NH 5%

Reference	Motorola PN	Value
L5203	2462587Q44	COIL CHIP 560nH
L5204	2462587N57	CHIP IND 220 NH 5%
L5301	2462587Q42	IND CHIP 390nH 10%
L5309	2462587Q20	IND CHIP 2.2uH 20%
L5361	2462587Q20	IND CHIP 2.2uH 20%
L5401	2460591B04	SQUARE COIL 11.03nH 4T
L5403	2462587V24	CHIP IND 15NH 5%
L5421	2460591A01	SQUARE COIL 4.22nH 3T
L5431	2460591X01	COIL SQUARE
L5451	2462587N62	CHIP IND 560 NH 5%
L5452	2460591X01	COIL SQUARE
L5461	2460591X01	COIL SQUARE
L5462	2460591X01	COIL SQUARE
L5501	2484657R01	Ferrite Bead
L5502	2484657R01	Ferrite Bead
L5503	2484657R01	Ferrite Bead
L5551	2462587N62	CHIP IND 560 NH 5%
L5601	2462587N60	CHIP IND 390 NH 5%
L5603	2462587N53	CHIP IND 100 nH 5%
L5604	2462587N60	CHIP IND 390 NH 5%
L5623	2462587V22	CHIP IND 8.2NH 5%
L5627	2462587V22	CHIP IND 8.2NH 5%
L5701	2462587V24	CHIP IND 15NH 5%
L5702	2462587V27	CHIP IND 27 NH 5%
L5711	2462587V27	CHIP IND 27 NH 5%
L5712	2462587V24	CHIP IND 15NH 5%
L5721	2462587V32	CHIP IND 68NH 5%
L5722	2462587T23	COIL CHIP 470nH
L5731	2462587T23	COIL CHIP 470nH
L5732	2460593C02	COIL MULT LAYERED TAP TEF RESN PEN
L5733	2462587T23	COIL CHIP 470nH
L5734	2462587T23	COIL CHIP 470nH
L5802	2462587V34	IND CHIP 100nH 5%
L5803	2462587V27	CHIP IND 27 NH 5%
L5804	2462587V24	CHIP IND 15NH 5%
L5805	2462587V24	CHIP IND 15NH 5%
L5806	2462587V34	IND CHIP 100nH 5%
L5807	2580443L01	TRAFO BALUN

Reference	Motorola PN	Value
L5809	2462587V27	CHIP IND 27 NH 5%
L5810	2462587V24	CHIP IND 15NH 5%
L5811	2462587V24	CHIP IND 15NH 5%
L5812	2580443L01	TRAFO BALUN
L5813	2462587N62	CHIP IND 560 NH 5%
M5421	2686201B01	HEAT SPREADER
Q5001	4813824A17	PNP 40V .2A B=100-
Q5002	4880214G02	SLCN NPN M4G02 SOT23
Q5031	4813827A07	NPN SML SIG MMBR941
Q5101	4813827A07	NPN SML SIG MMBR941
Q5180	4813827A07	NPN SML SIG MMBR941
Q5190	4813827A07	NPN SML SIG MMBR941
Q5201	4813827A07	NPN SML SIG MMBR941
Q5202	4880214G02	SLCN NPN M4G02 SOT23
Q5301	4805921T02	DUAL ROHM FMC2 RH
Q5331	4880048M01	NPN DIG 47k/47k
Q5351	4813827A07	NPN SML SIG MMBR941
Q5421	4886212B01	LDMOS PWR TSTR MRF1518
Q5431	4886163B01	LDMOS PWR TSTR MRF1535
Q5501	4813824A17	PNP 40V .2A B=100-
Q5521	4813824A17	PNP 40V .2A B=100-
Q5542	4813824A17	PNP 40V .2A B=100-
Q5551	4813824A17	PNP 40V .2A B=100-
Q5552	4880048M01	NPN DIG 47k/47k
Q5601	4805218N63	RF TRANS SOT 323 BFQ67W
Q5602	4880048M01	NPN DIG 47k/47k
Q5621	4813827A07	NPN SML SIG MMBR941
Q5631	4813827A07	NPN SML SIG MMBR941
Q5651	4805723X02	DUAL PNP UMT1N ROHM
Q5671	4880214G02	SLCN NPN M4G02 SOT23

Reference	Motorola PN	Value
Q5681	4880214G02	SLCN NPN M4G02 SOT23
Q5701	4813827A07	NPN SML SIG MMBR941
Q5711	4809939C05	DUAL NPN/PNP UMC5N
Q5801	4813827A07	NPN SML SIG MMBR941
Q5802	4802245J54	UMG5N DIGITAL TSTR
Q5804	4813824A17	PNP 40V .2A B=100-
R5001	0662057A73	10k 1/16W 5%
R5002	0662057A57	2k2 1/16W 5%
R5003	0662057A69	6k8 1/16W 5%
R5004	0662057A49	1k 1/16W 5%
R5005	0662057A65	4k7 1/16W 5%
R5006	0662057A37	330 1/16W 5%
R5007	0662057A37	330 1/16W 5%
R5008	0662057A61	3k3 1/16W 5%
R5009	0662057A18	51 1/16W 5%
R5011	0662057A35	270 1/16W 5%
R5012	0662057A53	1k5 1/16W 5%
R5013	0662057A39	390 1/16W 5%
R5014	0662057A39	390 1/16W 5%
R5015	0662057A09	22 1/16W 5%
R5016	0662057A61	3k3 1/16W 5%
R5017	0662057A65	4k7 1/16W 5%
R5018	0662057A13	33 1/16W 5%
R5021	0662057A89	47k 1/16W 5%
R5022	0662057A97	100k 1/16W
R5025	0662057A65	4k7 1/16W 5%
R5026	0662057A49	1k 1/16W 5%
R5027	0662057C13	2R7 1/10W 5%
R5031	0662057A53	1k5 1/16W 5%
R5032	0662057A57	2k2 1/16W 5%
R5036	0662057A49	1k 1/16W 5%
R5041	0662057A35	270 1/16W 5%
R5042	0662057B47	0 1/16W
R5044	0662057B47	0 1/16W
R5051	0662057A97	100k 1/16W
R5063	0662057A18	51 1/16W 5%
R5100	0662057A18	51 1/16W 5%
R5101	0662057A75	12k 1/16W 5%
R5102	0662057A83	27k 1/16W 5%
R5104	0662057A47	820 1/16W 5%
R5105	0662057A09	22 1/16W 5%
R5106	0662057A17	47 1/16W 5%
R5121	0662057A63	3k9 1/16W 5%
R5122	0662057A39	390 1/16W 5%
R5125	0662057A18	51 1/16W 5%
R5131	0662057A01	10 1/16W 5%
R5132	0662057A01	10 1/16W 5%
R5133	0662057A01	10 1/16W 5%
R5134	0662057A01	10 1/16W 5%
R5140	0662057A09	22 1/16W 5%
R5141	0662057B47	0 1/16W
R5142	0662057B47	0 1/16W
R5144	0662057A57	2k2 1/16W 5%
R5145	0662057A27	120 1/16W 5%
R5146	0662057A25	100 1/16W 5%
R5149	0662057A80	20k 1/16W 5%
R5151	0662057A01	10 1/16W 5%
R5152	0662057A01	10 1/16W 5%
R5157	0662057A89	47k 1/16W 5%
R5158	0662057A35	270 1/16W 5%
R5159	0662057B47	0 1/16W
R5160	0662057A49	1k 1/16W
R5166	0662057A01	10 1/16W
R5176	0662057A85	33k 1/16W
R5177	0662057A41	470 1/16W
R5179	0662057A35	270 1/16W
R5180	0662057A61	3k3 1/16W
R5181	0662057A91	56K 1/16W
R5182	0662057B47	0 1/16W
R5183	0662057A25	100 1/16W 5%
R5184	0662057A51	1k2 1/16W 5%
R5185	0662057A09	22 1/16W 5%
R5186	0662057B05	200k 1/16W
R5187	0662057A35	270 1/16W 5%
R5189	0662057B47	0 1/16W
R5190	0662057A80	20k 1/16W 5%
R5191	0662057A85	33k 1/16W 5%
R5192	0662057A69	6k8 1/16W 5%
R5193	0662057A25	100 1/16W 5%
R5194	0662057A51	1k2 1/16W 5%
R5195	0662057A09	22 1/16W 5%
R5196	0662057B05	200k 1/16W
R5197	0662057A35	270 1/16W 5%
R5199	0662057B47	0 1/16W
R5204	0662057A75	12k 1/16W 5%
R5205	0662057A83	27k 1/16W 5%
R5206	0662057A65	4k7 1/16W 5%
R5207	0662057A49	1k 1/16W 5%
R5208	0662057A45	680 OHMS 5%
R5209	0662057A53	1k5 1/16W 5%
R5210	0662057A05	15 1/16W 5%
R5211	0662057A37	330 1/16W 5%
R5212	0662057A55	1k8 1/16W 5%
R5213	0662057A65	4k7 1/16W 5%
R5214	0662057A59	2k7 1/16W 5%
R5215	0662057A41	470 1/16W 5%
R5216	0662057A35	270 1/16W 5%
R5217	0662057A73	10k 1/16W 5%
R5218	0662057A18	51 1/16W 5%
R5219	0662057A59	2k7 1/16W 5%
R5220	0662057A57	2k2 1/16W 5%
R5221	0662057A37	330 1/16W 5%
R5301	0662057A65	4k7 1/16W 5%
R5302	0662057A47	820 1/16W 5%
R5303	0662057A55	1k8 1/16W 5%
R5304	0662057A37	330 1/16W 5%
R5311	0662057B47	0 1/16W
R5312	0662057A25	100 1/16W 5%
R5314	0662057A89	47k 1/16W 5%
R5315	0662057A25	100 1/16W 5%
R5316	0662057A25	100 1/16W 5%
R5321	0662057A25	100 1/16W 5%
R5322	0662057A21	68 1/16W 5%
R5323	0662057A21	68 1/16W 5%
R5334	0662057A25	100 1/16W 5%
R5335	0662057A97	100k 1/16W
R5336	0662057A84	30k 1/16W 5%
R5337	0662057A97	100k 1/16W
R5338	0662057A93	68k 1/16W 5%
R5351	0662057A49	1k 1/16W 5%
R5352	0662057A89	47k 1/16W 5%
R5353	0662057A25	100 1/16W 5%
R5354	0662057A65	4k7 1/16W 5%
R5355	0662057A49	1k 1/16W 5%
R5361	0662057A65	4k7 1/16W 5%
R5401	0662057A32	200 1/16W 5%
R5403	0662057A49	1k 1/16W 5%
R5405	0662057A18	51 1/16W 5%
R5406	0662057A18	51 1/16W 5%
R5419	0662057C51	100 1/10W 5%
R5420	0662057C51	100 1/10W 5%
R5431	0680194M18	51 1W 5%
R5451	0662057C55	150 0HMS 5%
R5452	0662057C55	150 0HMS 5%
R5453	0662057A32	200 1/16W 5%
R5454	0662057A25	100 1/16W 5%
R5455	0662057A23	82 1/16W 5%
R5461	0662057A73	10k 1/16W 5%
R5501	0662057A45	680 OHMS 5%
R5503	0662057A85	33k 1/16W 5%
R5521	0662057A85	33k 1/16W 5%
R5522	0662057A87	39k 1/16W 5%
R5523	0662057A59	2k7 1/16W 5%
R5533	0662057C19	4R7 1/10W 5%
R5541	0662057A87	39k 1/16W 5%
R5542	0662057A93	68k 1/16W 5%
R5543	0662057A59	2k7 1/16W 5%
R5551	0662057A73	10k 1/16W 5%
R5552	0662057A59	2k7 1/16W 5%
R5553	0683962T52	130 5-1
R5601	0662057A69	6k8 1/16W 5%
R5604	0662057A71	8k2 1/16W 5%
R5605	0662057A31	180 1/16W 5%
R5606	0662057A13	33 1/16W 5%
R5607	0662057A13	33 1/16W 5%
R5621	0662057A73	10k 1/16W 5%
R5622	0662057A59	2k7 1/16W 5%
R5623	0662057A25	100 1/16W 5%
R5624	0662057A41	470 1/16W 5%
R5631	0662057A43	560 1/16W 5%
R5632	0662057A61	3k3 1/16W 5%

Reference	Motorola PN	Value
R5634	0662057A01	10 1/16W 5%
R5636	0662057A18	51 1/16W 5%
R5637	0662057A25	100 1/16W 5%
R5651	0662057A77	15k 1/16W 5%
R5652	0662057A18	51 1/16W 5%
R5653	0662057B47	0 1/16W
R5654	0662057A49	1k 1/16W 5%
R5655	0662057A49	1k 1/16W 5%
R5668	0662057A97	100k 1/16W
R5671	0662057A41	470 1/16W 5%
R5681	0662057A41	470 1/16W 5%
R5701	0662057A21	68 1/16W 5%
R5702	0662057A57	2k2 1/16W 5%
R5703	0662057A49	1k 1/16W 5%
R5704	0662057A09	22 1/16W 5%
R5706	0662057A18	51 1/16W 5%
R5707	0662057A25	100 1/16W 5%
R5711	0662057A25	100 1/16W 5%
R5712	0662057A37	330 1/16W 5%
R5713	0662057A37	330 1/16W 5%
R5714	0662057A31	180 1/16W 5%
R5715	0662057A01	10 1/16W 5%
R5721	0662057A49	1k 1/16W 5%
R5722	0662057A67	5k6 1/16W 5%
R5723	0662057A73	10k 1/16W 5%
R5725	0662057A79	18k 1/16W 5%
R5727	0662057A75	12k 1/16W 5%
R5731	0662057A09	22 1/16W 5%
R5732	0662057A25	100 1/16W 5%
R5733	0662057A13	33 1/16W 5%
R5734	0662057A29	150 1/16W 5%
R5803	0662057A15	39 1/16W 5%
R5804	0662057A05	15 1/16W 5%
R5805	0662057B47	0 1/16W
R5806	0662057A57	2k2 1/16W 5%
R5807	0662057A29	150 1/16W 5%
R5808	0662057A29	150 1/16W 5%
R5809	0662057A05	15 1/16W 5%
R5811	0662057A51	1k2 1/16W 5%
R5813	0662057A18	51 1/16W 5%
R5814	0662057A05	15 1/16W 5%

Reference	Motorola PN	Value
R5815	0662057A51	1k2 1/16W 5%
R5816	0662057A45	680 OHMS 5%
R5817	0662057A18	51 1/16W 5%
R5818	0662057A18	51 1/16W 5%
R5819	0662057A23	82 1/16W 5%
R5830	0662057A09	22 1/16W 5%
R5831	0662057A33	220 1/16W 5%
R5832	0662057A33	220 1/16W 5%
R5837	0662057A45	680 OHMS 5%
R5840	0662057A65	4k7 1/16W 5%
R5841	0662057A13	33 1/16W 5%
R5842	0662057A13	33 1/16W 5%
R5843	0662057A13	33 1/16W 5%
R5844	0662057A13	33 1/16W 5%
R5845	0662057A59	2k7 1/16W 5%
R5846	0662057A65	4k7 1/16W 5%
R5847	0662057G07	75k OHMS 1%
R5861	0662057B47	0 1/16W
SH5602	2666500A01	SHIELD VCO
SH5702	2666500A01	SHIELD VCO
T5061	2508396X02	TRANSFORMER
T5062	2508397X02	TRANSFORMER
U5101	5185963A83	ABACUS III HP
U5102	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5103	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5201	9102867C12	73.35MHZ CRYSTAL FILTER
U5321	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5322	5105739X05	SOT 5V HI-PRECISION REGULAT
U5331	5185963A27	TESTED AT25016 48 PIN GFP
U5401	5185130C65	VHF/UHF/800 MHZ LDMOS DRIVER
U5501	5185963A15	TEMP SENSOR 1M5
U5601	2460593C01	COIL MULT LAYERED TAP TEF RESN
U5701	5105750U54	VCO BUFFER PKG DIE
U5702	5185368C18	ESCORT IC IN 16 PIN QFN

Reference	Motorola PN	Value
U5801	5880334L02	450MHZ 90 DEG SPLITTER
U5802	5105457W85	CC ADDAG IC
U5803	5108428S43	LOW NOISE ODCT
Y5362	5102845C17	16.8MHZ TCXO 3.0V 2PPM SMD

Controller Parts on the Mainboard

Reference	Motorola PN	Value
C0100	2113743E20	100nF 16V
C0101	2113743E20	100nF 16V
C0102	2113743E20	100nF 16V
C0103	2113743E20	100nF 16V
C0104	2113743E20	100nF 16V
C0105	2113743E20	100nF 16V
C0110	2113743N14	3.3 PF +-.25PF
C0113	2113743E07	22nF 16V
C0121	2113740F67	470pF 5% 50V
C0122	2113740F49	82pF 5% 50V
C0123	2113743E20	100nF 16V
C0124	2113740F49	82pF 5% 50V
C0125	2113740F49	82pF 5% 50V
C0127	2113740F67	470pF 5% 50V
C0128	2113740F67	470pF 5% 50V
C0129	2113740F67	470pF 5% 50V
C0130	2113743L09	470 PF 10%
C0131	2113740F67	470pF 5% 50V
C0132	2113740F67	470pF 5% 50V
C0133	2113740F67	470pF 5% 50V
C0134	2113740F67	470pF 5% 50V
C0135	2113740F67	470pF 5% 50V
C0136	2113743N30	15.0PF 5%
C0137	2113740F39	33pF 5% 50V
C0138	2113740F67	470pF 5% 50V
C0139	2113740F39	33pF 5% 50V
C0141	2113743E20	100nF 16V
C0142	2113740F67	470pF 5% 50V
C0150	2113740F67	470pF 5% 50V
C0151	2113740F67	470pF 5% 50V
C0152	2113740F67	470pF 5% 50V
C0154	2113740F67	470pF 5% 50V

Reference	Motorola PN	Value
C0155	2113741F33	2.2nF 50V
C0156	2311049A07	1uF 10% 16V
C0157	2113740F67	470pF 5% 50V
C0158	2113740F67	470pF 5% 50V
C0159	2113740F67	470pF 5% 50V
C0200	2311049A57	10uF 10% 16V
C0201	2311049A57	10uF 10% 16V
C0202	2113743E20	100nF 16V
C0203	2113743E20	100nF 16V
C0204	2113743E20	100nF 16V
C0205	2113743E20	100nF 16V
C0213	2113743E20	100nF 16V
C0220	2113743E20	100nF 16V
C0221	2311049A07	1uF 10% 16V
C0222	2113743E20	100nF 16V
C0223	2113743E20	100nF 16V
C0224	2311049A57	10uF 10% 16V
C0225	2113743E20	100nF 16V
C0226	2113743E20	100nF 16V
C0227	2113743E20	100nF 16V
C0230	2113741F37	3.3nF 50V
C0231	2311049C05	47uF 10% 16V
C0232	2113743E20	100nF 16V
C0233	2113741F25	1nF 50V
C0234	2113741F25	1nF 50V
C0235	2113741F25	1nF 50V
C0300	2113740F67	470pF 5% 50V
C0301	2113741F17	470pF 50V
C0302	2311049C05	47uF 10% 16V
C0303	2113743E20	100nF 16V
C0304	2113741F17	470pF 50V
C0305	2380090M24	LYT 10uF 50V 20%
C0306	2380090M24	LYT 10uF 50V 20%
C0307	2113741F49	10nF 50V
C0308	2311049A97	33 UF 16
C0309	2311049A97	33 UF 16
C0310	2311049C06	22uF 20% 35V
C0312	2113743E20	100nF 16V
C0313	2113743E20	100nF 16V
C0315	2311049A97	33 UF 16
C0316	2311049A57	10uF 10% 16V

Reference	Motorola PN	Value
C0317	2113740F67	470pF 5% 50V NP0
C0319	2113743E20	100nF 16V
C0321	2113743E20	100nF 16V
C0322	2311049A99	47uF 20% 10V
C0323	2311049A57	10uF 10% 16V
C0324	2311049A09	2.2uF 10% 20V
C0326	2113743E07	22nF 16V
C0327	2113743E07	22nF 16V
C0328	2311049A99	47uF 20% 10V
C0329	2311049A97	33 UF 16
C0331	2311049A99	47uF 20% 10V
C0333	2113743E20	100nF 16V
C0335	2113740F67	470pF 5% 50V
C0336	2113740F67	470pF 5% 50V
C0337	2113740F67	470pF 5% 50V
C0338	2113740F67	470pF 5% 50V
C0339	2113740F67	470pF 5% 50V
C0401	2113743E20	100nF 16V
C0402	2113740F49	82pF 5% 50V
C0403	2113740F49	82pF 5% 50V
C0404	2113741F49	10nF 50V
C0405	2113740F57	180pF 5% 50V
C0406	2113740F57	180pF 5% 50V
C0407	2113740F57	180pF 5% 50V
C0408	2113740F57	180pF 5% 50V
C0409	2311049A09	2.2uF 10% 20V
C0410	2113740F57	180pF 5% 50V
C0411	2113740F57	180pF 5% 50V
C0412	2113740F57	180pF 5% 50V
C0413	2113740F57	180pF 5% 50V
C0414	2113740F57	180pF 5% 50V
C0415	2113740F57	180pF 5% 50V
C0416	2113740F57	180pF 5% 50V
C0417	2113741F49	10nF 50V
C0418	2113740F49	82pF 5% 50V
C0419	2113740F49	82pF 5% 50V
C0502	2113743P01	180 PF 5% 16V
C0503	2113743N48	82.0 PF 5%
C0504	2113743P01	180 PF 5% 16V
C0505	2113743P01	180 PF 5% 16V
C0506	2113743P01	180 PF 5% 16V
C0507	2113743P01	180 PF 5% 16V
C0508	2113743P01	180 PF 5% 16V
C0510	2113743P01	180 PF 5% 16V
C0511	2113743P01	180 PF 5% 16V
C0513	2113743N48	82.0 PF 5%
C0515	2113743N48	82.0 PF 5%
C0517	2113743N48	82.0 PF 5%
C0519	2113743P01	180 PF 5% 16V
C0520	2113743P01	180 PF 5% 16V
C0521	2113743P01	180 PF 5% 16V
C0522	2113743N48	82.0 PF 5%
C0523	2113743N48	82.0 PF 5%
C0524	2113743N48	82.0 PF 5%
C0525	2113743N48	82.0 PF 5%
C0526	2113743P01	180 PF 5% 16V
C0527	2113743P01	180 PF 5% 16VC0528
C0529	2113743N48	82.0 PF 5%
C0530	2113743N48	82.0 PF 5%
C0531	2113743N48	82.0 PF 5%
C0532	2113743N48	82.0 PF 5%
C0533	2113743N48	82.0 PF 5%
C0534	2113743N48	82.0 PF 5%
C0535	2113743N48	82.0 PF 5%
C0536	2113743N48	82.0 PF 5%
C0537	2113743P01	180 PF 5% 16V
C0538	2113743P01	180 PF 5% 16V
C0540	2113743P01	180 PF 5% 16V
C0551	2113740F49	82pF 5% 50V
C0552	2113740F57	180pF 5% 50V
C0553	2113740F57	180pF 5% 50V
C0555	2113740F49	82pF 5% 50V
C0556	2113740F57	180pF 5% 50V
C0557	2113740F57	180pF 5% 50V
C0558	2113740F49	82pF 5% 50V
C0560	2113740F57	180pF 5% 50V
C0561	2113740F57	180pF 5% 50V
D0100	4813833C02	DUALSOT MMBD6100
D0102	4880154K03	DUAL SCHOTTKY
D0161	4813833C02	DUALSOT MMBD6100
D0300	4813833C02	DUALSOT MMBD6100
D0301	4813833C02	DUALSOT MMBD6100
D0303	4813833C02	DUAL SOT MMBD6100
D0304	4813833C02	DUAL SOT MMBD6100
E0100	GMZN4001A	MILAN HDI CONTROLLER MODULE
E0300	2484657R01	Ferrite Bead
F0301	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
F0302	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL0200	5105109Z38	3 VOLT LINEAR PCM CODEC FILTER
J0301	0986165B01	DC PWR CONN
J0400	0986105B01	CONN SMD 20 PIN
J0450	0905505Y04	CONN ZIF HORIZONTAL
J0500	0905505Y04	CONN ZIF HORIZONTAL
J0550	0902636Y02	CONN FLEX 12 PIN
J0570	0905505Y03	CONN ZIF 18PIN
L0231	2484657R01	Ferrite Bead
L0232	2484657R01	Ferrite Bead
M0301	3980502Z01	CONTACT,BAKKUPB+
M0302	3980501Z01	CONTACT, BAKKUPB-
Q0100	4880214G02	SLCN NPN M4G02
Q0150	4880048M01	NPN DIG 47k/47k
Q0151	4880214G02	SLCN NPN M4G02
Q0152	4880048M01	NPN DIG 47k/47k
Q0153	4880214G02	SLCN NPN M4G02
Q0156	4880048M01	NPN DIG 47k/47k
Q0157	4880048M01	NPN DIG 47k/47k
Q0158	4880048M01	NPN DIG 47k/47k
Q0159	4880052M01	NPN DRLNGTN MXTA
Q0160	4880048M01	NPN DIG 47k/47k
Q0161	4805921T02	DUAL ROHM FMC2 RH
Q0200	4880048M01	NPN DIG 47k/47k
Q0201	4802245J54	UMG5N DIGITALTSTR
Q0202	4880048M01	NPN DIG 47k/47k
Q0203	4880048M01	NPN DIG 47k/47k
Q0300	4880214G02	SLCN NPN M4G02 SOT23
Q0301	4805921T02	DUAL ROHM FMC2 RH
Q0302	4880214G02	SLCN NPN M4G02
Q0303	4880048M01	NPN DIG 47k/47k
Q0305	4880214G02	SLCN NPN M4G02
R0100	0662057A89	47k 1/16W 5%
R0103	0662057A01	10 1/16W 5%
R0104	0662057A01	10 1/16W 5%
R0105	0662057A01	10 1/16W 5%
R0106	0662057A89	47k 1/16W 5%
R0108	0662057A89	47k 1/16W 5%
R0109	0662057A01	10 1/16W 5%
R0111	0662057A01	10 1/16W 5%
R0113	0662057A73	10k 1/16W 5%
R0115	0662057A94	75k 1/16W 5%
R0116	0662057A73	10k 1/16W 5%
R0117	0662057A84	30k 1/16W 5%
R0118	0662057A77	15k 1/16W 5%
R0119	0662057A73	10k 1/16W 5%
R0120	0662057A65	4k7 1/16W 5%
R0121	0662057B47	0 1/16W
R0125	0662057A65	4k7 1/16W
R0128	0662057A49	1k 1/16W 5%
R0132	0662057A45	680 OHMS 5%
R0133	0662057A89	47k 1/16W 5%
R0134	0662057A45	680 OHMS 5%
R0136	0662057A89	47k 1/16W 5%
R0150	0662057A89	47k 1/16W 5%
R0151	0662057A65	4k7 1/16W 5%
R0152	0662057A73	10k 1/16W 5%
R0153	0662057A89	47k 1/16W 5%
R0154	0662057A65	4k7 1/16W 5%
R0155	0662057A73	10k 1/16W 5%
R0156	0662057A89	47k 1/16W 5%
R0159	0662057A89	47k 1/16W 5%
R0160	0662057A65	4k7 1/16W 5%
R0161	0662057A89	47k 1/16W 5%
R0162	0662057A89	47k 1/16W 5%
R0163	0662057A89	47k 1/16W 5%
R0165	0662057A65	4k7 1/16W 5%
R0166	0662057A73	10k 1/16W 5%
R0167	0662057A89	47k 1/16W 5%
R0168	0662057A73	10k 1/16W 5%

Reference	Motorola PN	Value
R0170	0662057A73	10k 1/16W 5%
R0171	0662057A73	10k 1/16W 5%
R0200	0662057A43	560 1/16W 5%
R0201	0662057A25	100 1/16W 5%
R0202	0662057A25	100 1/16W 5%
R0203	0662057A43	560 1/16W 5%
R0204	0662057B08	270k 1/16W 5%
R0205	0662057B08	270k 1/16W 5%
R0206	0662057A89	47k 1/16W 5%
R0207	0662057A89	47k 1/16W 5%
R0208	0662057A89	47k 1/16W 5%
R0218	0662057A73	10k 1/16W 5%
R0220	0662057A49	1k 1/16W 5%
R0221	0662057A25	100 1/16W 5%
R0222	0662057A73	10k 1/16W 5%
R0223	0662057A65	4k7 1/16W 5%
R0224	0662057A77	15k 1/16W 5%
R0225	0662057A49	1k 1/16W 5%
R0228	0662057A73	10k 1/16W 5%
R0237	0662057A77	15k 1/16W 5%
R0238	0662057A83	27k 1/16W 5%
R0239	0662057A73	10k 1/16W 5%
R0240	0662057A97	100k 1/16W
R0241	0662057B47	0 1/16W
R0242	0662057A99	120K OHM 5%
R0243	0662057A82	24K 1/16W 5%
R0244	0662057A73	10k 1/16W 5%
R0245	0662057A53	1k5 1/16W 5%
R0300	0662057A49	1k 1/16W 5%
R0301	0662057B02	150k 1/16W
R0302	0662057A73	10k 1/16W 5%
R0303	0662057A91	56K 1/16W 5%
R0304	0662057A65	4k7 1/16W 5%
R0305	0660076E70	FILM 7500 1 1
R0306	0660076E51	FILM 1200 1 1
R0307	0660076E70	FILM 7500 1 1
R0308	0660076E51	FILM 1200 1 1
R0309	0662057A73	10k 1/16W 5%
R0310	0662057A89	47k 1/16W 5%
R0311	0662057A53	1k5 1/16W 5%
R0312	0662057A84	30k 1/16W 5%

Reference	Motorola PN	Value
R0313	0662057A73	10k 1/16W 5%
R0314	0662057A49	1k 1/16W 5%
R0317	0662057A85	33k 1/16W 5%
R0318	0662057A87	39k 1/16W 5%
R0319	0662057A83	27k 1/16W 5%
R0320	0662057A89	47k 1/16W 5%
R0400	0662057A89	47k 1/16W 5%
R0402	0662057A65	4k7 1/16W 5%
R0403	0662057A73	10k 1/16W 5%
R0404	0662057A65	4k7 1/16W 5%
R0405	0662057A51	1k2 1/16W 5%
R0406	0662057A73	10k 1/16W 5%
R0407	0662057A33	220 1/16W 5%
R0408	0662057A33	220 1/16W 5%
R0409	0662057A43	560 1/16W 5%
R0410	0662057A97	100k 1/16W
R0411	0662057A33	220 1/16W 5%
R0412	0662057A33	220 1/16W 5%
R0413	0662057A73	10k 1/16W 5%
R0505	0662057A09	22 1/16W 5%
R0527	0662057A65	4k7 1/16W 5%
R0557	0662057A01	10 1/16W 5%
R0559	0662057A01	10 1/16W 5%
R0562	0662057B47	0 1/16W
R0571	0662057A89	47k 1/16W 5%
U0100	5109841C40	SER RTC/CALDS1306
U0102	5113820A02	DUAL SING SPLY LO PWR
U0103	5113820A02	DUAL SING SPLY LO PWR
U0104	5187423J01	LV UHS ANALOG SW 2CH
U0135	0662057B47	0 1/16W
U0150	5185765B28	POWER CONTROL PASS
U0201	5184704M60	IC-CMOS 04M60 ANA-LOS
U0202	5105750U28	SNGL ANALOG SWITCH
U0203	5185963A52	DIG POT LIN X9315
U0204	5185963A52	DIG POT LIN X9315
U0205	5109699X01	AUDIO PA TDA1519C
U0206	5183222M49	QUAD OPAMP

Reference	Motorola PN	Value
U0300	5183308X01	ADJ VLTG REG LM2941
U0301	5183308X01	ADJ VLTG REG LM2941
U0302	5183308X01	ADJ VLTG REG LM2941
U0303	5113816A07	REG 5V POS 500MA MC78M05
U0304	5105469E65	VLTG REGLTR LP2951C
U0305	5105469E65	VLTG REGLTR LP2951C
U0306	5105469E65	VLTG REGLTR LP2951C
U0307	5113816A62	VLTG REG MC33275
VR0101	4813830A14	5.1V 5% 225mW
VR0163	4813830A15	5.6V 5% 225mW
VR0300	4813832C77	TRANS SUP. 24V HIGH PWR
VR0301	4880140L15	SOT ZENER 10V TA
VR0401	4805656W09	ZENER QUAD MMQA20VT1
VR0402	4805656W09	ZENER QUAD MMQA20VT1
VR0403	4805656W09	ZENER QUAD MMQA20VT1
VR0404	4813830A15	5.6V 5% 225mW
VR0405	4813830A15	5.6V 5% 225mW
VR0406	4813830A40	SOC23 AUTO SDN
VR0407	4813830A40	SOC23 AUTO SDN
VR0408	4813830A15	5.6V 5% 225mW
VR0409	4813830A15	5.6V 5% 225mW
Y0101	4809995L05	XTAL QUARTZ 32.768KHZ

Parts on the HDI Controller Board

Reference Symbol	Motorola PN	Value
C0100	2113743L41	.01uF
C0101	2113743M24	0.1uF
C0102	2113743M24	0.1uF
C0103	2113743L41	.01uF
C0104	2113743L41	.01uF
C0105	2113743L33	4700pF
C0106	2113928C04	4.7uF

Reference Symbol	Motorola PN	Value
C0107	2113740F57	180pF
C0108	2113928E01	1uF
C0109	2113743M24	0.1uF
C0111	2113928E01	1uF
C0112	2113928C04	4.7uF
C0113	2113743M24	0.1uF
C0114	2113743M24	0.1uF
C0115	2113743M24	0.1uF
C0116	2113743M24	0.1uF
C0117	2113743L41	.01uF
C0118	2113743M24	0.1uF
C0119	2113743M24	0.1uF
C0120	2113743L41	.01uF
C0121	2113743M24	0.1uF
C0122	2113743L41	.01uF
C0123	2113743M24	0.1uF
C0124	2113743M24	0.1uF
C0125	2113743M24	0.1uF
C0126	2113743M24	0.1uF
C0127	2113743M24	0.1uF
C0129	2113740F57	180pF
E0100	2480067M02	ind0805"
E0101	2480067M02	ind0805"
E0102	2480067M02	ind0805"
R0101	0662057M01	0 NU
R0102	0662057M01	0
R0103	0662057N07	22K
R0104	0662057M42	47
R0108	0662057M01	0 NU
R0121	0662057N07	22K
R0122	0662057M74	1K
U0100	5185130C40	30C40
U0101	5186249J25	KM616FU4110
U0102	5199420A01	28F320C3

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

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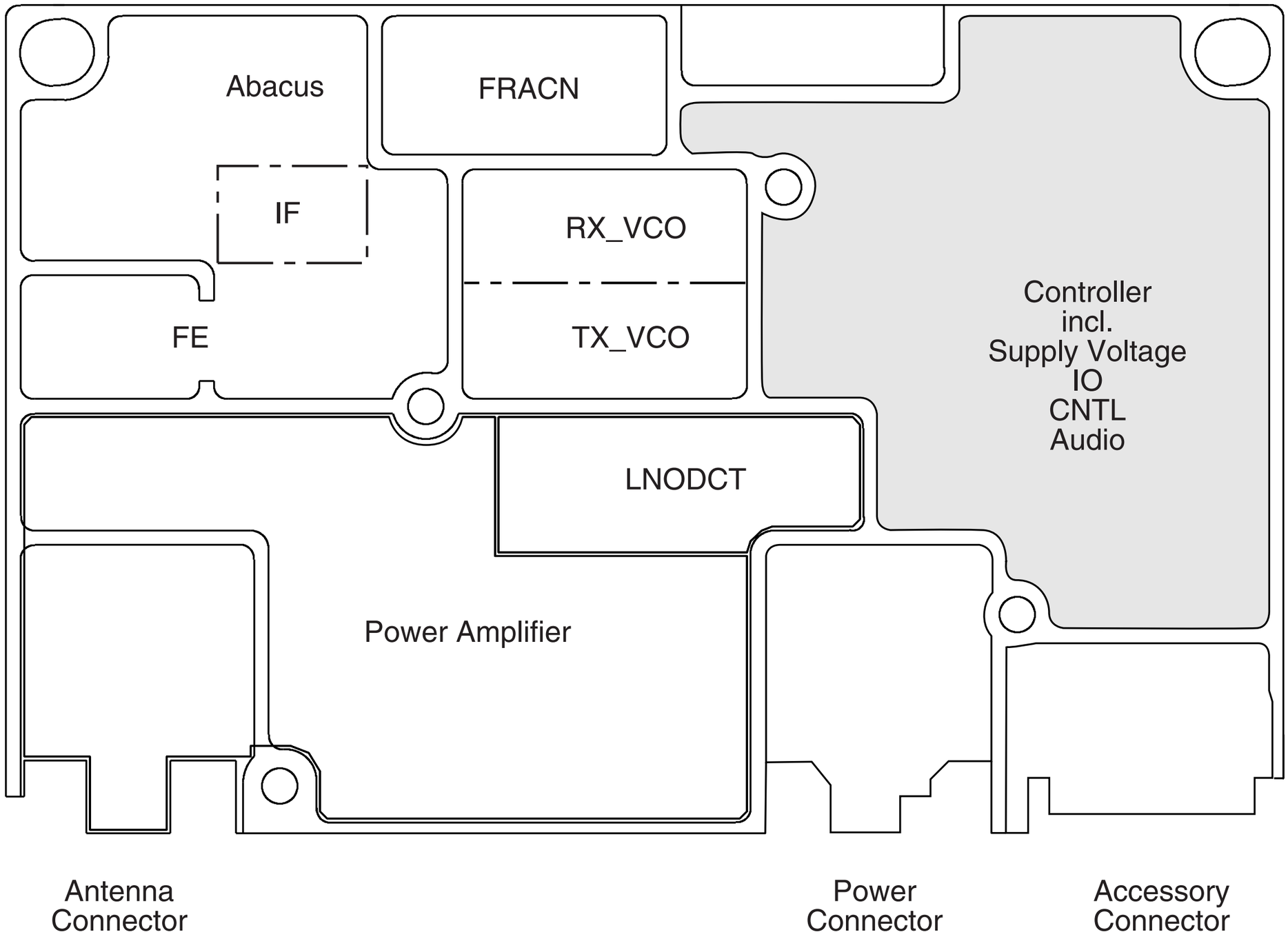
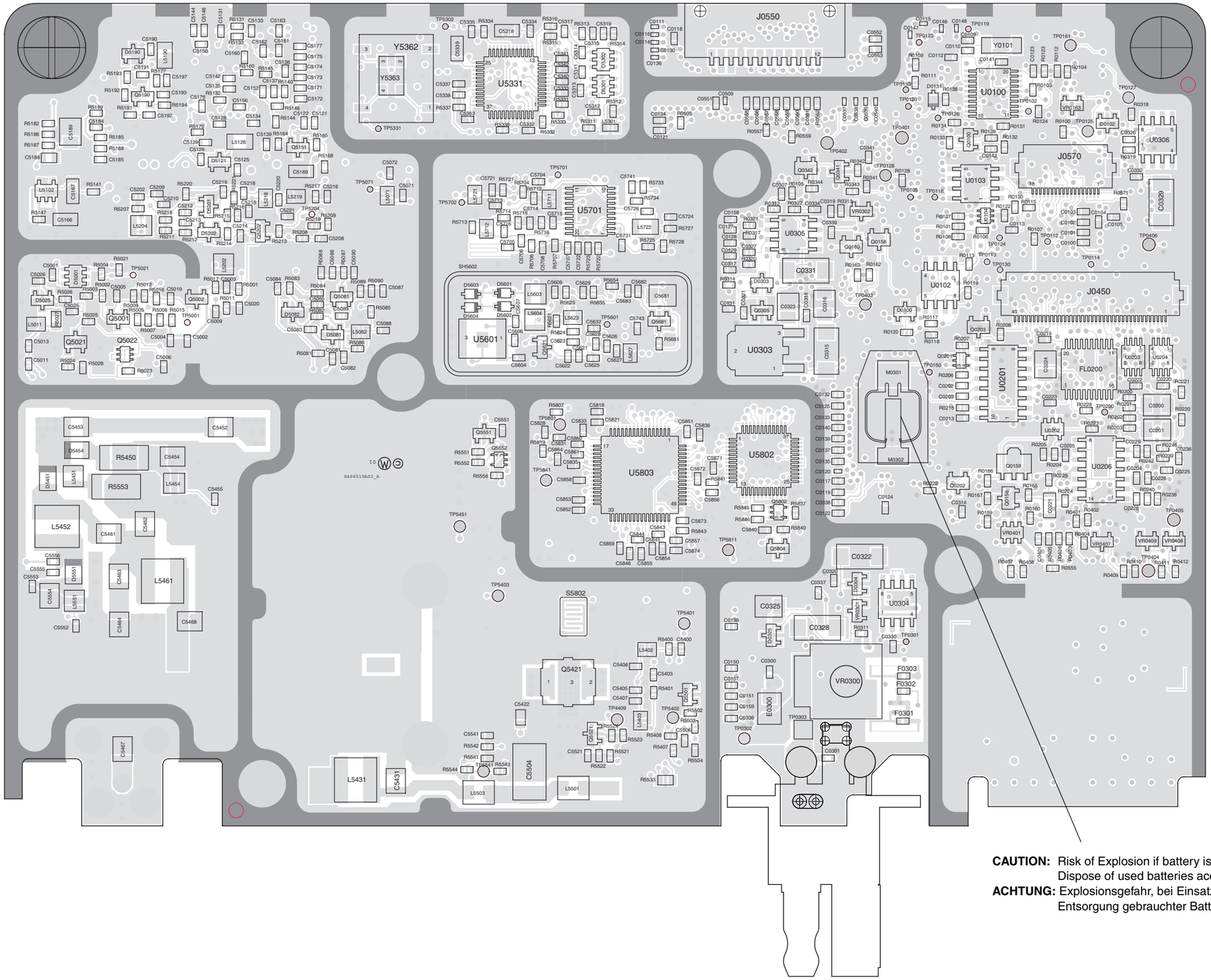
CHAPTER 8.1.2

Transceiver 400MHz (PCB No. 8466519A02_A): SCHEMATICS, PCBs and PARTS LISTS

SCHEMATICS and PCBS



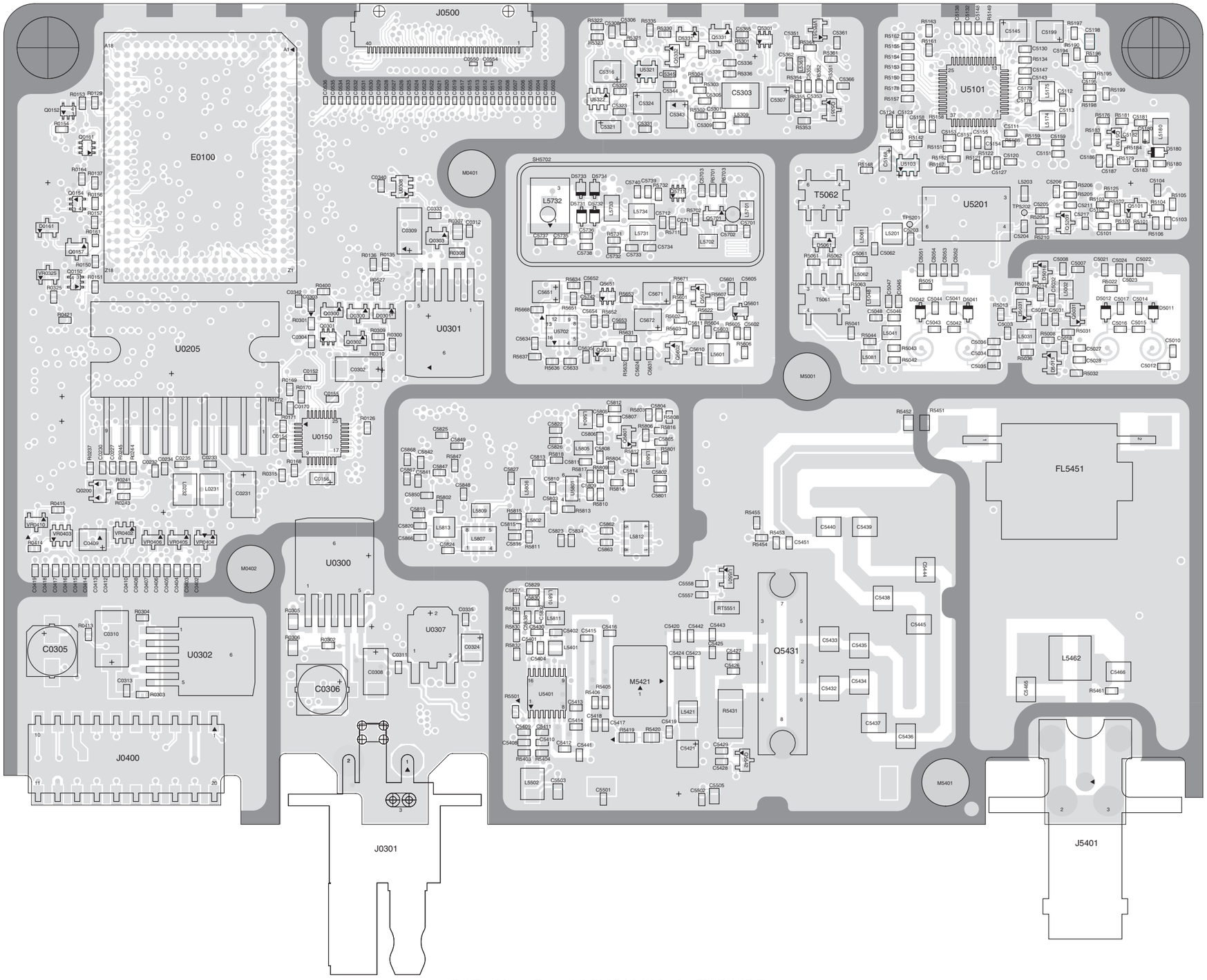
CHASSIS_OVERVIEW TRANSCEIVER



CAUTION: Risk of Explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
ACHTUNG: Explosionsgefahr, bei Einsatz einer falschen Ersatzbatterie. Entsorgung gebrauchter Batterien entprechend Vorschrift.

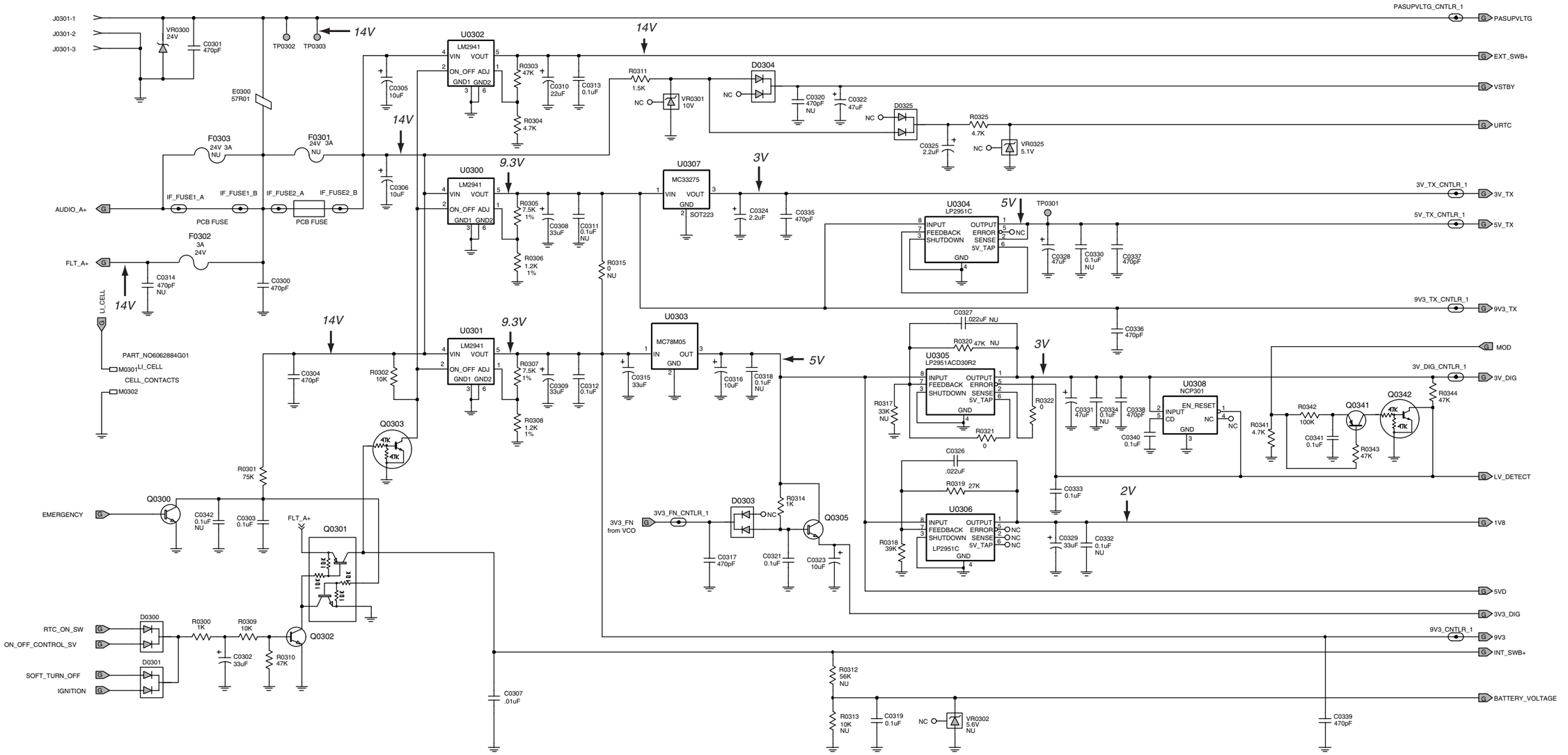
ZWG0130860-A

PCB / Main Board 8466519A02_A / BOTTOM SIDE



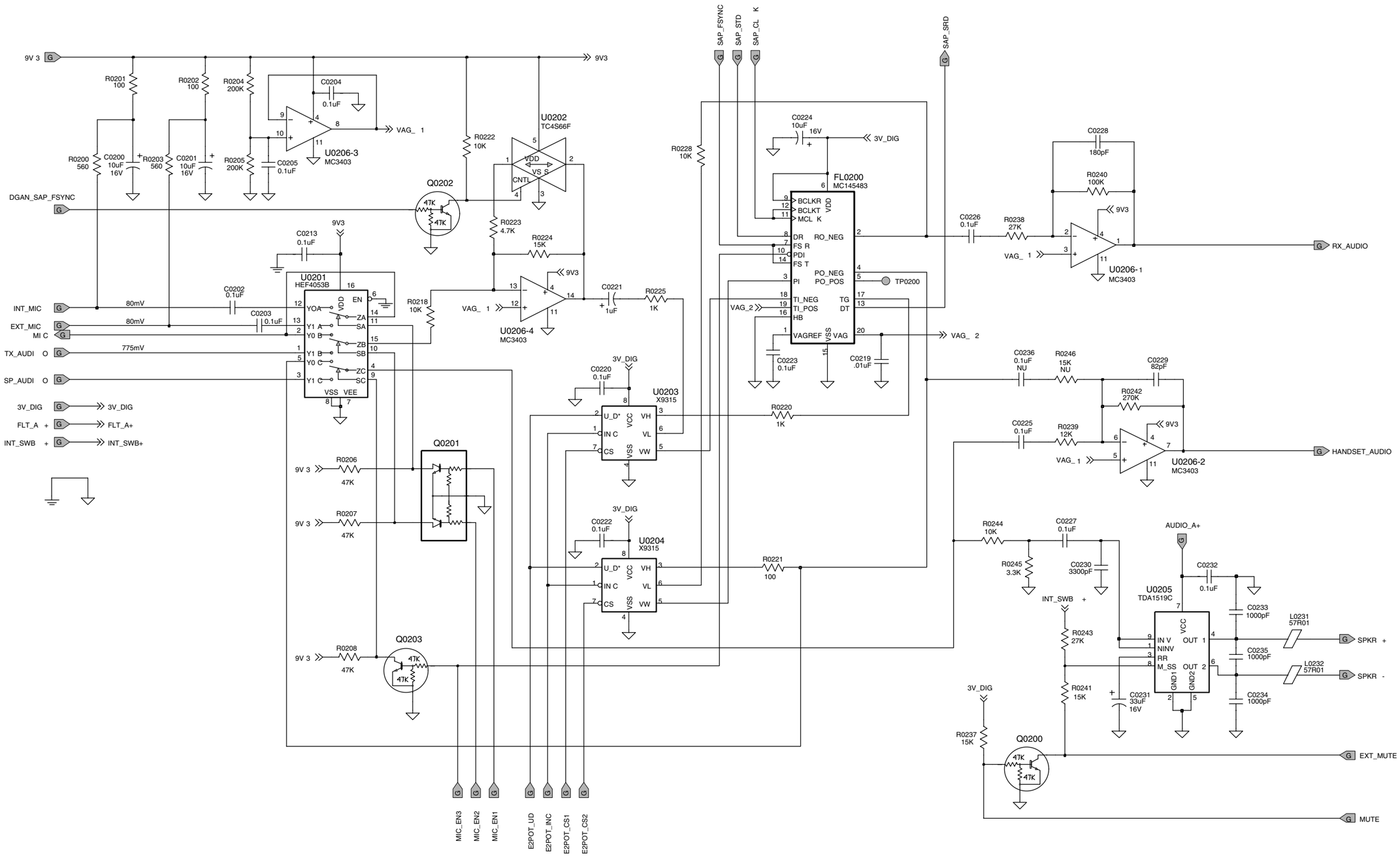
ZWG0130859-A

PCB / Main Board 8466519A02_A / TOP SIDE



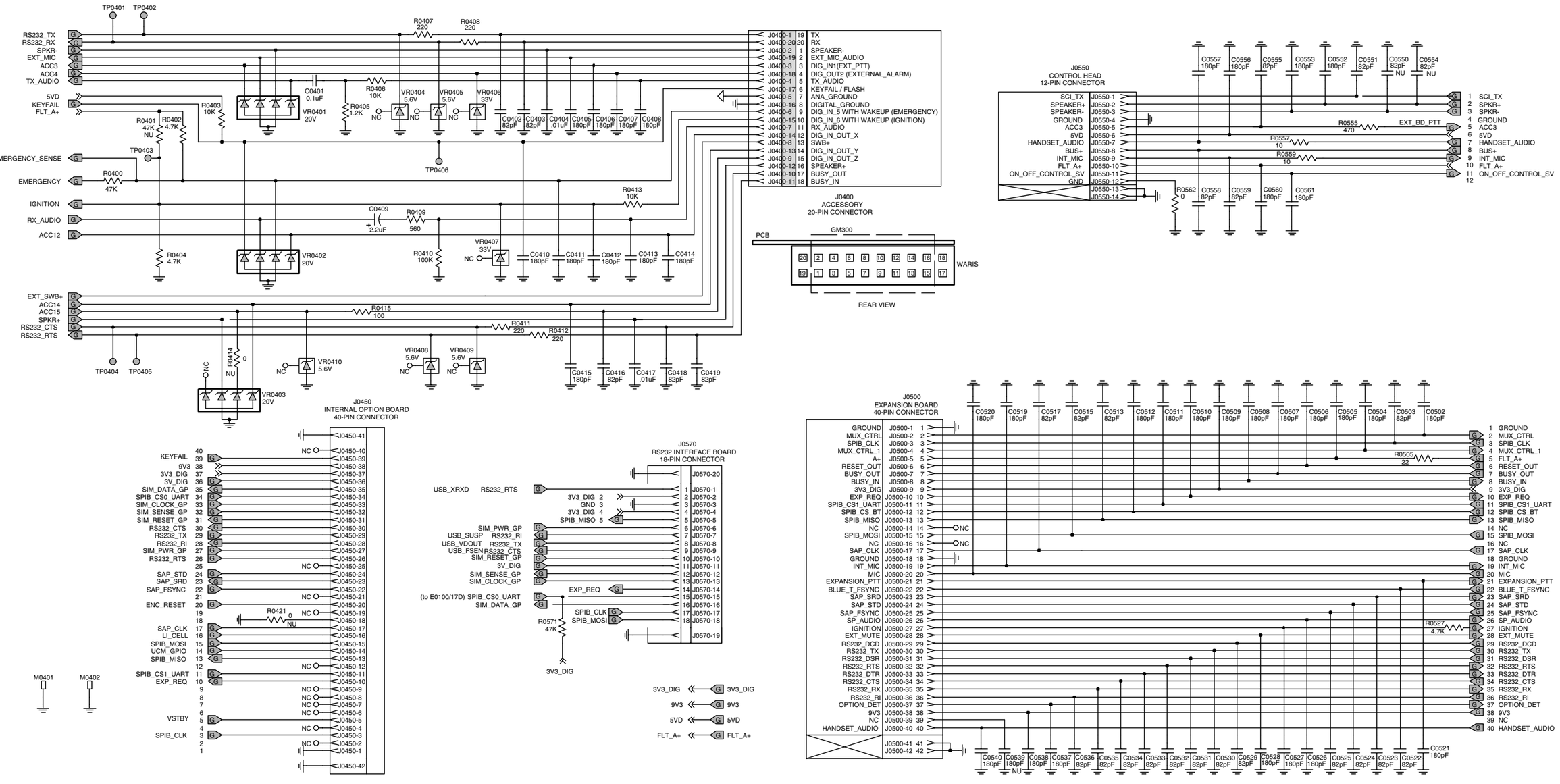
ZWG0130874-A

Main Board 8466519A02_A / CNTRL_SUPPLY_VOLTAGE



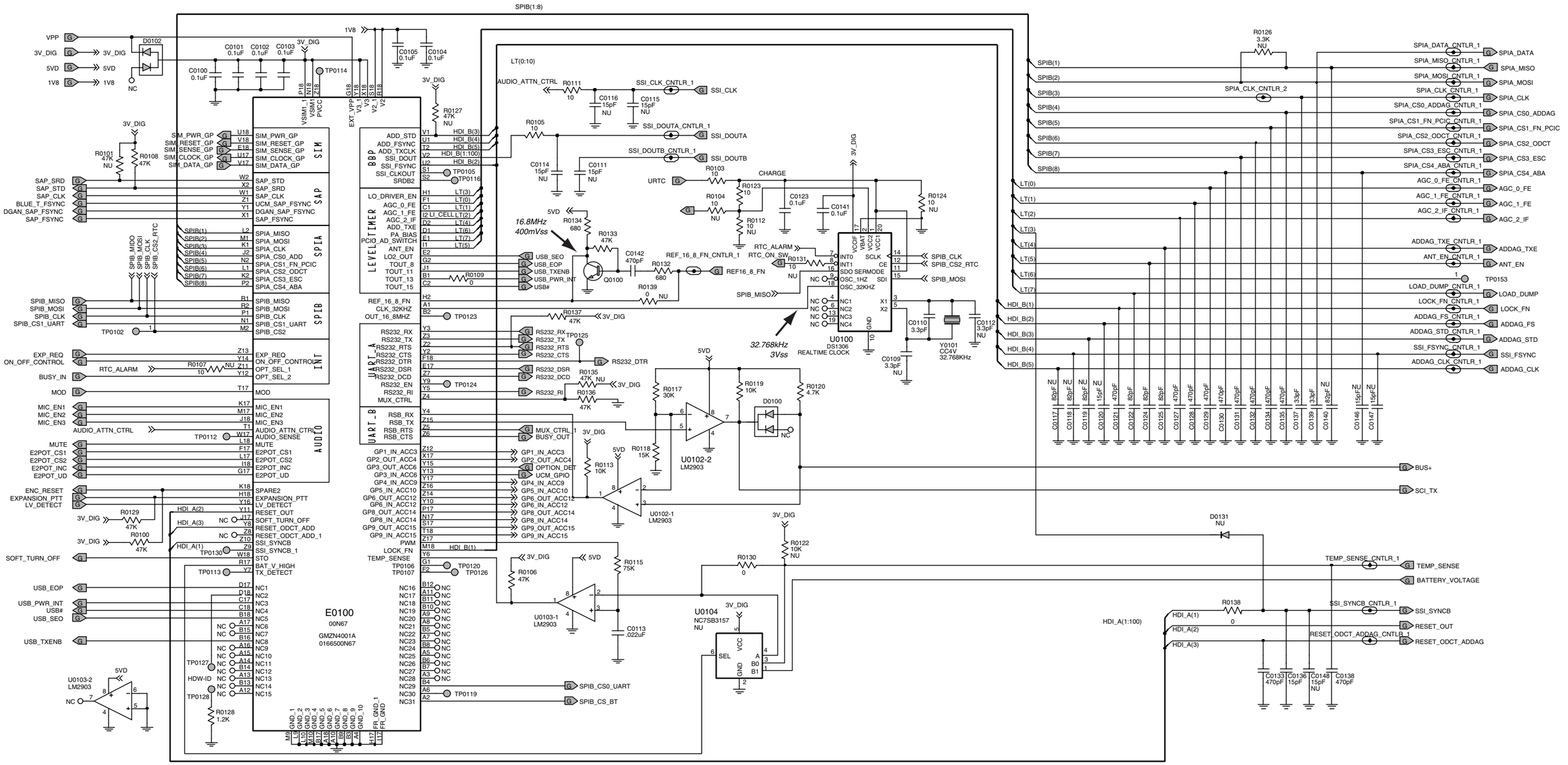
ZWG0130870-A

Main Board 8466519A02_A / CNTRL_AUDIO_POWER_AMPLIFIER

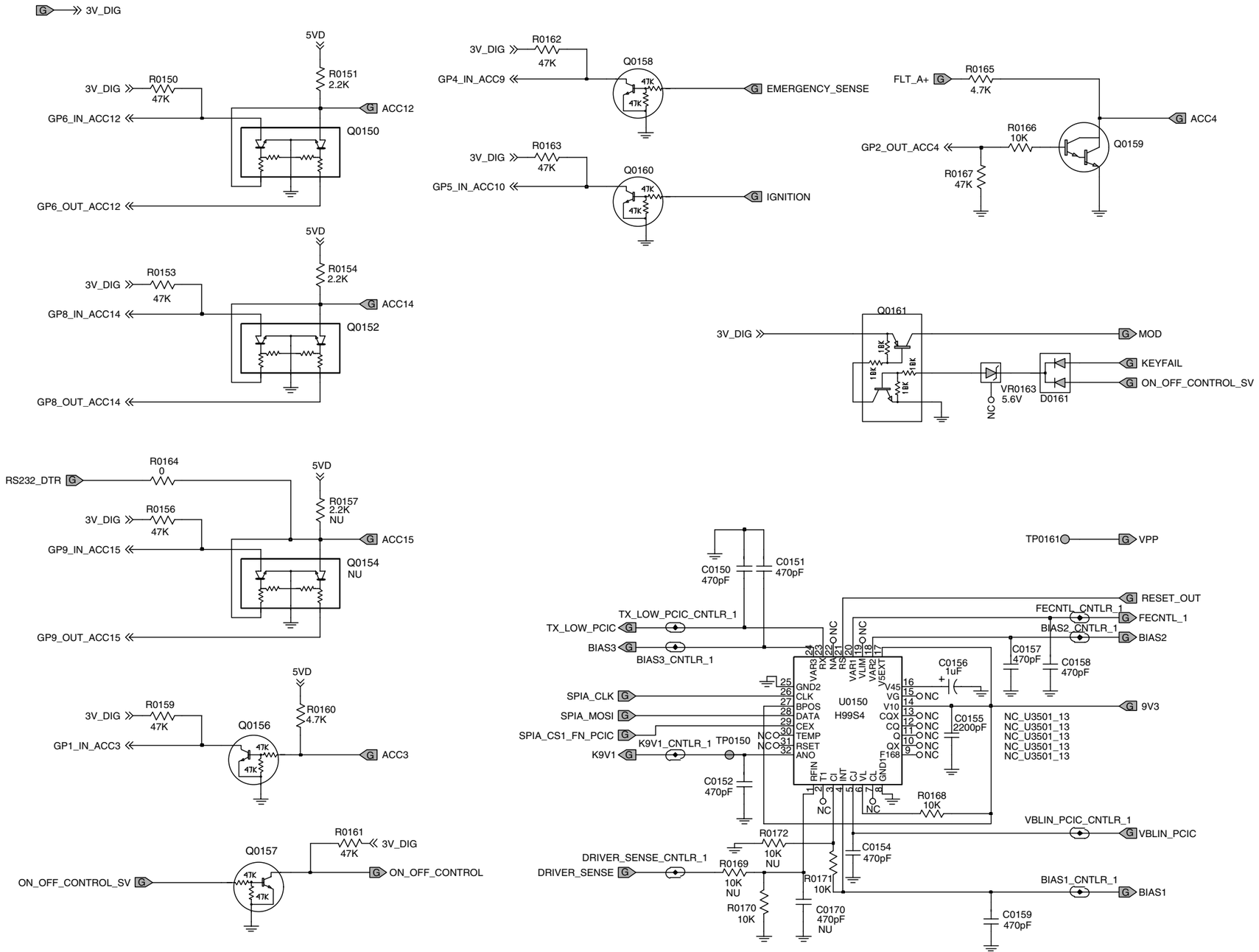


ZWG0130873-A

Main Board 8466519A02_A / CNTRL_I/O

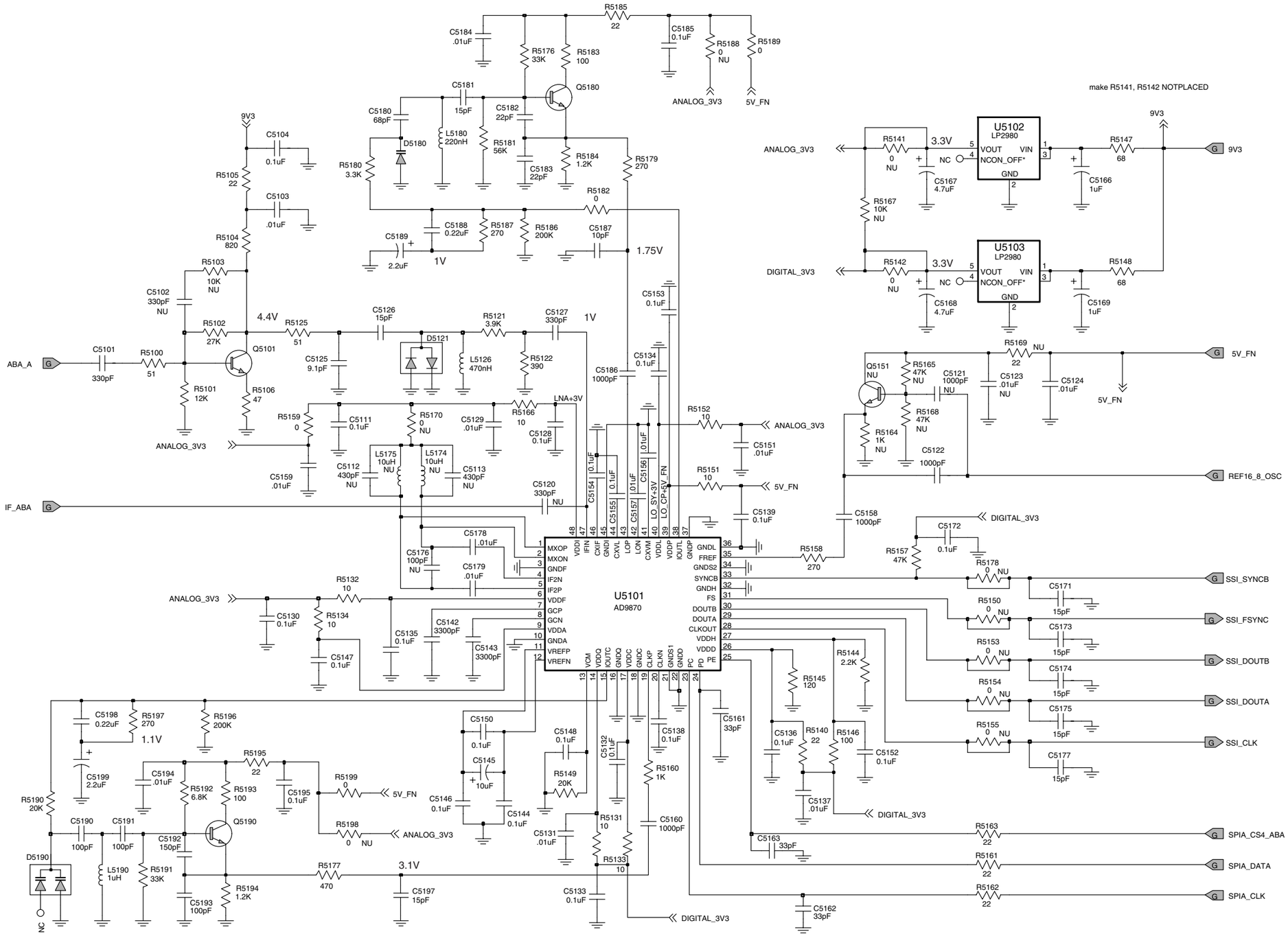


Main Board 8466519A02_A / CNTRL_CNTL (Sheet1)

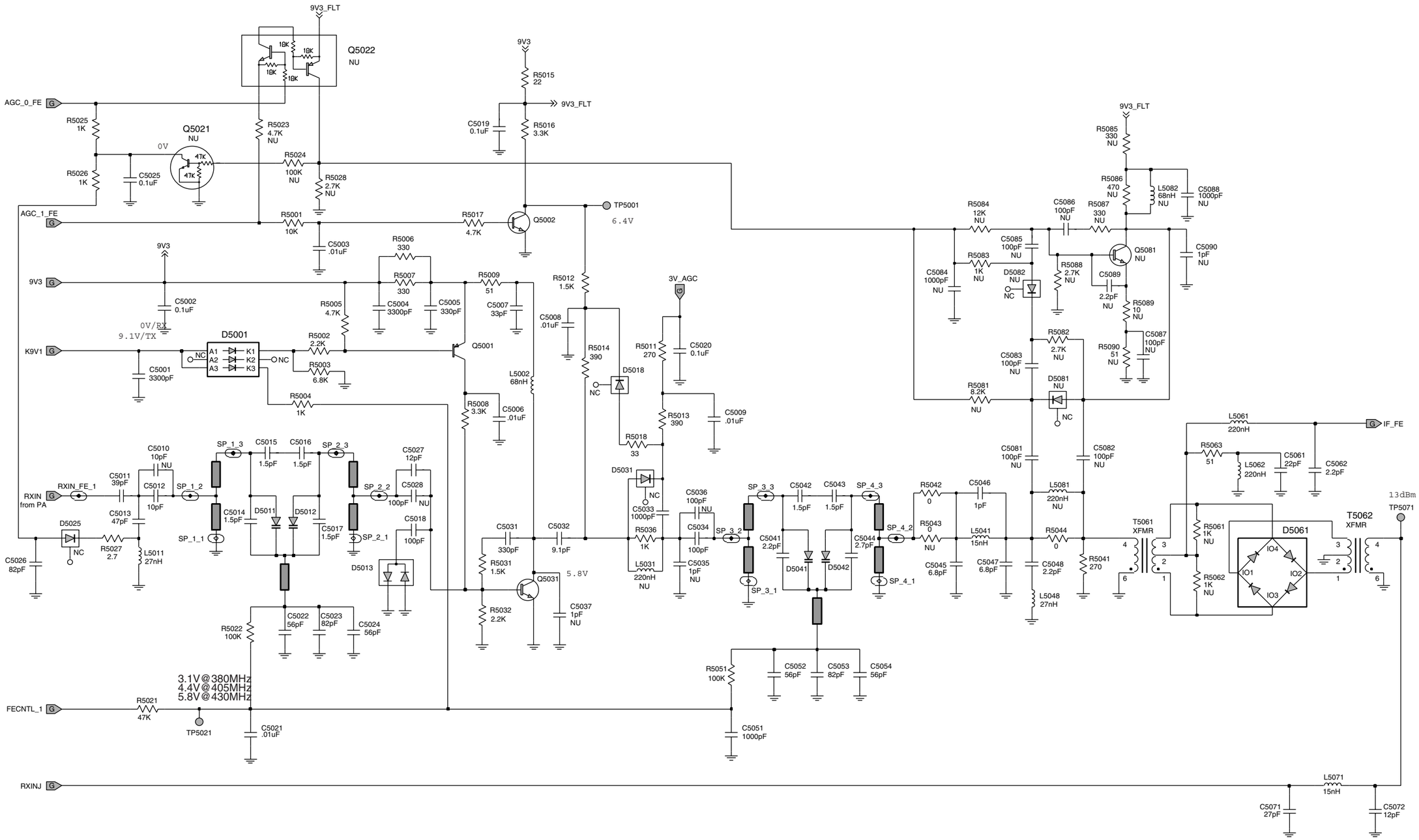


ZWG0130872-A

Main Board 8466519A02_A / CNTRL_CNTL (Sheet 2)



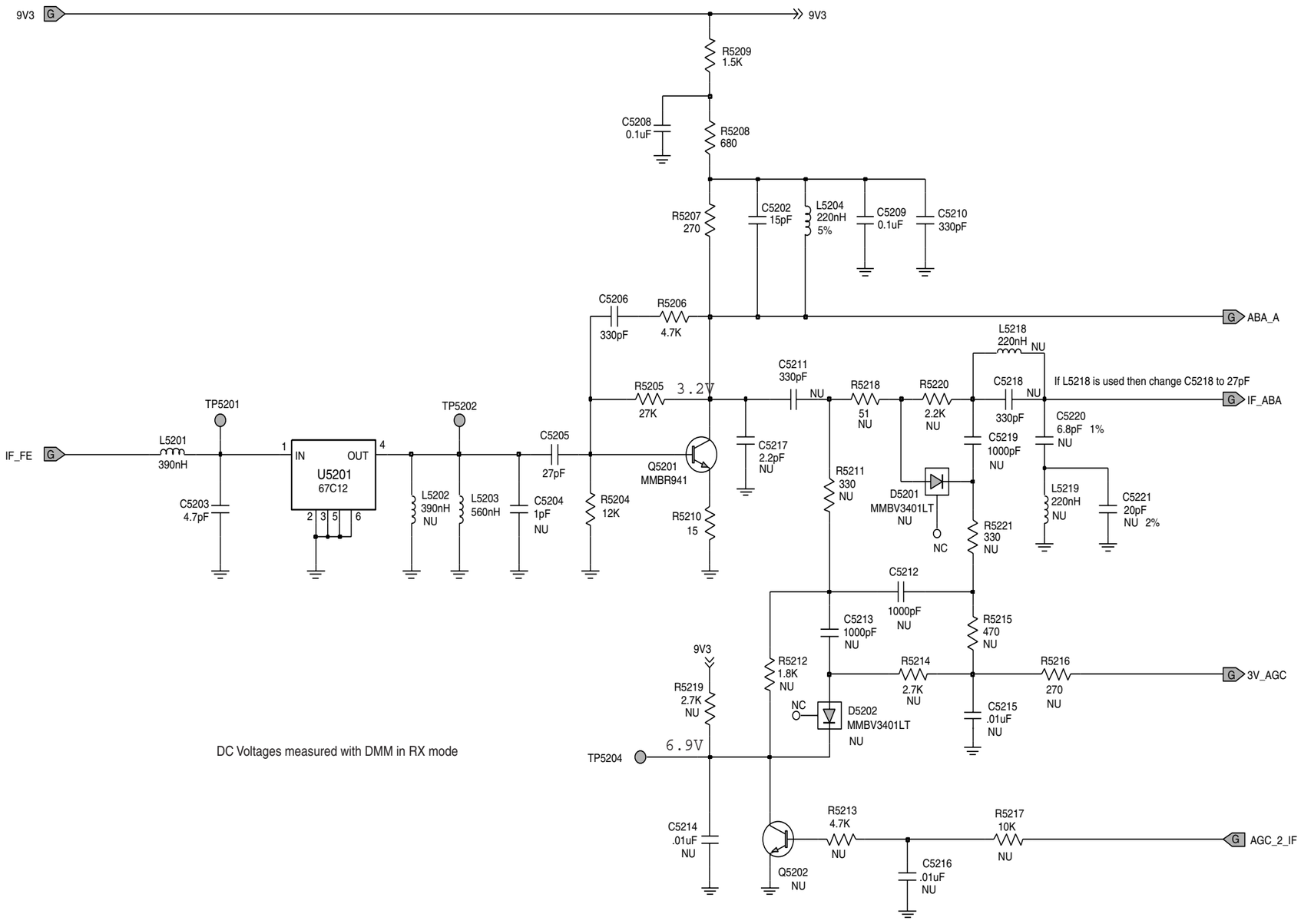
Main Board 8466519A02_A / RF_ABACUS



DC Voltages measured with DMM in RX mode

ZWG0130863-A

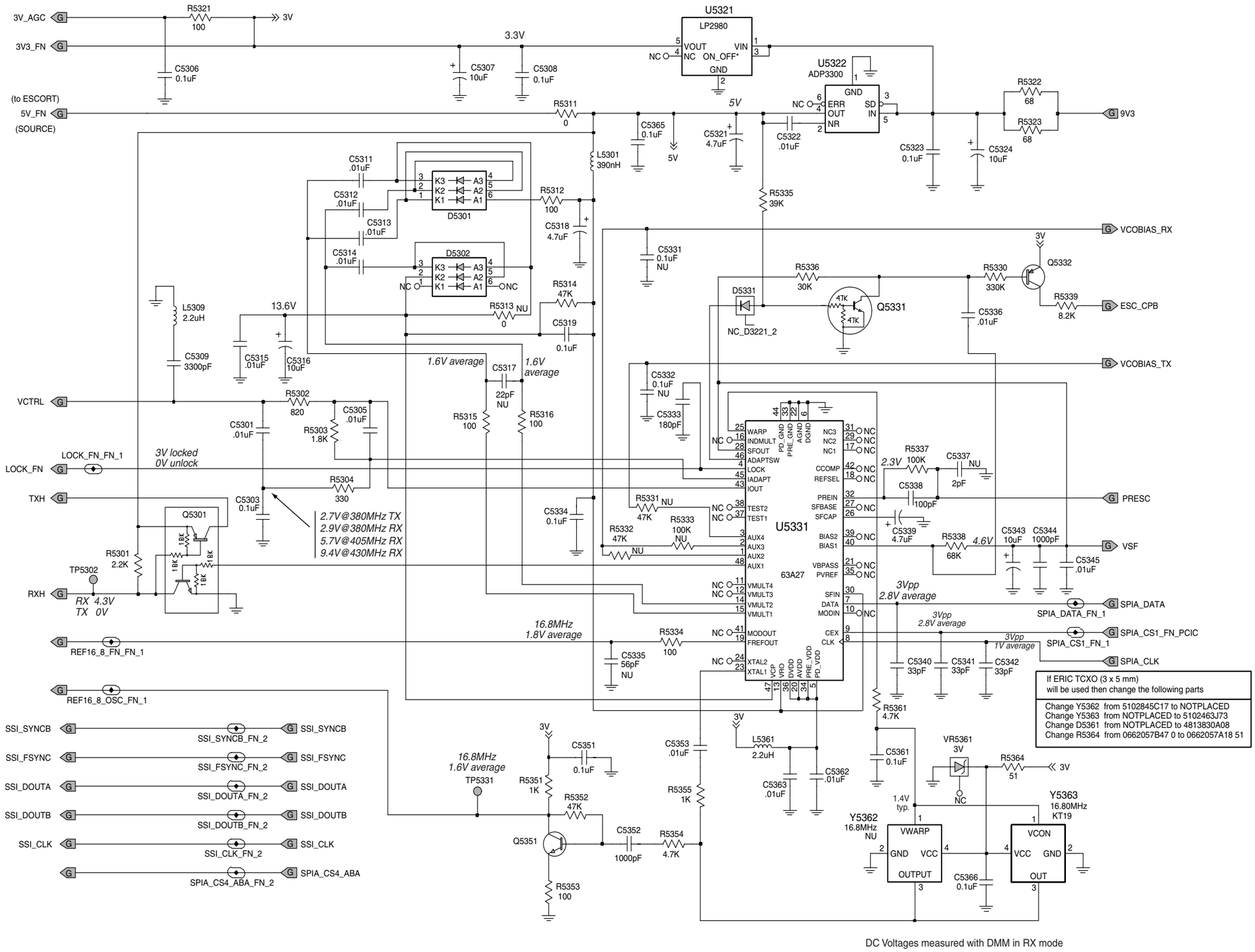
Main Board 8466519A02_A / RF_Front_End



DC Voltages measured with DMM in RX mode

ZWG0130865-A

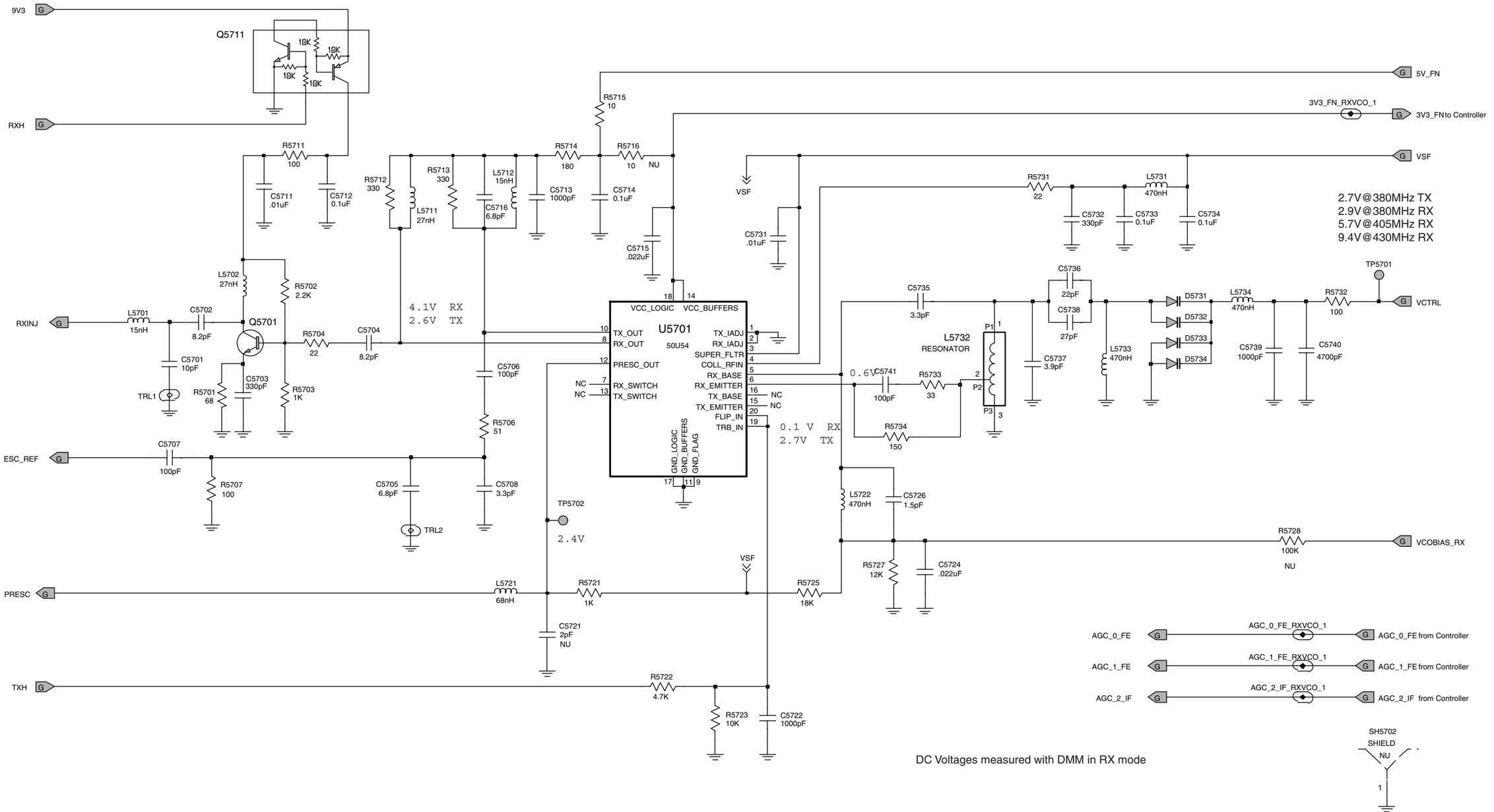
Main Board 8466519A02_A / RF_IF



DC Voltages measured with DMM in RX mode

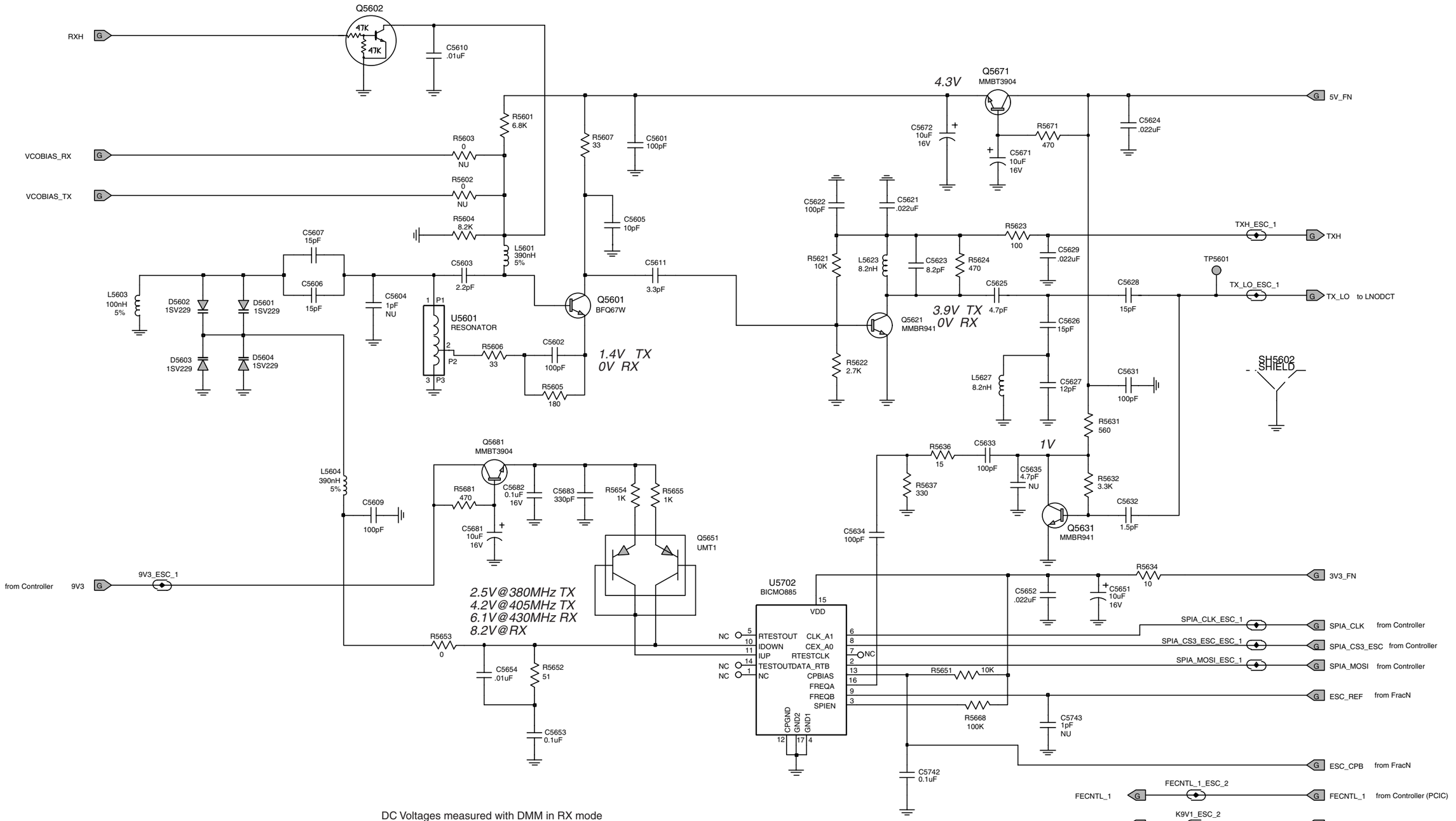
ZWG0130864-A

Main Board 8466519A02_A / RF_FRACN



ZWG0130866-A

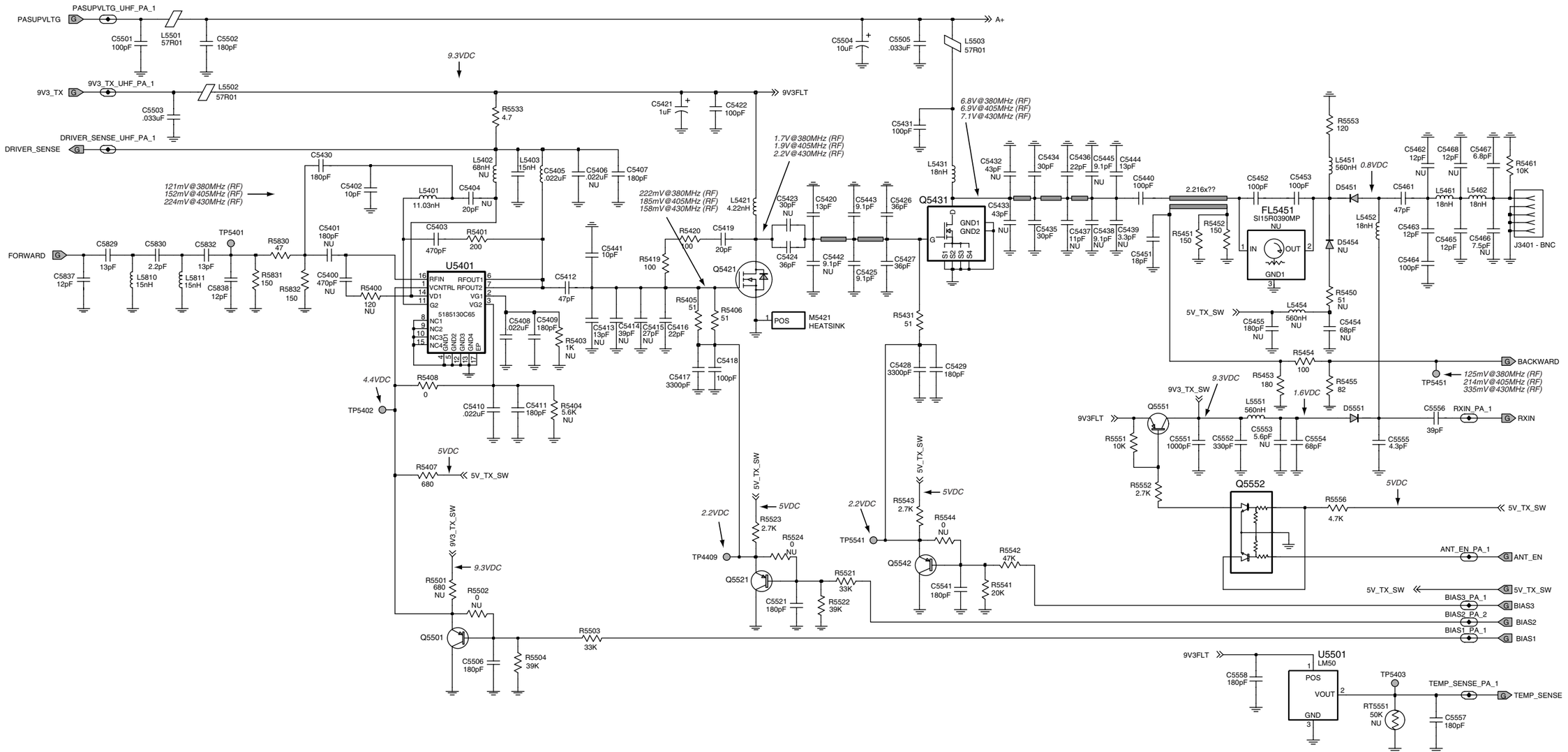
Main Board 8466519A02_A / RF_RX_VCO



DC Voltages measured with DMM in RX mode

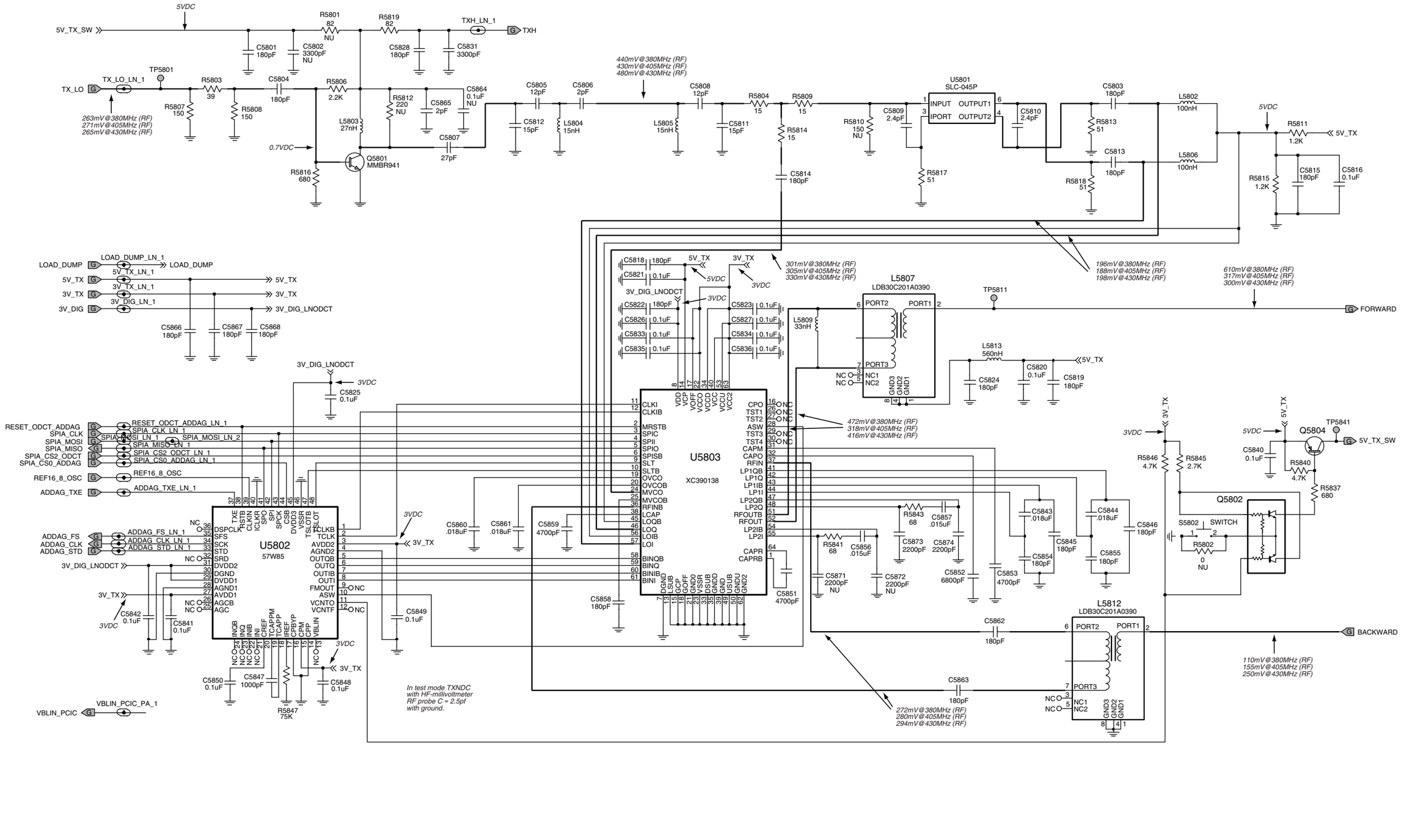
ZWG0130867-A

Main Board 8466519A02_A / RF_TX_VCO



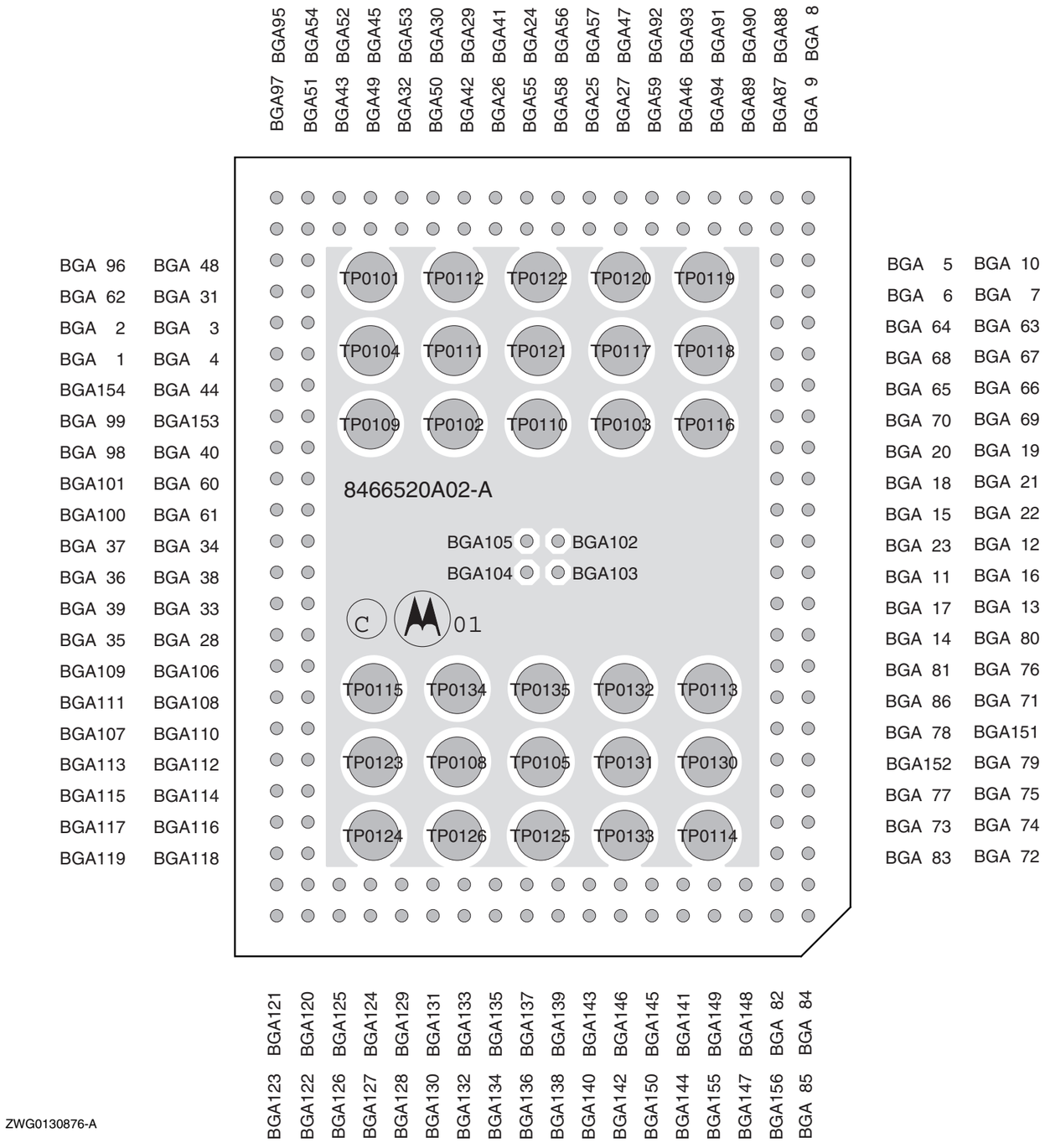
ZWG0130869-A

Main Board 8466519A02_A / POWER_AMPLIFIER__PA

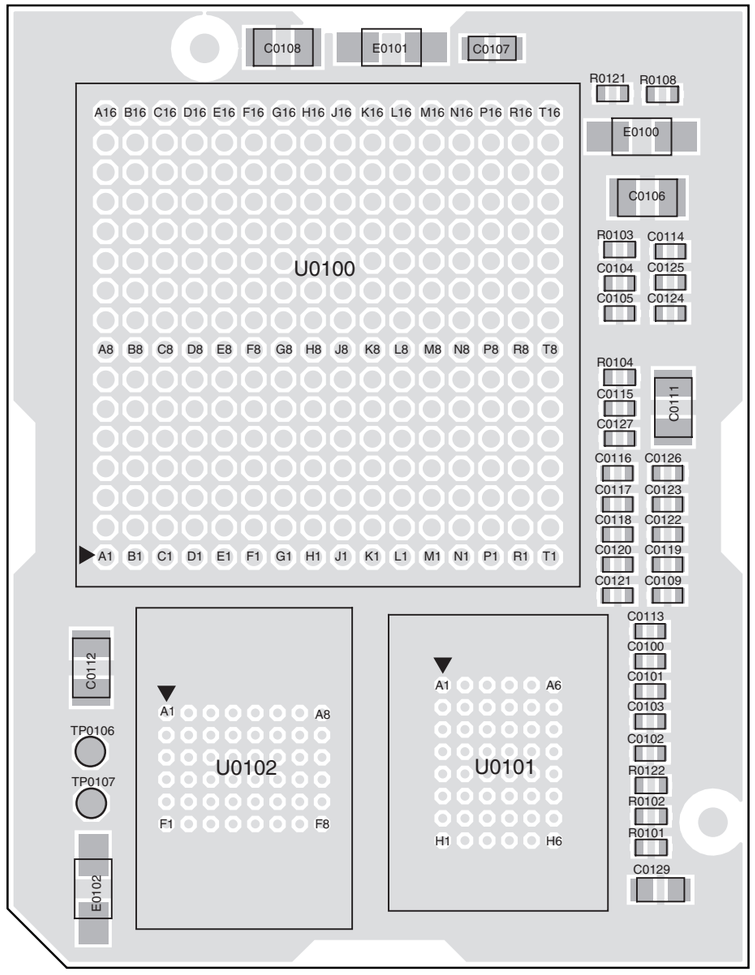


ZWG0130868-A

Main Board 8466519A02_A / POWER_AMPLIFIER_LNODCT

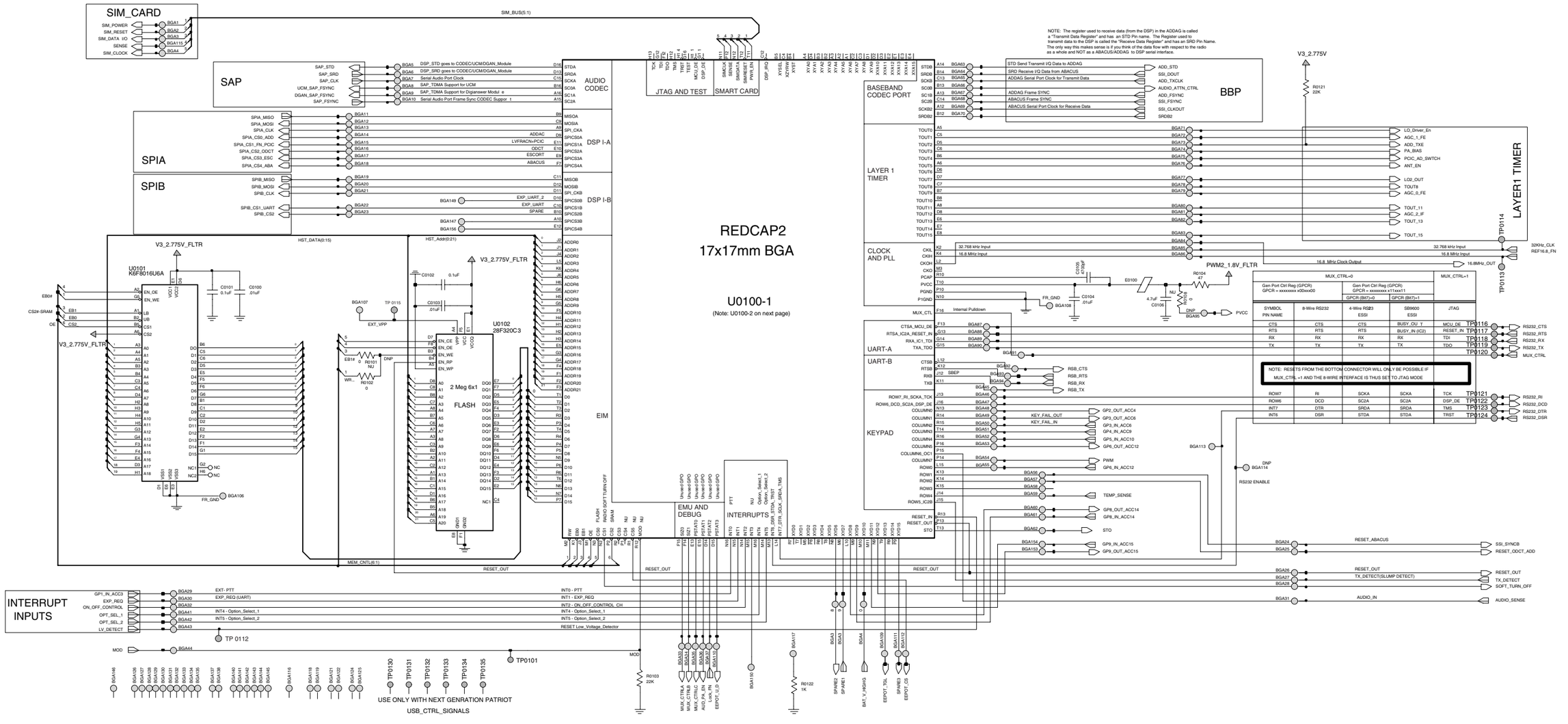


ZWG0130876-A



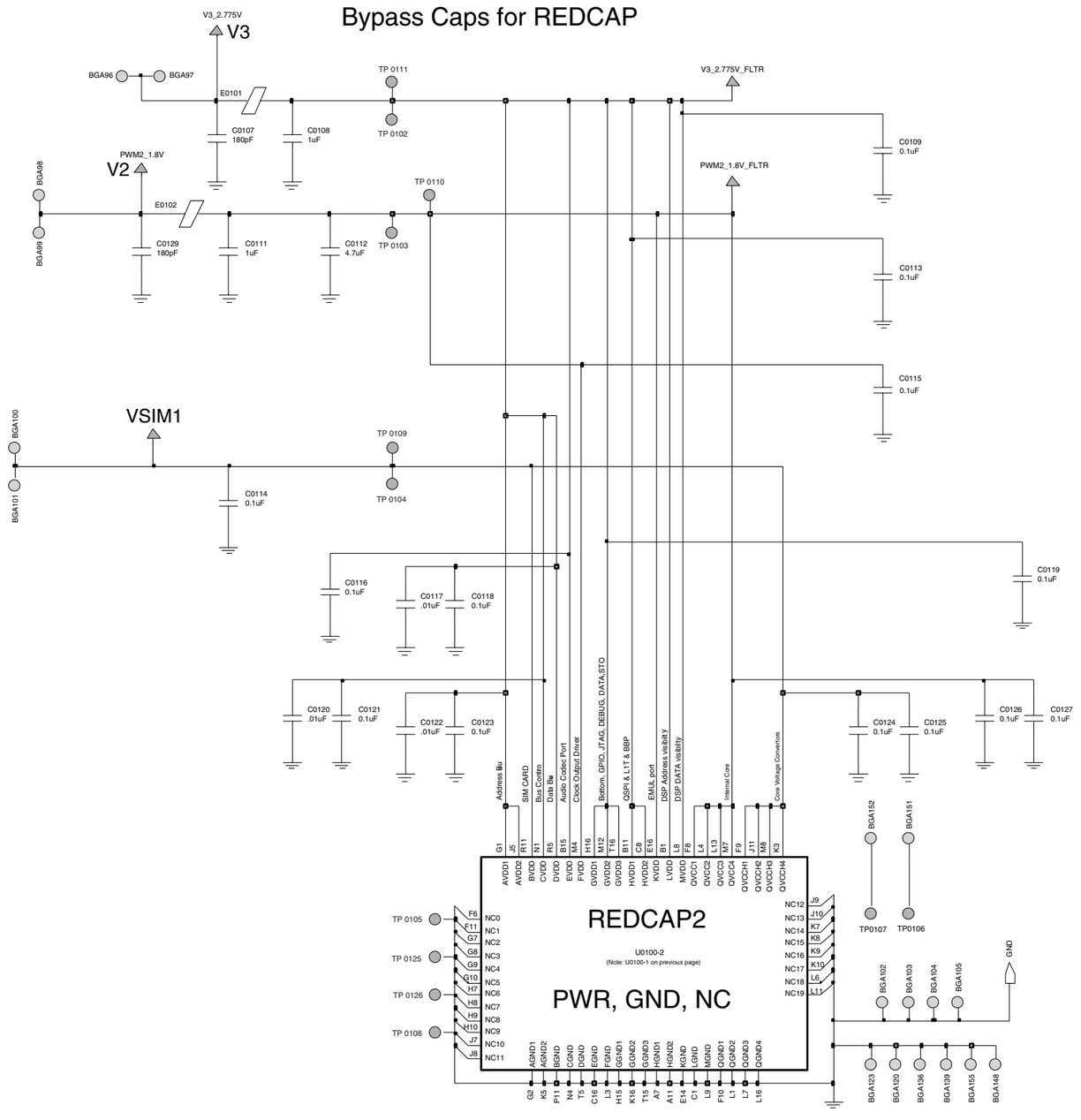
ZWG0130875_A

PCB / HDI_Controller 8466520A02_A / BOTTOM & TOP SIDE



ZWG0130877-A

HDI_Controller 8466520A02_A (Sheet 1)



ZWG0130878-A

HDI_Controller 8466520A02_A (Sheet 2)

PARTS LISTS

RF Parts on the Mainboard

Reference	Motorola PN	Value
C5001	2113741F37	3.3nF 50V
C5002	2113743E20	100nF 16V
C5003	2113741F49	10nF 50V
C5004	2113741F37	3.3nF 50V
C5005	2113741F13	330pF 50V
C5006	2113741F49	10nF 50V
C5007	2113740F39	33pF 5% 50V
C5008	2113741F49	10nF 50V
C5009	2113741F49	10nF 50V
C5011	2113740F41	39pF 5% 50V
C5012	2113740F27	10pF 5% 50V
C5013	2113740F43	47pF 5% 50V
C5014	2113740F07	1.5pF 5% 50V
C5015	2113740F07	1.5pF 5% 50V
C5016	2113740F07	1.5pF 5% 50V
C5017	2113740F07	1.5pF 5% 50V
C5018	2113740F51	100pF 5% 50V
C5019	2113743E20	100nF 16V
C5020	2113743E20	100nF 16V
C5021	2113741F49	10nF 50V
C5022	2113740F45	56pF 5% 50V
C5023	2113740F49	82pF 5% 50V
C5024	2113740F45	56pF 5% 50V
C5025	2113743E20	100nF 16V
C5026	2113740F49	82pF 5% 50V
C5027	2113740F29	12pF 5% 50V
C5031	2113741F13	330pF 50V
C5032	2113740F26	9.1pF 5% 50V
C5033	2113741F25	1nF 50V
C5034	2113740F51	100pF 5% 50V
C5041	2113740F11	2.2pF 5% 50V
C5042	2113740F07	1.5pF 5% 50V
C5043	2113740F07	1.5pF 5% 50V
C5044	2113740F13	2.7pF 5% 50V
C5045	2113740F23	6.8pF 5% 50V
C5046	2113740F03	1pF 5% 50V
C5047	2113740F23	6.8pF 5% 50V
C5048	2113740F11	2.2pF 5% 50V
C5051	2113741F25	1nF 50V
C5052	2113740F45	56pF 5% 50V
C5053	2113740F49	82pF 5% 50V
C5054	2113740F45	56pF 5% 50V
C5061	2113740F35	22pF 5% 50V
C5062	2113740F11	2.2pF 5% 50V
C5071	2113740F37	27pF 5% 50V
C5072	2113740F29	12pF 5% 50V
C5101	2113740F63	330pF 5% 50V
C5103	2113741F49	10nF 50V
C5104	2113743E20	100nF 16V
C5111	2113743E20	100nF 16V
C5122	2113741F25	1nF 50V
C5124	2113741F49	10nF 50V
C5125	2113740F26	9.1pF 5% 50V
C5126	2113740F31	15pF 5% 50V
C5127	2113740F63	330pF 5% 50V
C5128	2113743E20	100nF 16V
C5129	2113741F49	10nF 50V
C5130	2113743E20	100nF 16V
C5131	2113741F49	10nF 50V
C5132	2113743E20	100nF 16V
C5133	2113743E20	100nF 16V
C5134	2113743E20	100nF 16V
C5135	2113743E20	100nF 16V
C5136	2113743E20	100nF 16V
C5137	2113741F49	10nF 50V
C5138	2113743E20	100nF 16V
C5139	2113743E20	100nF 16V
C5142	2113741F37	3.3nF 50V
C5143	2113741F37	3.3nF 50V
C5144	2113743E20	100nF 16V
C5145	2311049A57	TANT CP 10uF 10% 16V
C5146	2113743E20	100nF 16V
C5147	2113743E20	100nF 16V
C5148	2113743E20	100nF 16V
C5150	2113743E20	100nF 16V
C5151	2113741F49	10nF 50V
C5152	2113743E20	100nF 16V
C5153	2113743E20	100nF 16V
C5154	2113743E20	100nF 16V
C5155	2113743E20	100nF 16V
C5156	2113741F49	10nF 50V
C5157	2113741F49	10nF 50V
C5158	2113741F25	1nF 50V
C5159	2113741F49	10nF 50V
C5160	2113741F25	1nF 50V
C5161	2113740F39	33pF 5% 50V
C5162	2113740F39	33pF 5% 50V
C5163	2113740F39	33pF 5% 50V
C5166	2311049A07	TANT CP 1uF 10% 16V
C5167	2311049A56	TANT CP 4.7uF 20% 10V
C5168	2311049A56	TANT CP 4.7uF 20% 10V
C5169	2311049A07	TANT CP 1uF 10% 16V
C5171	2113740F31	15pF 5% 50V
C5172	2113743E20	100nF 16V
C5173	2113740F31	15pF 5% 50V
C5174	2113740F31	15pF 5% 50V
C5175	2113740F31	15pF 5% 50V
C5177	2113740F31	15pF 5% 50V
C5178	2113741F49	10nF 50V
C5179	2113741F49	10nF 50V
C5180	2113740F47	68pF 5% 50V
C5181	2113740F31	15pF 5% 50V
C5182	2113740F35	22pF 5% 50V
C5183	2113740F35	22pF 5% 50V
C5184	2113741F49	10nF 50V
C5185	2113743E20	100nF 16V
C5186	2113741F25	1nF 50V
C5187	2113740F27	10pF 5% 50V
C5188	2113743A23	220nF 16V X7R
C5189	2311049A09	TANT CP 2.2uF 10% 20V
C5190	2113740F51	100pF 5% 50V
C5191	2113740F51	100pF 5% 50V
C5192	2113740F55	150pF 5% 50V
C5193	2113740F51	100pF 5% 50V
C5194	2113741F49	10nF 50V
C5195	2113743E20	100nF 16V
C5197	2113740F31	15pF 5% 50V
C5198	2113743A23	220nF 16V X7R
C5199	2311049A09	TANT CP 2.2uF 10% 20V
C5202	2113740F31	15pF 5% 50V
C5203	2113740F19	4.7pF 5% 50V
C5205	2113740F37	27pF 5% 50V
C5206	2113740F63	330pF 5% 50V
C5208	2113743E20	100nF 16V
C5209	2113743E20	100nF 16V
C5210	2113740F63	330pF 5% 50V
C5301	2113741F49	10nF 50V
C5303	0804533C37	METAL/POLY FILM 0.1
C5305	2113741F49	10nF 50V
C5306	2113743E20	100nF 16V
C5307	2311049A57	TANT CP 10uF 10% 16V
C5308	2113743E20	100nF 16V
C5309	2113741F37	3.3nF 50V
C5311	2113741F49	10nF 50V
C5312	2113741F49	10nF 50V
C5313	2113741F49	10nF 50V
C5314	2113741F49	10nF 50V
C5315	2113741F49	10nF 50V
C5316	2311049A57	TANT CP 10uF 10% 16V
C5318	2311049A56	TANT CP 4.7uF 20% 10V
C5319	2113743E20	100nF 16V
C5321	2311049A56	TANT CP 4.7uF 20% 10V
C5322	2113741F49	10nF 50V
C5323	2113743E20	100nF 16V
C5324	2311049A57	TANT CP 10uF 10% 16V
C5333	2113740F57	180pF 5% 50V
C5334	2113743E20	100nF 16V
C5336	2113741F49	10nF 50V
C5338	2113740F51	100pF 5% 50V
C5339	2311049A56	TANT CP 4.7uF 20% 10V
C5340	2113740F39	33pF 5% 50V
C5341	2113740F39	33pF 5% 50V
C5342	2113740F39	33pF 5% 50V

Reference	Motorola PN	Value
C5343	2311049A57	TANT CP 10uF 10% 16V
C5344	2113741F25	1nF 50V
C5345	2113741F49	10nF 50V
C5351	2113743E20	100nF 16V
C5352	2113741F25	1nF 50V
C5353	2113741F49	10nF 50V
C5361	2113743E20	100nF 16V
C5362	2113741F49	10nF 50V
C5363	2113741F49	10nF 50V
C5365	2113743E20	100nF 16V
C5366	2113743E20	100nF 16V
C5402	2113740F27	10pF 5% 50V
C5403	2113740F67	470pF 5% 50V
C5405	2113743E07	22nF 16V
C5407	2113740F57	180pF 5% 50V
C5408	2113743E07	22nF 16V
C5409	2113740F57	180pF 5% 50V
C5410	2113743E07	22nF 16V
C5411	2113740F57	180pF 5% 50V
C5412	2113740F43	47pF 5% 50V
C5416	2113740F35	22pF 5% 50V
C5417	2113741F37	3.3nF 50V
C5418	2113740F51	100pF 5% 50V
C5419	2113740F34	20pF 5% 50V
C5420	2113740F30	13pF 5% 50V
C5421	2311049A08	TANT CP 1uF 10% 35V
C5422	2113740A55	100pF 5% 50V 080
C5424	2113740F40	36pF 5% 50V
C5425	2113740F26	9.1pF 5% 50V
C5426	2113740F40	36pF 5% 50V
C5427	2113740F40	36pF 5% 50V
C5428	2113741F37	3.3nF 50V
C5429	2113740F57	180pF 5% 50V
C5430	2113740F57	180pF 5% 50V
C5431	2111078B42	HQ 100pF 5%
C5434	2111078B27	HQ 30pF 5%
C5435	2111078B27	HQ 30pF 5%
C5436	2111078B22	HQ 22pF 5%
C5440	2111078B42	HQ 100pF 5%

Reference	Motorola PN	Value
C5441	2113740F27	10pF 5% 50V
C5443	2113740F26	9.1pF 5% 50V
C5444	2111078B16	HQ 13pF 5%
C5451	2113740F33	18pF 5% 50V
C5452	2111078B42	HQ 100pF 5%
C5453	2111078B42	HQ 100pF 5%
C5461	2111078B34	HQ 47pF 5%
C5463	2111078B15	HQ 12pF 5%
C5464	2111078B42	HQ 100pF 5%
C5465	2111078B15	HQ 12pF 5%
C5467	2111078B09	HQ 6.8pF 5%
C5501	2113740F51	100pF 5% 50V
C5502	2113740F57	180pF 5% 50V
C5503	2113741A57	33nF 50V X7R
C5504	2311049A45	TANT CP 10uF 10% 35V
C5505	2113741A57	33nF 50V X7R
C5506	2113740F57	180pF 5% 50V
C5521	2113740F57	180pF 5% 50V
C5541	2113740F57	180pF 5% 50V
C5551	2113741F25	1nF 50V
C5552	2113740F63	330pF 5% 50V
C5554	2111078B38	HQ 68pF 5%
C5555	2113740F18	4.3pF 5% 50V
C5556	2113740F41	39pF 5% 50V
C5557	2113740F57	180pF 5% 50V
C5558	2113740F57	180pF 5% 50V
C5601	2113740F51	100pF 5% 50V
C5602	2113740F51	100pF 5% 50V
C5603	2113740F11	2.2pF 5% 50V
C5605	2113740F27	10pF 5% 50V
C5606	2113740F31	15pF 5% 50V
C5607	2113740F31	15pF 5% 50V
C5609	2113740F51	100pF 5% 50V
C5610	2113741F49	10nF 50V
C5611	2113740F15	3.3pF 5% 50V
C5621	2113743E07	22nF 16V
C5622	2113740F51	100pF 5% 50V
C5623	2113740F25	8.2pF 5% 50V
C5624	2113743E07	22nF 16V
C5625	2113740F19	4.7pF 5% 50V

Reference	Motorola PN	Value
C5626	2113740F31	15pF 5% 50V
C5627	2113740F29	12pF 5% 50V
C5628	2113740F31	15pF 5% 50V
C5629	2113743E07	22nF 16V
C5631	2113740F51	100pF 5% 50V
C5632	2113740F07	1.5pF 5% 50V
C5633	2113740F51	100pF 5% 50V
C5634	2113740F51	100pF 5% 50V
C5651	2311049A57	TANT CP 10uF 10% 16V
C5652	2113743E07	22nF 16V
C5653	2113743E20	100nF 16V
C5654	2113741F49	10nF 50V
C5671	2311049A57	TANT CP 10uF 10% 16V
C5672	2311049A57	TANT CP 10uF 10% 16V
C5681	2311049A57	TANT CP 10uF 10% 16V
C5682	2113743E20	100nF 16V
C5683	2113740F63	330pF 5% 50V
C5701	2113740F27	10pF 5% 50V
C5702	2113740F25	8.2pF 5% 50V
C5703	2113741F13	330pF 50V
C5704	2113740F25	8.2pF 5% 50V
C5705	2113740F23	6.8pF 5% 50V
C5706	2113740F51	100pF 5% 50V
C5707	2113740F51	100pF 5% 50V
C5708	2113740F15	3.3pF 5% 50V
C5711	2113741F49	10nF 50V
C5712	2113743E20	100nF 16V
C5713	2113741F25	1nF 50V
C5714	2113743E20	100nF 16V
C5715	2113743E07	22nF 16V
C5716	2113740F23	6.8pF 5% 50V
C5722	2113741F25	1nF 50V
C5724	2113743E07	22nF 16V
C5726	2113740F07	1.5pF 5% 50V
C5731	2113741F49	10nF 50V
C5732	2113740F63	330pF 5% 50V
C5733	2113743E20	100nF 16V
C5734	2113743E20	100nF 16V

Reference	Motorola PN	Value
C5735	2113740F15	3.3pF 5% 50V
C5736	2113740F35	22pF 5% 50V
C5737	2113740F17	3.9pF 5% 50V
C5738	2113740F37	27pF 5% 50V
C5739	2113741F25	1nF 50V
C5740	2113741F41	4.7nF 50V
C5741	2113740F51	100pF 5% 50V
C5742	2113743E20	100nF 16V
C5801	2113740F57	180pF 5% 50V
C5803	2113740F57	180pF 5% 50V
C5804	2113740F57	180pF 5% 50V
C5805	2113740L20	12 PF 50V 2.0%
C5806	2113740L01	CER CHIP 2.0PF+- 0.1PF
C5807	2113740F37	27pF 5% 50V
C5808	2113740F29	12pF 5% 50V
C5809	2113740L03	CER CHIP 2.4PF +- 0.1PF
C5810	2113740L03	CER CHIP 2.4PF +- 0.1PF
C5811	2113740F31	15pF 5% 50V
C5812	2113740F31	15pF 5% 50V
C5813	2113740F57	180pF 5% 50V
C5814	2113740F57	180pF 5% 50V
C5815	2113740F57	180pF 5% 50V
C5816	2113743E20	100nF 16V
C5818	2113740F57	180pF 5% 50V
C5819	2113740F57	180pF 5% 50V
C5820	2113743E20	100nF 16V
C5821	2113743E20	100nF 16V
C5822	2113740F57	180pF 5% 50V
C5823	2113743E20	100nF 16V
C5824	2113740F57	180pF 5% 50V
C5825	2113743E20	100nF 16V
C5826	2113743E20	100nF 16V
C5827	2113743E20	100nF 16V
C5828	2113740F57	180pF 5% 50V
C5829	2113740L21	13.0 PF 50V 2.0%
C5830	2113740L02	CER CHIP 2.2PF+- 0.1PF
C5831	2113741F37	3.3nF 50V
C5832	2113740L21	13.0 PF 50V 2.0%

Reference	Motorola PN	Value
C5833	2113743E20	100nF 16V
C5834	2113743E20	100nF 16V
C5835	2113743E20	100nF 16V
C5836	2113743E20	100nF 16V
C5837	2113740L20	12 PF 50V 2.0%
C5838	2113740L20	12 PF 50V 2.0%
C5840	2113743E20	100nF 16V
C5841	2113743E20	100nF 16V
C5842	2113743E20	100nF 16V
C5843	2113743E05	18nF 16V
C5844	2113743E05	18nF 16V
C5845	2113740F57	180pF 5% 50V
C5846	2113740F57	180pF 5% 50V
C5847	2113741F25	1nF 50V
C5848	2113743E20	100nF 16V
C5849	2113743E20	100nF 16V
C5850	2113743E20	100nF 16V
C5851	2113741F41	4.7nF 50V
C5852	2113741F45	6.8nF 50V
C5853	2113741F41	4.7nF 50V
C5854	2113740F57	180pF 5% 50V
C5855	2113740F57	180pF 5% 50V
C5856	2113743E03	15nF 16V
C5857	2113743E03	15nF 16V
C5858	2113740F57	180pF 5% 50V
C5859	2113741F41	4.7nF 50V
C5860	2113743E05	18nF 16V
C5861	2113743E05	18nF 16V
C5862	2113740F57	180pF 5% 50V
C5863	2113740F57	180pF 5% 50V
C5865	2113740L01	CER CHIP 2.0PF+-0.1PF
C5866	2113740F57	180pF 5% 50V
C5867	2113740F57	180pF 5% 50V
C5868	2113740F57	180pF 5% 50V
C5873	2113741F33	2.2nF 50V
C5874	2113741F33	2.2nF 50V
D5001	4802233J09	DIODE TRIPLE SOT143-RH
D5011	4862824C01	DIODE VARACTOR CHIP

Reference	Motorola PN	Value
D5012	4862824C01	DIODE VARACTOR CHIP
D5013	4880154K03	DIODE DUAL SCHOT-TKY SOT23
D5018	4880142L01	DIODE PIN
D5025	4880142L01	DIODE PIN
D5031	4880142L01	DIODE PIN
D5041	4862824C01	DIODE VARACTOR CHIP
D5042	4862824C01	DIODE VARACTOR CHIP
D5061	4886143B01	MIXER DIODE CROSSOVER
D5121	4880154K03	DIODE DUAL SCHOT-TKY SOT23
D5180	4862824C01	DIODE VARACTOR CHIP
D5190	4805649Q13	DIODE VCTR 1SV228 SOT23
D5301	4802233J09	DIODE TRIPLE SOT143-RH
D5302	4802233J09	DIODE TRIPLE SOT143-RH
D5331	4813825A05	DIODE 30V HOT CAR-RIER MMBD301
D5451	4802482J02	DIODE PIN MA/COM
D5551	4802482J02	DIODE PIN MA/COM
D5601	4862824C01	DIODE VARACTOR CHIP
D5602	4862824C01	DIODE VARACTOR CHIP
D5603	4862824C01	DIODE VARACTOR CHIP
D5604	4862824C01	DIODE VARACTOR CHIP
D5731	4862824C01	DIODE VARACTOR CHIP
D5732	4862824C01	DIODE VARACTOR CHIP
D5733	4862824C01	DIODE VARACTOR CHIP
D5734	4862824C01	DIODE VARACTOR CHIP
J5401	0986166B01	RF CONN BNC
L5002	2462587V32	CHIP IND 68NH 5%
L5011	2462587V27	CHIP IND 27 NH 5%
L5041	2462587V24	CHIP IND 15NH 5%
L5048	2462587V27	CHIP IND 27 NH 5%

Reference	Motorola PN	Value
L5061	2462587V38	IND CHIP 220 NH 5%
L5062	2462587V38	IND CHIP 220 NH 5%
L5071	2462587V24	CHIP IND 15NH 5%
L5126	2462587T23	COIL CHIP 470nH
L5180	2462587T19	IND CHIP 220NH 5% LOW PRO
L5190	2462587T30	COIL CHIP 1uH
L5201	2462587N60	CHIP IND 390 NH 5%
L5203	2462587Q44	COIL CHIP 560nH
L5204	2462587N57	CHIP IND 220 NH 5%
L5301	2462587Q42	IND CHIP 390nH 10%
L5309	2462587Q20	IND CHIP 2.2uH 20%
L5361	2462587Q20	IND CHIP 2.2uH 20%
L5401	2460591B04	SQUARE COIL 11.03nH 4T
L5403	2462587V24	CHIP IND 15NH 5%
L5421	2460591A01	SQUARE COIL 4.22nH 3T
L5431	2485873L01	COIL SQ 18nH 3TNS
L5451	2462587N62	CHIP IND 560 NH 5%
L5452	2485873L01	COIL SQ 18nH 3TNS
L5461	2485873L01	COIL SQ 18nH 3TNS
L5462	2485873L01	COIL SQ 18nH 3TNS
L5501	2484657R01	Ferrite Bead
L5502	2484657R01	Ferrite Bead
L5503	2484657R01	Ferrite Bead
L5551	2462587N62	CHIP IND 560 NH 5%
L5601	2462587N60	CHIP IND 390 NH 5%
L5603	2462587N53	CHIP IND 100 nH 5%
L5604	2462587N60	CHIP IND 390 NH 5%
L5623	2462587V22	CHIP IND 8.2NH 5%
L5627	2462587V22	CHIP IND 8.2NH 5%
L5701	2462587V24	CHIP IND 15NH 5%
L5702	2462587V27	CHIP IND 27 NH 5%
L5711	2462587V27	CHIP IND 27 NH 5%
L5712	2462587V24	CHIP IND 15NH 5%
L5721	2462587V32	CHIP IND 68NH 5%
L5722	2462587T23	COIL CHIP 470nH
L5731	2462587T23	COIL CHIP 470nH
L5732	2460593C02	COIL MULT LAYERED TAP TEF RES
L5733	2462587T23	COIL CHIP 470nH

Reference	Motorola PN	Value
L5734	2462587T23	COIL CHIP 470nH
L5802	2462587V34	IND CHIP 100nH 5%
L5803	2462587V27	CHIP IND 27 NH 5%
L5804	2462587V24	CHIP IND 15NH 5%
L5805	2462587V24	CHIP IND 15NH 5%
L5806	2462587V34	IND CHIP 100nH 5%
L5807	2580443L01	TRAFO BALUN
L5809	2462587V28	CHIP IND 33 NH 5%
L5810	2462587V24	CHIP IND 15NH 5%
L5811	2462587V24	CHIP IND 15NH 5%
L5812	2580443L01	TRAFO BALUN
L5813	2462587N62	CHIP IND 560 NH 5%
M5421	2686201B01	HEAT SPREADER
Q5001	4813824A17	TSTR PNP 40V .2A B=100-
Q5002	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5031	4813827A07	TSTR NPN SML SIG MMBR941
Q5101	4813827A07	TSTR NPN SML SIG MMBR941
Q5180	4813827A07	TSTR NPN SML SIG MMBR941
Q5190	4813827A07	TSTR NPN SML SIG MMBR941
Q5201	4813827A07	TSTR NPN SML SIG MMBR941
Q5301	4805723X03	TRANS DUAL NPN-PNP UMD3N ROHM
Q5331	4880048M01	TSTR NPN DIG 47k/47k
Q5332	4813824A17	TSTR PNP 40V .2A B=100-
Q5351	4813827A07	TSTR NPN SML SIG MMBR941
Q5421	4886212B01	LDMOS PWR TSTR MRF1518
Q5431	4886163B01	LDMOS PWR TSTR MRF1535
Q5501	4813824A17	TSTR PNP 40V .2A B=100-
Q5521	4813824A17	TSTR PNP 40V .2A B=100-
Q5542	4813824A17	TSTR PNP 40V .2A B=100-
Q5551	4813824A17	TSTR PNP 40V .2A B=100-

Reference	Motorola PN	Value
Q5552	4802245J54	UMG5N DIGITAL TSTR
Q5601	4805218N63	RF TRANS SOT 323 BFQ67W
Q5602	4880048M01	TSTR NPN DIG 47k/47k
Q5621	4813827A07	TSTR NPN SML SIG MMBR941
Q5631	4813827A07	TSTR NPN SML SIG MMBR941
Q5651	4805723X02	TSTR DUAL PNP UMT1N ROHM
Q5671	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5681	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5701	4813827A07	TSTR NPN SML SIG MMBR941
Q5711	4805723X03	TRANS DUAL NPN-PNP UMD3N ROHM
Q5801	4813827A07	TSTR NPN SML SIG MMBR941
Q5802	4802245J54	UMG5N DIGITAL TSTR
Q5804	4813824A17	TSTR PNP 40V .2A B=100-
R5001	0662057A73	10k 1/16W 5%
R5002	0662057A57	2k2 1/16W 5%
R5003	0662057A69	6k8 1/16W 5%
R5004	0662057A49	1k 1/16W 5%
R5005	0662057A65	4k7 1/16W 5%
R5006	0662057A37	330 1/16W 5%
R5007	0662057A37	330 1/16W 5%
R5008	0662057A61	3k3 1/16W 5%
R5009	0662057A18	51 1/16W 5%
R5011	0662057A35	270 1/16W 5%
R5012	0662057A53	1k5 1/16W 5%
R5013	0662057A39	390 1/16W 5%
R5014	0662057A39	390 1/16W 5%
R5015	0662057A09	22 1/16W 5%
R5016	0662057A61	3k3 1/16W 5%
R5017	0662057A65	4k7 1/16W 5%
R5018	0662057A13	33 1/16W 5%
R5021	0662057A89	47k 1/16W 5%
R5022	0662057A97	100k 1/16W
R5025	0662057A49	1k 1/16W 5%

Reference	Motorola PN	Value
R5026	0662057A49	1k 1/16W 5%
R5027	0662057C13	2R7 1/10W 5%
R5031	0662057A53	1k5 1/16W 5%
R5032	0662057A57	2k2 1/16W 5%
R5036	0662057A49	1k 1/16W 5%
R5041	0662057A35	270 1/16W 5%
R5042	0662057B47	0 1/16W
R5044	0662057B47	0 1/16W
R5051	0662057A97	100k 1/16W
R5063	0662057A18	51 1/16W 5%
R5100	0662057A18	51 1/16W 5%
R5101	0662057A75	12k 1/16W 5%
R5102	0662057A83	27k 1/16W 5%
R5104	0662057A47	820 1/16W 5%
R5105	0662057A09	22 1/16W 5%
R5106	0662057A17	47 1/16W 5%
R5121	0662057A63	3k9 1/16W 5%
R5122	0662057A39	390 1/16W 5%
R5125	0662057A18	51 1/16W 5%
R5131	0662057A01	10 1/16W 5%
R5132	0662057A01	10 1/16W 5%
R5133	0662057A01	10 1/16W 5%
R5134	0662057A01	10 1/16W 5%
R5140	0662057A09	22 1/16W 5%
R5144	0662057A57	2k2 1/16W 5%
R5145	0662057A27	120 1/16W 5%
R5146	0662057A25	100 1/16W 5%
R5147	0662057A21	68 1/16W 5%
R5148	0662057A21	68 1/16W 5%
R5149	0662057A80	20k 1/16W 5%
R5151	0662057A01	10 1/16W 5%
R5152	0662057A01	10 1/16W 5%
R5157	0662057A89	47k 1/16W 5%
R5158	0662057A35	270 1/16W 5%
R5159	0662057B47	0 1/16W
R5160	0662057A49	1k 1/16W 5%
R5161	0662057A09	22 1/16W 5%
R5162	0662057A09	22 1/16W 5%
R5163	0662057A09	22 1/16W 5%
R5166	0662057A01	10 1/16W 5%
R5176	0662057A85	33k 1/16W 5%

Reference	Motorola PN	Value
R5177	0662057A41	470 1/16W 5%
R5179	0662057A35	270 1/16W 5%
R5180	0662057A61	3k3 1/16W 5%
R5181	0662057A91	56K 1/16W 5%
R5182	0662057B47	0 1/16W
R5183	0662057A25	100 1/16W 5%
R5184	0662057A51	1k2 1/16W 5%
R5185	0662057A09	22 1/16W 5%
R5186	0662057B05	200k 1/16W
R5187	0662057A35	270 1/16W 5%
R5189	0662057B47	0 1/16W
R5190	0662057A80	20k 1/16W 5%
R5191	0662057A85	33k 1/16W 5%
R5192	0662057A69	6k8 1/16W 5%
R5193	0662057A25	100 1/16W 5%
R5194	0662057A51	1k2 1/16W 5%
R5195	0662057A09	22 1/16W 5%
R5196	0662057B05	200k 1/16W
R5197	0662057A35	270 1/16W 5%
R5199	0662057B47	0 1/16W
R5204	0662057A75	12k 1/16W 5%
R5205	0662057A83	27k 1/16W 5%
R5206	0662057A65	4k7 1/16W 5%
R5207	0662057A35	270 1/16W 5%
R5208	0662057A45	680 OHMS 5%
R5209	0662057A53	1k5 1/16W 5%
R5210	0662057A05	15 1/16W 5%
R5301	0662057A57	2k2 1/16W 5%
R5302	0662057A47	820 1/16W 5%
R5303	0662057A55	1k8 1/16W 5%
R5304	0662057A37	330 1/16W 5%
R5311	0662057B47	0 1/16W
R5312	0662057A25	100 1/16W 5%
R5314	0662057A89	47k 1/16W 5%
R5315	0662057A25	100 1/16W 5%
R5316	0662057A25	100 1/16W 5%
R5321	0662057A25	100 1/16W 5%
R5322	0662057A21	68 1/16W 5%
R5323	0662057A21	68 1/16W 5%
R5330	0662057B10	330k 1/16W 5%
R5334	0662057A25	100 1/16W 5%

Reference	Motorola PN	Value
R5335	0662057A87	39k 1/16W 5%
R5336	0662057A84	30k 1/16W 5%
R5337	0662057A97	100k 1/16W
R5338	0662057A93	68k 1/16W 5%
R5339	0662057A71	8k2 1/16W 5%
R5351	0662057A49	1k 1/16W 5%
R5352	0662057A89	47k 1/16W 5%
R5353	0662057A25	100 1/16W 5%
R5354	0662057A65	4k7 1/16W 5%
R5355	0662057A49	1k 1/16W 5%
R5361	0662057A65	4k7 1/16W 5%
R5364	0662057A18	51 1/16W 5%
R5401	0662057A32	200 1/16W 5%
R5405	0662057A18	51 1/16W 5%
R5406	0662057A18	51 1/16W 5%
R5407	0662057A45	680 OHMS 5%
R5408	0662057B47	0 1/16W
R5419	0662057C51	100 1/10W 5%
R5420	0662057C51	100 1/10W 5%
R5431	0680194M18	51 1W 5%
R5451	0662057C55	150 0HMS 5%
R5452	0662057C55	150 0HMS 5%
R5453	0662057A31	180 1/16W 5%
R5454	0662057A25	100 1/16W 5%
R5455	0662057A23	82 1/16W 5%
R5461	0662057A73	10k 1/16W 5%
R5503	0662057A85	33k 1/16W 5%
R5504	0662057A87	39k 1/16W 5%
R5521	0662057A85	33k 1/16W 5%
R5522	0662057A87	39k 1/16W 5%
R5523	0662057A59	2k7 1/16W 5%
R5533	0662057C19	4R7 1/10W 5%
R5541	0662057A80	20k 1/16W 5%
R5542	0662057A89	47k 1/16W 5%
R5543	0662057A59	2k7 1/16W 5%
R5551	0662057A73	10k 1/16W 5%
R5552	0662057A59	2k7 1/16W 5%
R5553	0683962T51	120 1W 5%
R5556	0662057A65	4k7 1/16W 5%
R5601	0662057A69	6k8 1/16W 5%
R5604	0662057A71	8k2 1/16W 5%

Reference	Motorola PN	Value
R5605	0662057A31	180 1/16W 5%
R5606	0662057A13	33 1/16W 5%
R5607	0662057A13	33 1/16W 5%
R5621	0662057A73	10k 1/16W 5%
R5622	0662057A59	2k7 1/16W 5%
R5623	0662057A25	100 1/16W 5%
R5624	0662057A41	470 1/16W 5%
R5631	0662057A43	560 1/16W 5%
R5632	0662057A61	3k3 1/16W 5%
R5634	0662057A01	10 1/16W 5%
R5636	0662057A05	15 1/16W 5%
R5637	0662057A37	330 1/16W 5%
R5651	0662057A73	10k 1/16W 5%
R5652	0662057A18	51 1/16W 5%
R5653	0662057B47	0 1/16W
R5654	0662057A49	1k 1/16W 5%
R5655	0662057A49	1k 1/16W 5%
R5668	0662057A97	100k 1/16W
R5671	0662057A41	470 1/16W 5%
R5681	0662057A41	470 1/16W 5%
R5701	0662057A21	68 1/16W 5%
R5702	0662057A57	2k2 1/16W 5%
R5703	0662057A49	1k 1/16W 5%
R5704	0662057A09	22 1/16W 5%
R5706	0662057A18	51 1/16W 5%
R5707	0662057A25	100 1/16W 5%
R5711	0662057A25	100 1/16W 5%
R5712	0662057A37	330 1/16W 5%
R5713	0662057A37	330 1/16W 5%
R5714	0662057A31	180 1/16W 5%
R5715	0662057A01	10 1/16W 5%
R5721	0662057A49	1k 1/16W 5%
R5722	0662057A65	4k7 1/16W 5%
R5723	0662057A73	10k 1/16W 5%
R5725	0662057A79	18k 1/16W 5%
R5727	0662057A75	12k 1/16W 5%
R5731	0662057A09	22 1/16W 5%
R5732	0662057A25	100 1/16W 5%
R5733	0662057A13	33 1/16W 5%
R5734	0662057A29	150 1/16W 5%
R5803	0662057A15	39 1/16W 5%

Reference	Motorola PN	Value
R5804	0662057A05	15 1/16W 5%
R5806	0662057A57	2k2 1/16W 5%
R5807	0662057A29	150 1/16W 5%
R5808	0662057A29	150 1/16W 5%
R5809	0662057A05	15 1/16W 5%
R5811	0662057A51	1k2 1/16W 5%
R5813	0662057A18	51 1/16W 5%
R5814	0662057A05	15 1/16W 5%
R5815	0662057A51	1k2 1/16W 5%
R5816	0662057A45	680 OHMS 5%
R5817	0662057A18	51 1/16W 5%
R5818	0662057A18	51 1/16W 5%
R5819	0662057A23	82 1/16W 5%
R5830	0662057A17	47 1/16W 5%
R5831	0662057A29	150 1/16W 5%
R5832	0662057A29	150 1/16W 5%
R5837	0662057A45	680 OHMS 5%
R5840	0662057A65	4k7 1/16W 5%
R5841	0662057A21	68 1/16W 5%
R5843	0662057A21	68 1/16W 5%
R5845	0662057A59	2k7 1/16W 5%
R5846	0662057A65	4k7 1/16W 5%
R5847	0662057A94	75k 1/16W 5%
SH5602	2666500A01	SHIELD VCO
T5061	2508396X02	TRANSFORMER
T5062	2508397X02	TRANSFORMER
U5101	5185963A83	IC ABACUS III HP
U5102	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5103	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5201	9102867C12	73.35MHZ CRYSTAL FILTER
U5321	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5322	5105739X05	IC SOT 5V HI-PRECI-SION REGULA
U5331	5185963A27	IC TESTED AT25016 48 PIN GFP
U5401	5185130C65	IC VHF/UHF/800 MHZ LDMOS DRIV
U5501	5185963A15	TEMP SENSOR 1M5
U5601	2460593C01	COIL MULT LAYERED TAP TEF RES

Reference	Motorola PN	Value
U5701	5105750U54	VCO BUFFER PKG DIE
U5702	5185368C18	ESCORT IC IN 16 PIN QFN
U5801	5880334L02	450MHZ 90 DEG SPLITTER
U5802	5105457W85	CC ADDAG IC
U5803	5108428S43	LOW NOISE ODCT
VR5361	4813830A08	DIODE 3.0V 5% 225MW MMBZ5225B
Y5363	5102463J73	16.8MHZ ERIC TCXO 2PPM SMD

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers

Controller Parts on the Main Board

Reference Symbol	Motorola PN	Value
C0100	2113743E20	100nF 16V
C0101	2113743E20	100nF 16V
C0102	2113743E20	100nF 16V
C0103	2113743E20	100nF 16V
C0104	2113743E20	100nF 16V
C0105	2113743E20	100nF 16V
C0110	2113740F15	3.3pF 5% 50V NP0
C0113	2113743E07	22nF 16V
C0121	2113740F67	470pF 5% 50V NP0
C0122	2113740F49	82pF 5% 50V NP0
C0123	2113743E20	100nF 16V
C0124	2113740F49	82pF 5% 50V NP0
C0125	2113740F49	82pF 5% 50V NP0
C0127	2113740F67	470pF 5% 50V NP0
C0128	2113740F67	470pF 5% 50V NP0
C0129	2113740F67	470pF 5% 50V NP0
C0130	2113743L09	470 PF 10% X7R
C0131	2113740F67	470pF 5% 50V NP0
C0132	2113740F67	470pF 5% 50V NP0
C0133	2113740F67	470pF 5% 50V NP0
C0134	2113740F67	470pF 5% 50V NP0
C0135	2113740F67	470pF 5% 50V NP0
C0136	2113743N30	15.0PF 5% COG

Reference Symbol	Motorola PN	Value
C0137	2113740F39	33pF 5% 50V NP0
C0138	2113740F67	470pF 5% 50V NP0
C0139	2113740F39	33pF 5% 50V NP0
C0141	2113743E20	100nF 16V
C0142	2113740F67	470pF 5% 50V NP0
C0150	2113740F67	470pF 5% 50V NP0
C0151	2113740F67	470pF 5% 50V NP0
C0152	2113740F67	470pF 5% 50V NP0
C0154	2113740F67	470pF 5% 50V NP0
C0155	2113741F33	2.2nF 50V
C0156	2311049A07	CAP TANT CP 1uF 10% 16V
C0157	2113740F67	470pF 5% 50V NP0
C0158	2113740F67	470pF 5% 50V NP0
C0159	2113740F67	470pF 5% 50V NP0
C0200	2311049A57	CAP TANT CP 10uF 10% 16V
C0201	2311049A57	CAP TANT CP 10uF 10% 16V
C0202	2113743E20	100nF 16V
C0203	2113743E20	100nF 16V
C0204	2113743E20	100nF 16V
C0205	2113743E20	100nF 16V
C0213	2113743E20	100nF 16V
C0219	2113741F49	10nF 50V
C0220	2113743E20	100nF 16V
C0221	2311049A07	CAP TANT CP 1uF 10% 16V
C0222	2113743E20	100nF 16V
C0223	2113743E20	100nF 16V
C0224	2311049A57	CAP TANT CP 10uF 10% 16V
C0225	2113743E20	100nF 16V
C0226	2113743E20	100nF 16V
C0227	2113743E20	100nF 16V
C0228	2113740F57	180pF 5% 50V NP0
C0229	2113740F49	82pF 5% 50V NP0
C0230	2113741F37	3.3nF 50V
C0231	2311049A97	CAP TANT CHIP 33 UF 16
C0232	2113743E20	100nF 16V
C0233	2113741F25	1nF 50V

Reference Symbol	Motorola PN	Value
C0234	2113741F25	1nF 50V
C0235	2113741F25	1nF 50V
C0300	2113740F67	470pF 5% 50V NP0
C0301	2113740F67	470pF 5% 50V NP0
C0302	2311049A97	CAP TANT CHIP 33 UF 16
C0303	2113743E20	100nF 16V
C0304	2113740F67	470pF 5% 50V NP0
C0305	2380090M24	LYT 10uF 50V 20%
C0306	2380090M24	LYT 10uF 50V 20%
C0307	2113741F49	10nF 50V
C0308	2311049A97	CAP TANT CHIP 33 UF 16
C0309	2311049A97	CAP TANT CHIP 33 UF 16
C0310	2311049C06	CAP TANT CP 22uF 20% 35V
C0312	2113743E20	100nF 16V
C0313	2113743E20	100nF 16V
C0315	2311049A97	CAP TANT CHIP 33 UF 16
C0316	2311049A57	CAP TANT CP 10uF 10% 16V
C0317	2113740F67	470pF 5% 50V NP0
C0319	2113743E20	100nF 16V
C0321	2113743E20	100nF 16V
C0322	2311049A99	CAP TANT CP 47uF 20% 10V
C0323	2311049A57	CAP TANT CP 10uF 10% 16V
C0324	2311049A09	CAP TANT CP 2.2uF 10% 20V
C0325	2311049A09	CAP TANT CP 2.2uF 10% 20V
C0326	2113743E07	22nF 16V
C0328	2311049A99	CAP TANT CP 47uF 20% 10V
C0329	2311049A97	CAP TANT CHIP 33 UF 16
C0331	2311049A99	CAP TANT CP 47uF 20% 10V
C0333	2113743E20	100nF 16V
C0335	2113740F67	470pF 5% 50V NP0
C0336	2113740F67	470pF 5% 50V NP0
C0337	2113740F67	470pF 5% 50V NP0

Reference Symbol	Motorola PN	Value
C0338	2113740F67	470pF 5% 50V NP0
C0339	2113740F67	470pF 5% 50V NP0
C0340	2113743E20	100nF 16V
C0341	2113743E20	100nF 16V
C0401	2113743E20	100nF 16V
C0402	2113740F49	82pF 5% 50V NP0
C0403	2113740F49	82pF 5% 50V NP0
C0404	2113741F49	10nF 50V
C0405	2113740F57	180pF 5% 50V NP0
C0406	2113740F57	180pF 5% 50V NP0
C0407	2113740F57	180pF 5% 50V NP0
C0408	2113740F57	180pF 5% 50V NP0
C0409	2311049A09	CAP TANT CP 2.2uF 10% 20V
C0410	2113740F57	180pF 5% 50V NP0
C0411	2113740F57	180pF 5% 50V NP0
C0412	2113740F57	180pF 5% 50V NP0
C0413	2113740F57	180pF 5% 50V NP0
C0414	2113740F57	180pF 5% 50V NP0
C0415	2113740F57	180pF 5% 50V NP0
C0416	2113740F49	82pF 5% 50V NP0
C0417	2113741F49	10nF 50V
C0418	2113740F49	82pF 5% 50V NP0
C0419	2113740F49	82pF 5% 50V NP0
C0502	2113743P01	180 PF 5% 16V
C0503	2113743N48	82.0 PF 5% COG
C0504	2113743P01	180 PF 5% 16V
C0505	2113743P01	180 PF 5% 16V
C0506	2113743P01	180 PF 5% 16V
C0507	2113743P01	180 PF 5% 16V
C0508	2113743P01	180 PF 5% 16V
C0509	2113743P01	180 PF 5% 16V
C0510	2113743P01	180 PF 5% 16V
C0511	2113743P01	180 PF 5% 16V
C0512	2113743P01	180 PF 5% 16V
C0513	2113743N48	82.0 PF 5% COG
C0515	2113743N48	82.0 PF 5% COG
C0517	2113743N48	82.0 PF 5% COG
C0519	2113743P01	180 PF 5% 16V
C0520	2113743P01	180 PF 5% 16V

Reference Symbol	Motorola PN	Value
C0521	2113743P01	180 PF 5% 16V
C0522	2113743N48	82.0 PF 5% COG
C0523	2113743N48	82.0 PF 5% COG
C0524	2113743N48	82.0 PF 5% COG
C0525	2113743N48	82.0 PF 5% COG
C0526	2113743P01	180 PF 5% 16V
C0527	2113743P01	180 PF 5% 16V
C0528	2113743P01	180 PF 5% 16V
C0529	2113743N48	82.0 PF 5% COG
C0530	2113743N48	82.0 PF 5% COG
C0531	2113743N48	82.0 PF 5% COG
C0532	2113743N48	82.0 PF 5% COG
C0533	2113743N48	82.0 PF 5% COG
C0534	2113743N48	82.0 PF 5% COG
C0535	2113743N48	82.0 PF 5% COG
C0536	2113743N48	82.0 PF 5% COG
C0537	2113743P01	180 PF 5% 16V
C0538	2113743P01	180 PF 5% 16V
C0540	2113743P01	180 PF 5% 16V
C0551	2113740F49	82pF 5% 50V NP0
C0552	2113740F57	180pF 5% 50V NP0
C0553	2113740F57	180pF 5% 50V NP0
C0555	2113740F49	82pF 5% 50V NP0
C0556	2113740F57	180pF 5% 50V NP0
C0557	2113740F57	180pF 5% 50V NP0
C0558	2113740F49	82pF 5% 50V NP0
C0559	2113740F49	82pF 5% 50V NP0
C0560	2113740F57	180pF 5% 50V NP0
C0561	2113740F57	180pF 5% 50V NP0
D0100	4813833C02	DIODE DUAL SOT MMBD6100
D0102	4880154K03	DIODE DUAL SCHOT-TKY SOT23
D0161	4813833C02	DIODE DUAL SOT MMBD6100
D0300	4813833C02	DIODE DUAL SOT MMBD6100
D0301	4813833C02	DIODE DUAL SOT MMBD6100
D0303	4813833C02	DIODE DUAL SOT MMBD6100
D0304	4813833C02	DIODE DUAL SOT MMBD6100

Reference Symbol	Motorola PN	Value
D0325	4813833C02	DIODE DUAL SOT MMBD6100
E0100	GMZN4001B	MILAN HDI CNTRL MOD 1M
E0300	2484657R01	Ferrite Bead
F0302	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL0200	5105109Z38	3 VOLT LINEAR PCM CODEC FILTER
J0301	0986165B01	DC PWR CONN
J0400	0986105B01	CONNECTOR SMD 20 PIN
J0450	0905505Y04	CONN ZIF HORIZON-TAL
J0500	0905505Y04	CONN ZIF HORIZON-TAL
J0550	0902636Y02	CONNECTOR FLEX 12 PIN
J0570	0905505Y03	CONN ZIF 18PIN
L0231	2484657R01	Ferrite Bead
L0232	2484657R01	Ferrite Bead
M0301	3980502Z01	CONTACT, BACKUP B+
M0302	3980501Z01	CONTACT, BACKUP B-
Q0100	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0150	4802245J54	UMG5N DIGITAL TSTR
Q0152	4802245J54	UMG5N DIGITAL TSTR
Q0156	4880048M01	TSTR NPN DIG 47k/47k
Q0157	4880048M01	TSTR NPN DIG 47k/47k
Q0158	4880048M01	TSTR NPN DIG 47k/47k
Q0159	4880052M01	TSTR NPN DRLNGTN MXTA
Q0160	4880048M01	TSTR NPN DIG 47k/47k
Q0161	4805723X03	TRANS DUAL NPN-PNP UMD3N ROHM
Q0200	4880048M01	TSTR NPN DIG 47k/47k
Q0201	4802245J54	UMG5N DIGITAL TSTR

Reference Symbol	Motorola PN	Value
Q0202	4880048M01	TSTR NPN DIG 47k/47k
Q0203	4880048M01	TSTR NPN DIG 47k/47k
Q0300	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0301	4805723X03	TRANS DUAL NPN-PNP UMD3N ROHM
Q0302	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0303	4880048M01	TSTR NPN DIG 47k/47k
Q0305	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0341	4813824A17	TSTR PNP 40V .2A B=100-
Q0342	4880048M01	TSTR NPN DIG 47k/47k
R0100	0662057A89	47k 1/16W 5%
R0103	0662057A01	10 1/16W 5%
R0104	0662057A01	10 1/16W 5%
R0105	0662057A01	10 1/16W 5%
R0106	0662057A89	47k 1/16W 5%
R0108	0662057A89	47k 1/16W 5%
R0109	0662057B47	0 1/16W
R0111	0662057A01	10 1/16W 5%
R0113	0662057A73	10k 1/16W 5%
R0115	0662057A94	75k 1/16W 5%
R0117	0662057A84	30k 1/16W 5%
R0118	0662057A77	15k 1/16W 5%
R0119	0662057A73	10k 1/16W 5%
R0120	0662057A65	4k7 1/16W 5%
R0128	0662057A51	1k2 1/16W 5%
R0129	0662057A89	47k 1/16W 5%
R0130	0662057B47	0 1/16W
R0132	0662057A45	CHIP RES 680 OHMS 5%
R0133	0662057A89	47k 1/16W 5%
R0134	0662057A45	CHIP RES 680 OHMS 5%
R0136	0662057A89	47k 1/16W 5%
R0137	0662057A89	47k 1/16W 5%
R0138	0662057B47	0 1/16W
R0150	0662057A89	47k 1/16W 5%

Reference Symbol	Motorola PN	Value
R0151	0662057A57	2k2 1/16W 5%
R0153	0662057A89	47k 1/16W 5%
R0154	0662057A57	2k2 1/16W 5%
R0156	0662057A89	47k 1/16W 5%
R0159	0662057A89	47k 1/16W 5%
R0160	0662057A65	4k7 1/16W 5%
R0161	0662057A89	47k 1/16W 5%
R0162	0662057A89	47k 1/16W 5%
R0163	0662057A89	47k 1/16W 5%
R0164	0662057B47	0 1/16W
R0165	0662057A65	4k7 1/16W 5%
R0166	0662057A73	10k 1/16W 5%
R0167	0662057A89	47k 1/16W 5%
R0168	0662057A73	10k 1/16W 5%
R0170	0662057A73	10k 1/16W 5%
R0171	0662057A73	10k 1/16W 5%
R0200	0662057A43	560 1/16W 5%
R0201	0662057A25	100 1/16W 5%
R0202	0662057A25	100 1/16W 5%
R0203	0662057A43	560 1/16W 5%
R0204	0662057B05	200k 1/16W
R0205	0662057B05	200k 1/16W
R0206	0662057A89	47k 1/16W 5%
R0207	0662057A89	47k 1/16W 5%
R0208	0662057A89	47k 1/16W 5%
R0218	0662057A73	10k 1/16W 5%
R0220	0662057A49	1k 1/16W 5%
R0221	0662057A25	100 1/16W 5%
R0222	0662057A73	10k 1/16W 5%
R0223	0662057A65	4k7 1/16W 5%
R0224	0662057A77	15k 1/16W 5%
R0225	0662057A49	1k 1/16W 5%
R0228	0662057A73	10k 1/16W 5%
R0237	0662057A77	15k 1/16W 5%
R0238	0662057A83	27k 1/16W 5%
R0239	0662057A75	12k 1/16W 5%
R0240	0662057A97	100k 1/16W
R0241	0662057A77	15k 1/16W 5%
R0242	0662057B08	270k 1/16W 5%
R0243	0662057A83	27k 1/16W 5%

Reference Symbol	Motorola PN	Value
R0244	0662057A73	10k 1/16W 5%
R0245	0662057A61	3k3 1/16W 5%
R0300	0662057A49	1k 1/16W 5%
R0301	0662057A94	75k 1/16W 5%
R0302	0662057A73	10k 1/16W 5%
R0303	0662057A89	47k 1/16W 5%
R0304	0662057A65	4k7 1/16W 5%
R0305	0660076E70	FILM 7500 1 1
R0306	0660076E51	FILM 1200 1 1
R0307	0660076E70	FILM 7500 1 1
R0308	0660076E51	FILM 1200 1 1
R0309	0662057A73	10k 1/16W 5%
R0310	0662057A89	47k 1/16W 5%
R0311	0662057A53	1k5 1/16W 5%
R0314	0662057A49	1k 1/16W 5%
R0318	0662057A87	39k 1/16W 5%
R0319	0662057A83	27k 1/16W 5%
R0321	0662057B47	0 1/16W
R0322	0662057B47	0 1/16W
R0325	0662057A65	4k7 1/16W 5%
R0341	0662057A65	4k7 1/16W 5%
R0342	0662057A97	100k 1/16W
R0343	0662057A89	47k 1/16W 5%
R0344	0662057A89	47k 1/16W 5%
R0400	0662057A89	47k 1/16W 5%
R0402	0662057A65	4k7 1/16W 5%
R0403	0662057A73	10k 1/16W 5%
R0404	0662057A65	4k7 1/16W 5%
R0405	0662057A51	1k2 1/16W 5%
R0406	0662057A73	10k 1/16W 5%
R0407	0662057A33	220 1/16W 5%
R0408	0662057A33	220 1/16W 5%
R0409	0662057A43	560 1/16W 5%
R0410	0662057A97	100k 1/16W
R0411	0662057A33	220 1/16W 5%
R0412	0662057A33	220 1/16W 5%
R0413	0662057A73	10k 1/16W 5%
R0415	0662057A25	100 1/16W 5%
R0505	0662057A09	22 1/16W 5%
R0527	0662057A65	4k7 1/16W 5%

Reference Symbol	Motorola PN	Value
R0555	0662057A41	470 1/16W 5%
R0557	0662057A01	10 1/16W 5%
R0559	0662057A01	10 1/16W 5%
R0562	0662057B47	0 1/16W
R0571	0662057A89	47k 1/16W 5%
U0100	5164602A01	IC DS1306EN SERIAL RTC
U0102	5113820A02	IC DUAL SING SPLY LO PWR
U0103	5113820A02	IC DUAL SING SPLY LO PWR
U0150	5185765B26	IC POWER CONTROL PASS
U0201	5184704M60	IC-CMOS 04M60 ANALOS
U0202	5105750U28	SNGL ANALOG SWITCH SMD
U0203	5185963A52	IC DIG POT LIN X9315
U0204	5185963A52	IC DIG POT LIN X9315
U0205	5109699X01	AUDIO PA TDA1519C
U0206	5183222M49	IC QUAD OPAMP __3403_
U0300	5183308X01	ADJ VLTG REG LM2941 TO263
U0301	5183308X01	ADJ VLTG REG LM2941 TO263
U0302	5183308X01	ADJ VLTG REG LM2941 TO263
U0303	5113816A07	REG 5V POS 500MA MC78M05
U0304	5105469E65	IC VLTG REGLTR LP2951C
U0305	5113816M39	VLTG REG LP2951ACD-3.0R2
U0306	5105469E65	IC VLTG REGLTR LP2951C
U0307	5113816A62	VLTG REG MC33275 3.0V
U0308	5113815A54	UNDERVLTG SENS CKT MC33465N-28
VR0163	4813830A15	DIODE 5.6V 5% 225mW
VR0300	4813832C77	TRANS SUP. 24V HIGH PWR
VR0301	4880140L15	DIODE SOT ZENER 10V TA

Reference Symbol	Motorola PN	Value
VR0325	4813830A14	DIODE 5.1V 5% 225mW
VR0401	4805656W09	DIODE ZENER QUAD MMQA20VT1
VR0402	4805656W09	DIODE ZENER QUAD MMQA20VT1
VR0403	4805656W09	DIODE ZENER QUAD MMQA20VT1
VR0404	4813830A15	DIODE 5.6V 5% 225mW
VR0405	4813830A15	DIODE 5.6V 5% 225mW
VR0406	4813830A40	SOC23 AUTO SDN
VR0407	4813830A40	SOC23 AUTO SDN
VR0408	4813830A15	DIODE 5.6V 5% 225mW
VR0409	4813830A15	DIODE 5.6V 5% 225mW
VR0410	4813830A15	DIODE 5.6V 5% 225mW
Y0101	4809995L05	XTAL QUARTZ 32.768KHZ

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

Parts on the HDI Controller Board

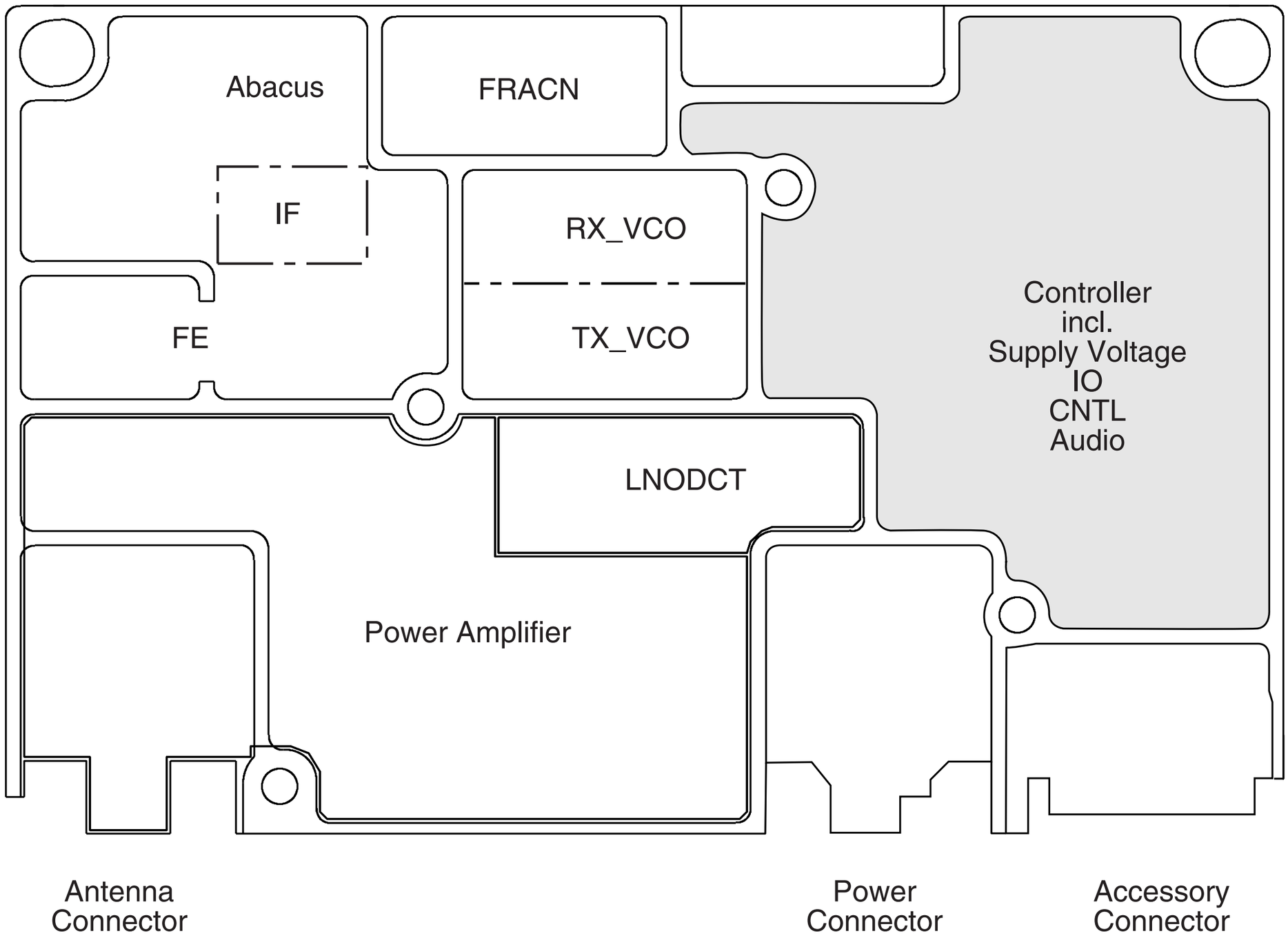
Reference Symbol	Motorola PN	Value
C0100	2113743L41	CAP CHIP 10000 PF 10% X7R
C0101	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0102	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0103	2113743L41	CAP CHIP 10000 PF 10% X7R
C0104	2113743L41	CAP CHIP 10000 PF 10% X7R
C0105	2113743L33	CAP CHIP 4700 PF 10% X7R
C0106	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C0107	2113740F57	CAP CHIP REEL CL1 +/-30 180
C0108	2113928E01	CAP CER CHIP 1.0 UF 10 % 10V
C0109	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0111	2113928E01	CAP CER CHIP 1.0 UF 10 % 10V
C0112	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C0113	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0114	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0115	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0116	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0117	2113743L41	CAP CHIP 10000 PF 10% X7R
C0118	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0119	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0120	2113743L41	CAP CHIP 10000 PF 10% X7R
C0121	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0122	2113743L41	CAP CHIP 10000 PF 10% X7R
C0123	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0124	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0125	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0126	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0127	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0129	2113740F57	CAP CHIP REEL CL1 +/-30 180
E0100	2480067M02	CHK RF CHIP BEAD INDUCTOR
E0101	2480067M02	CHK RF CHIP BEAD INDUCTOR
E0102	2480067M02	CHK RF CHIP BEAD INDUCTOR
R0101	NOTPLACED	GCAM DUMMY PART NUMBER
R0102	0662057M01	RES. CHIP 0 5% 20X40
R0103	0662057N07	RES. CHIP 22K 5% 20X40
R0104	0662057M42	RES. CHIP 47 5% 20X40
R0108	NOTPLACED	GCAM DUMMY PART NUMBER
R0121	0662057N07	RES. CHIP 22K 5% 20X40
R0122	0662057M76	RES. CHIP 1200 5% 20X40
U0100	5185368C99	IC REDCAP
U0101	5109509A43	IC SRAM 512X16 70NS 7X9MM
U0102	5185130C97	IC 32MBIT FLASH 28F320C3

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

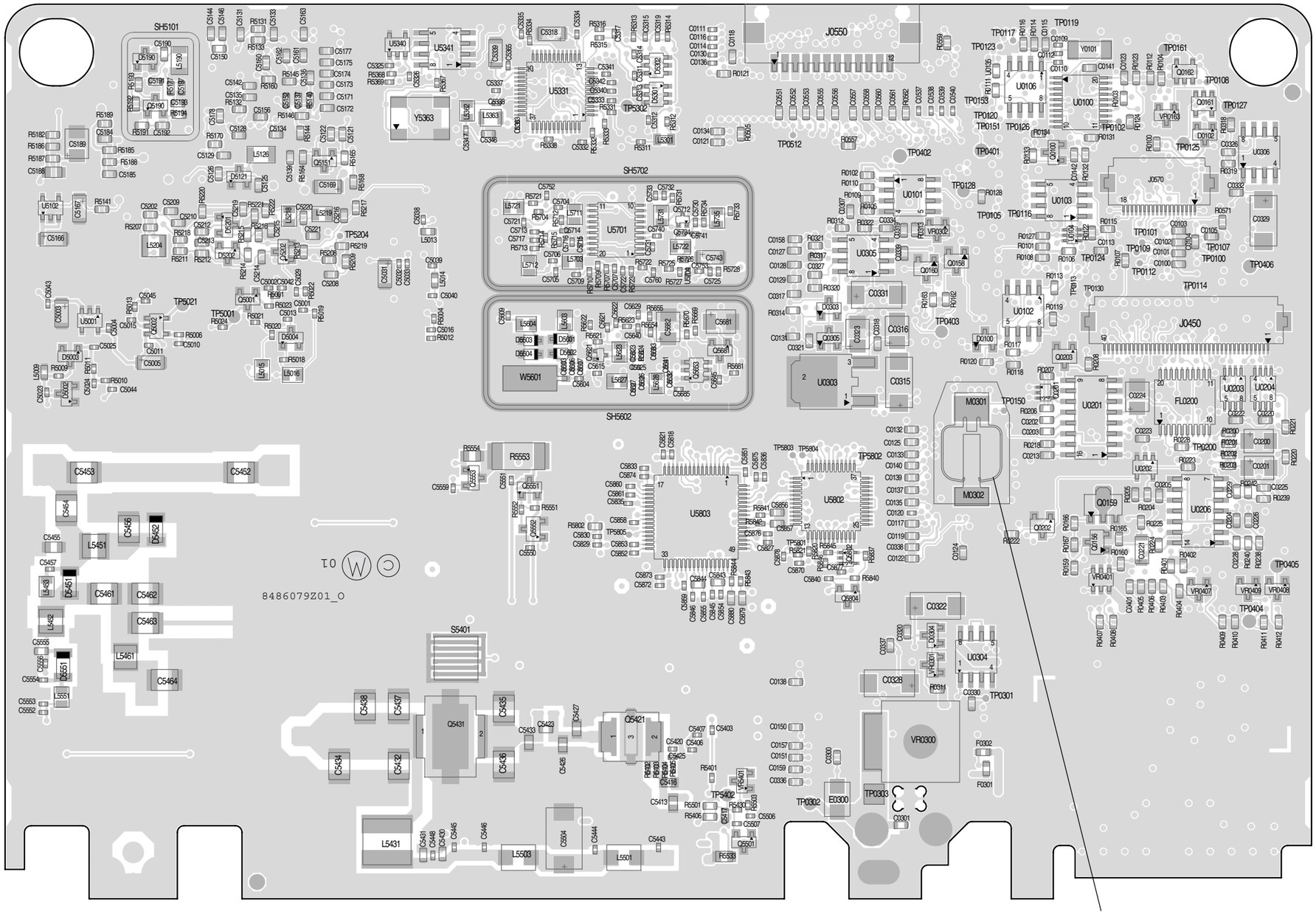
CHAPTER 8.2.1

Transceiver 800MHz (PCB No. 8486079Z01_O): SCHEMATICS, PCBs and PARTS LISTS

SCHEMATICS and PCBS

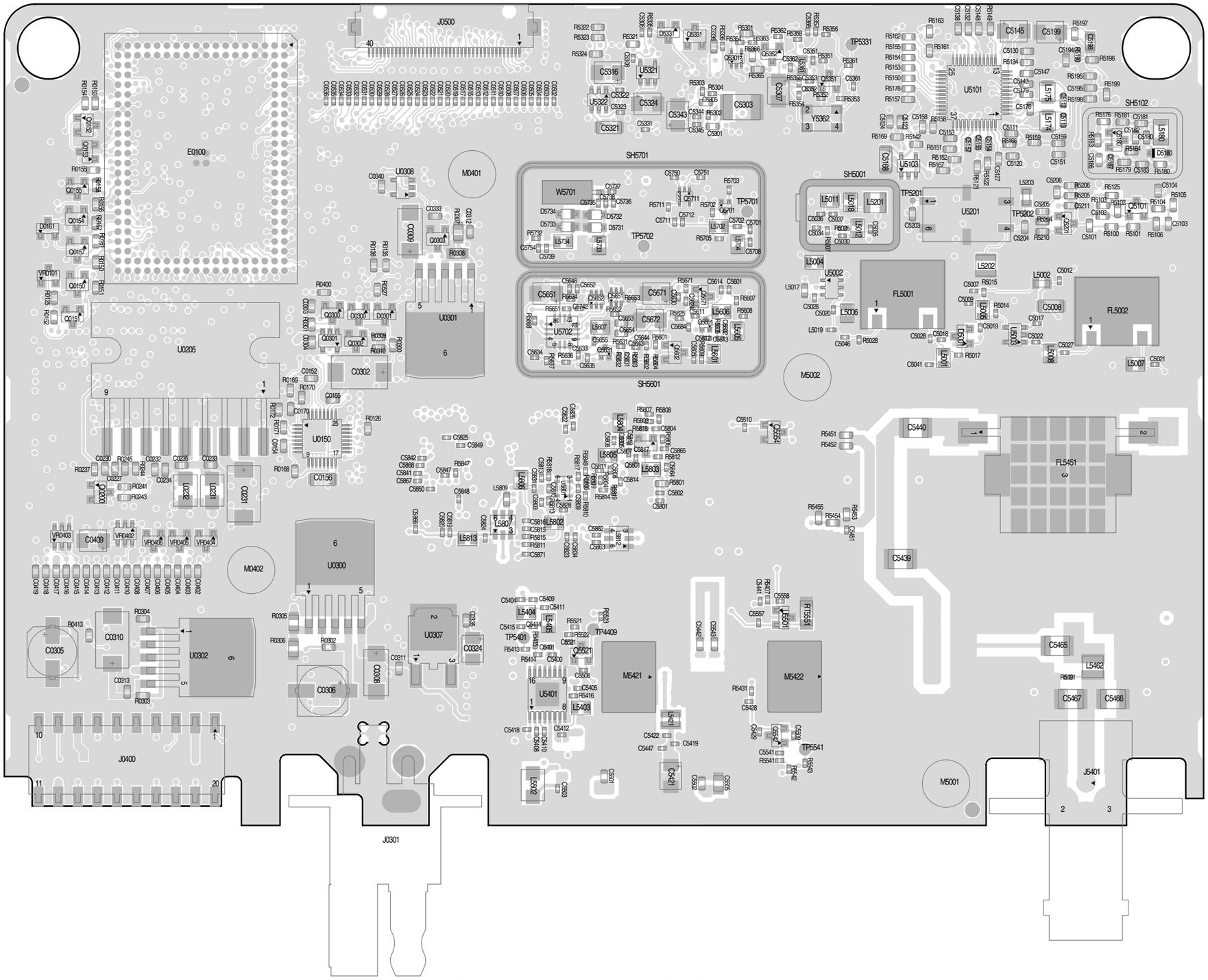


CHASSIS_OVERVIEW TRANSCEIVER

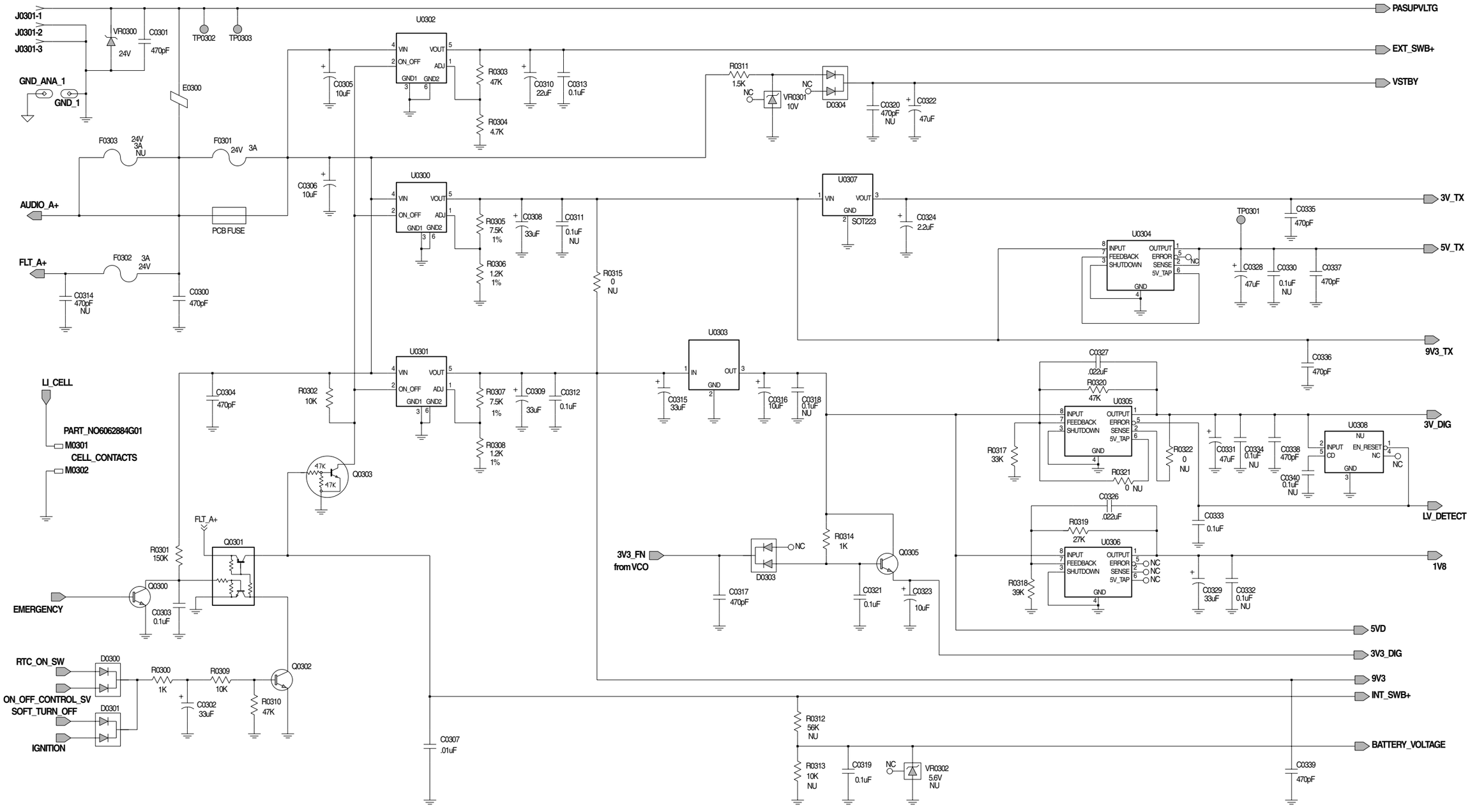


CAUTION: Risk of Explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
ACHTUNG: Explosionsgefahr, bei Einsatz einer falschen Ersatzbatterie. Entsorgung gebrauchter Batterien entprechend Vorschrift.

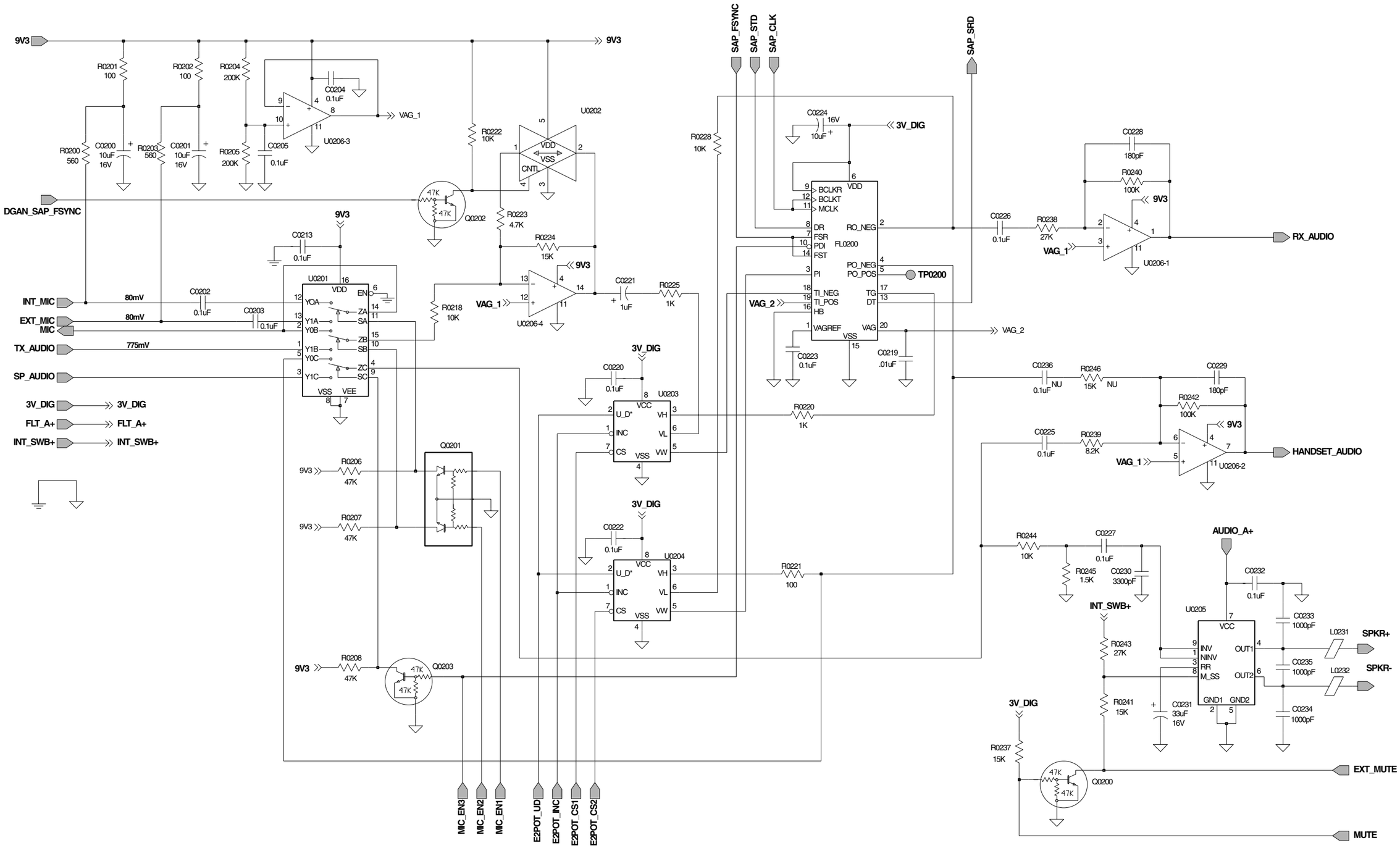
PCB / Main Board 8486079Z01_O / BOTTOM SIDE



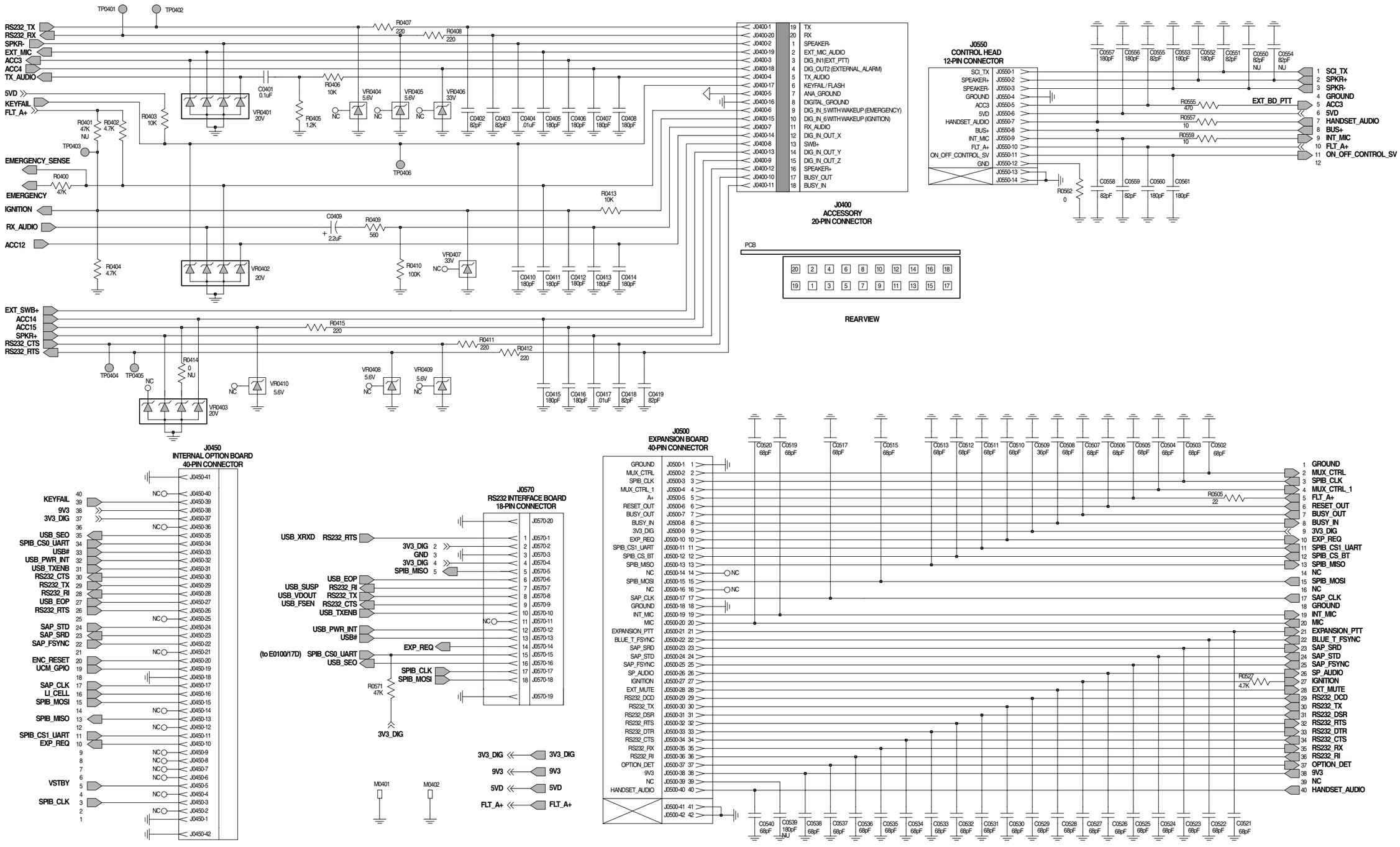
PCB / Main Board 8486079Z01_O / TOP SIDE



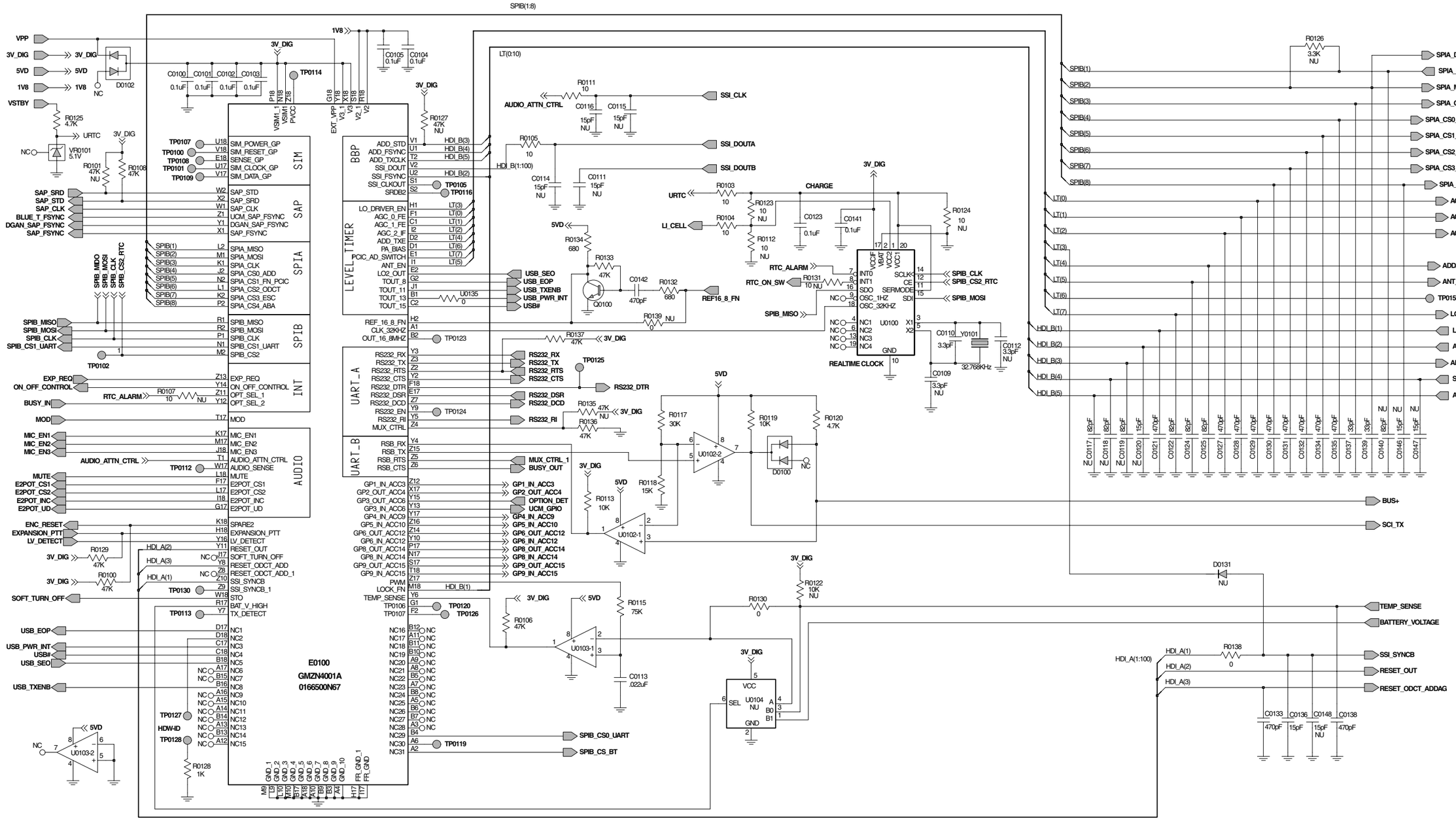
Main Board 8486079Z01_O / CNTRL_SUPPLY_VOLTAGE



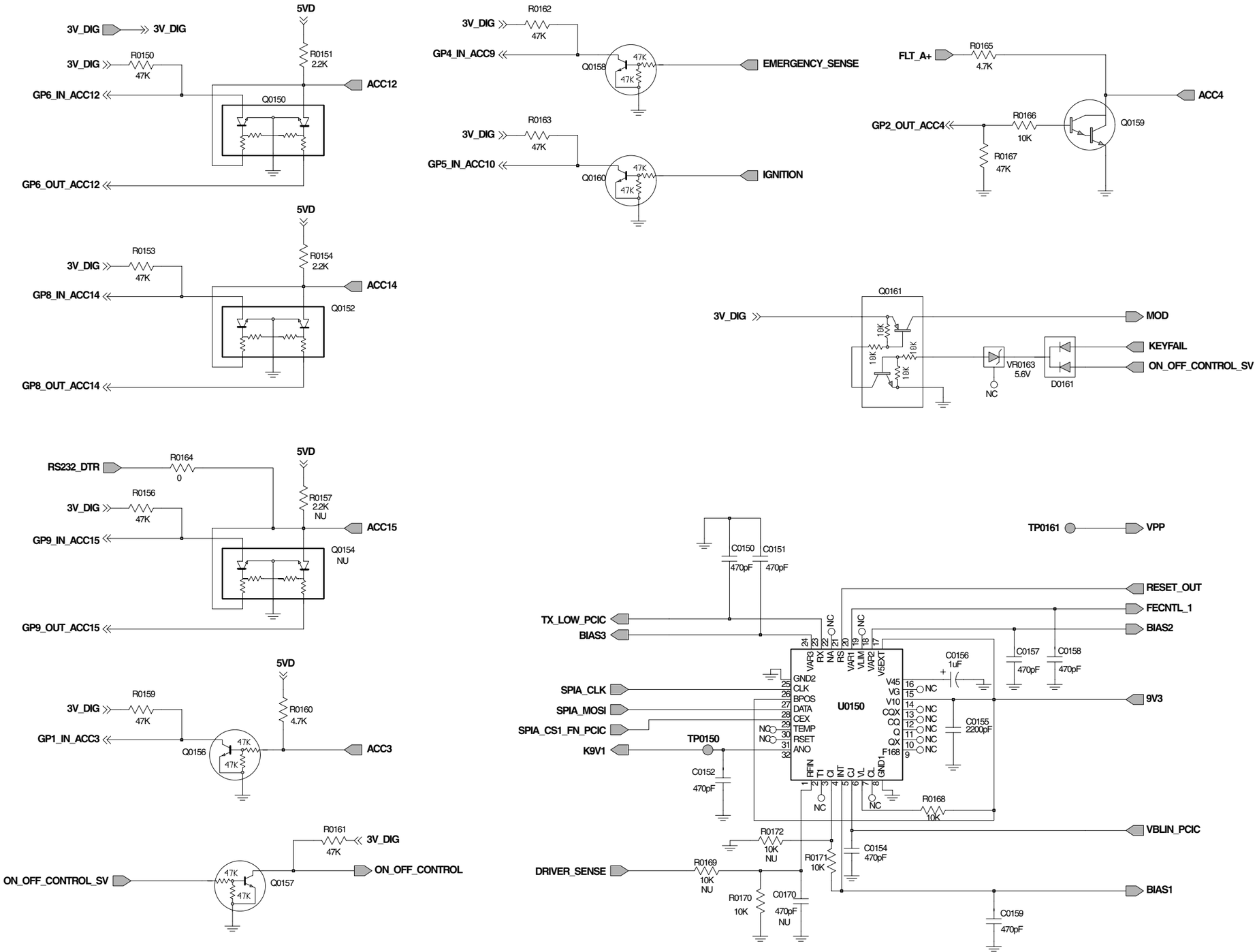
Main Board 8486079Z01_O / CNTRL_AUDIO_POWER_AMPLIFIER



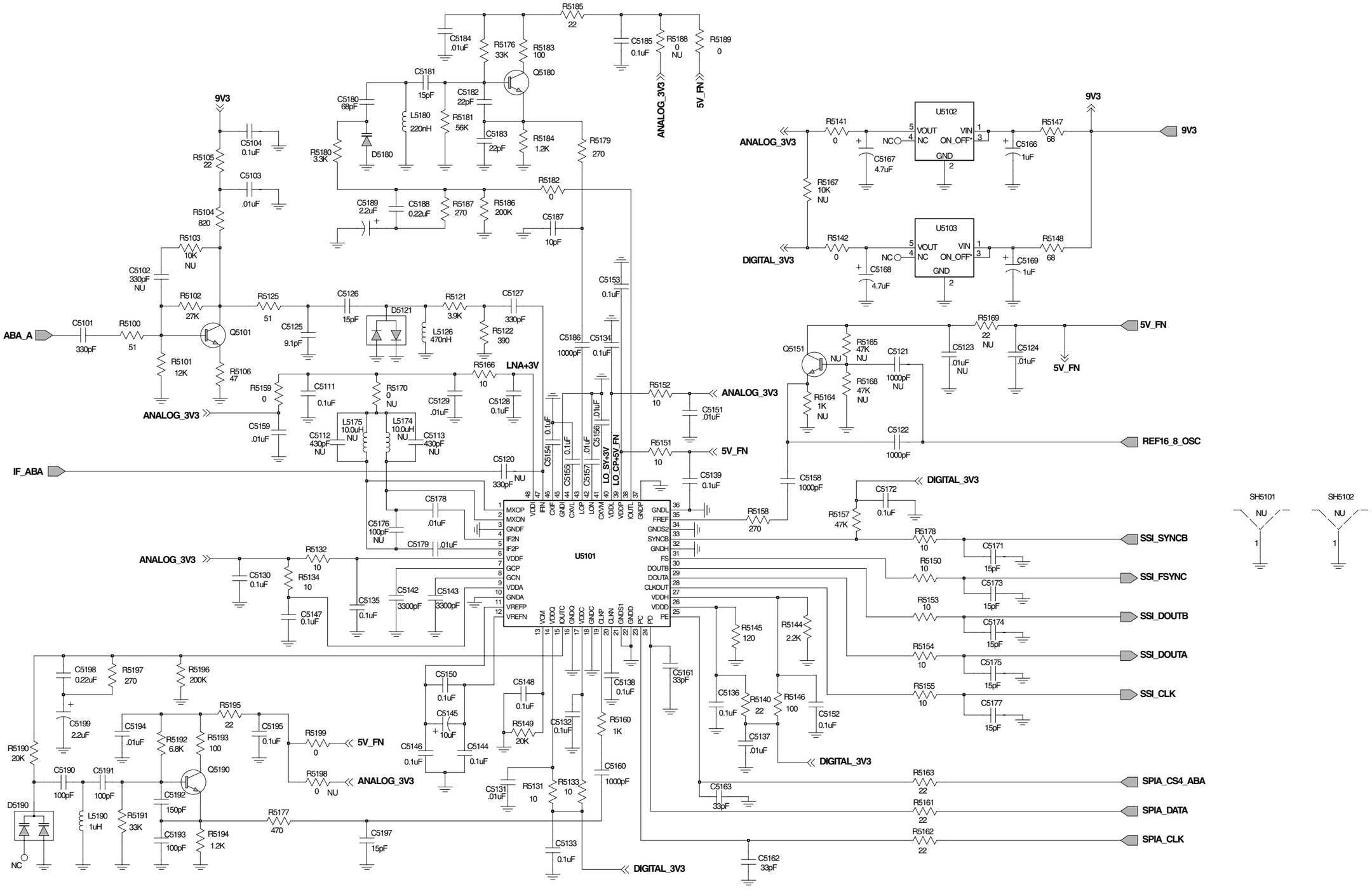
Main Board 8486079Z01_O / CNTRL_I/O



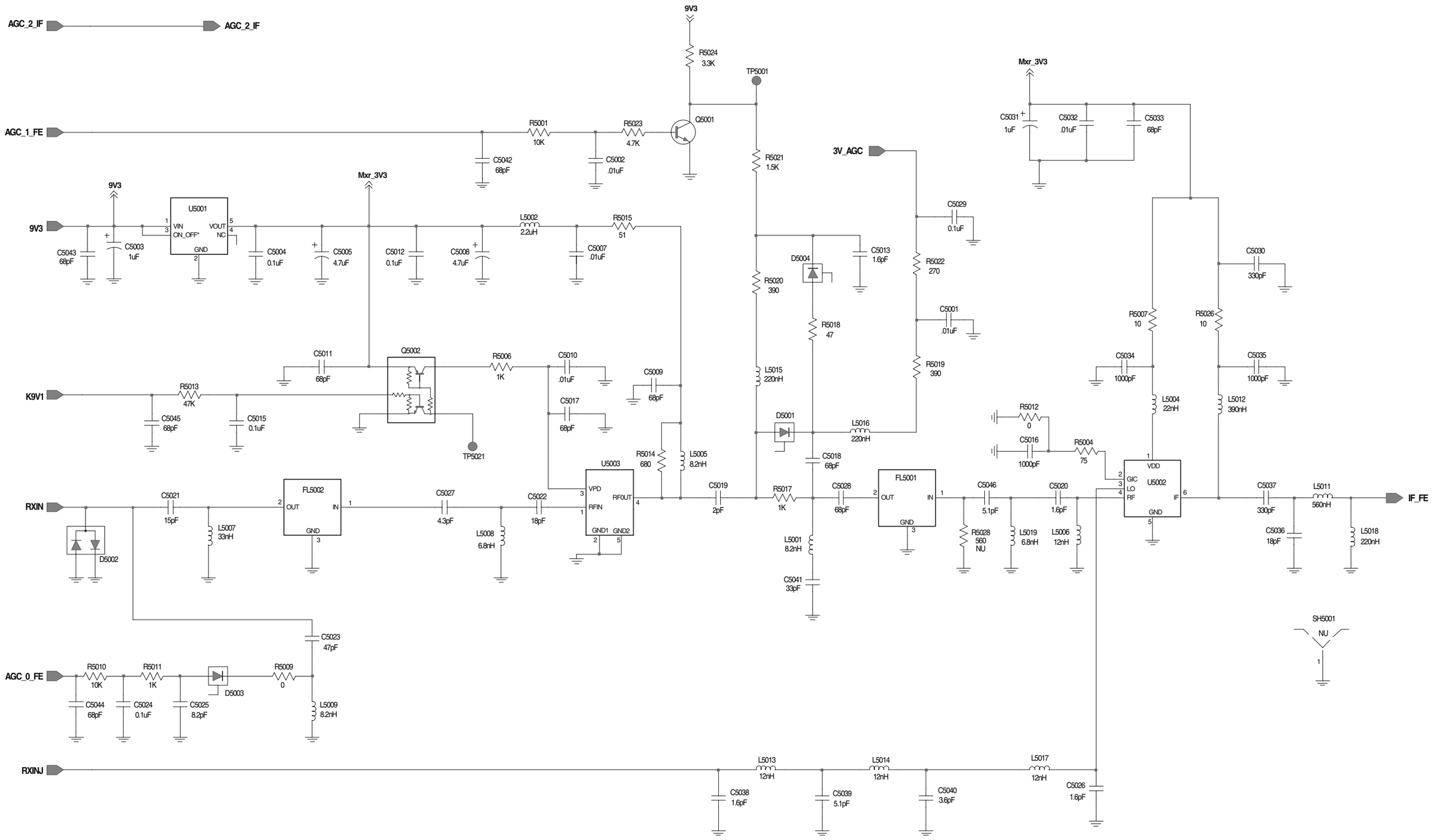
Main Board 8486079Z01_O / CNTRL_CNTL (Sheet1)



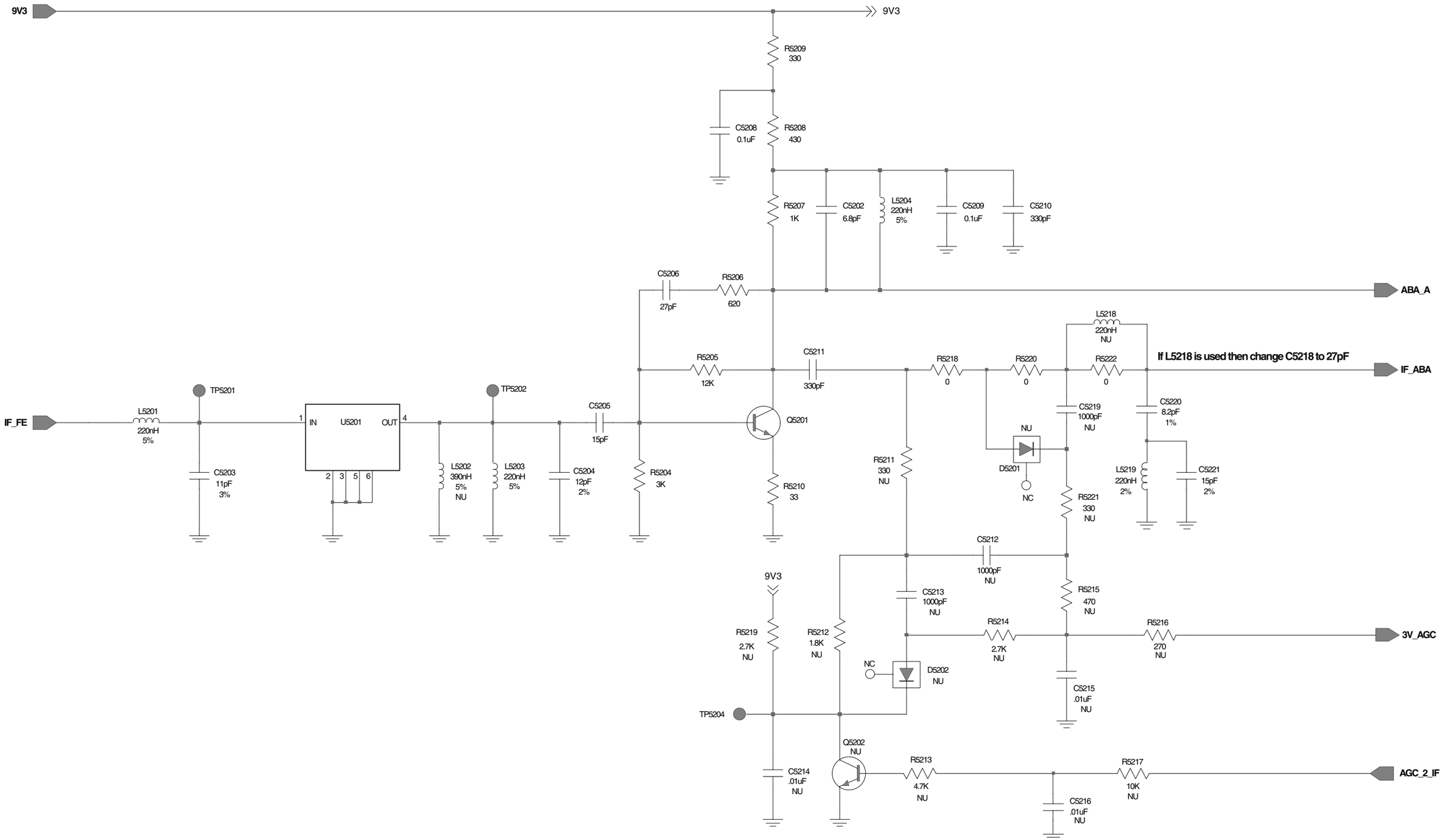
Main Board 8486079Z01_O / CNTRL_CNTL (Sheet 2)



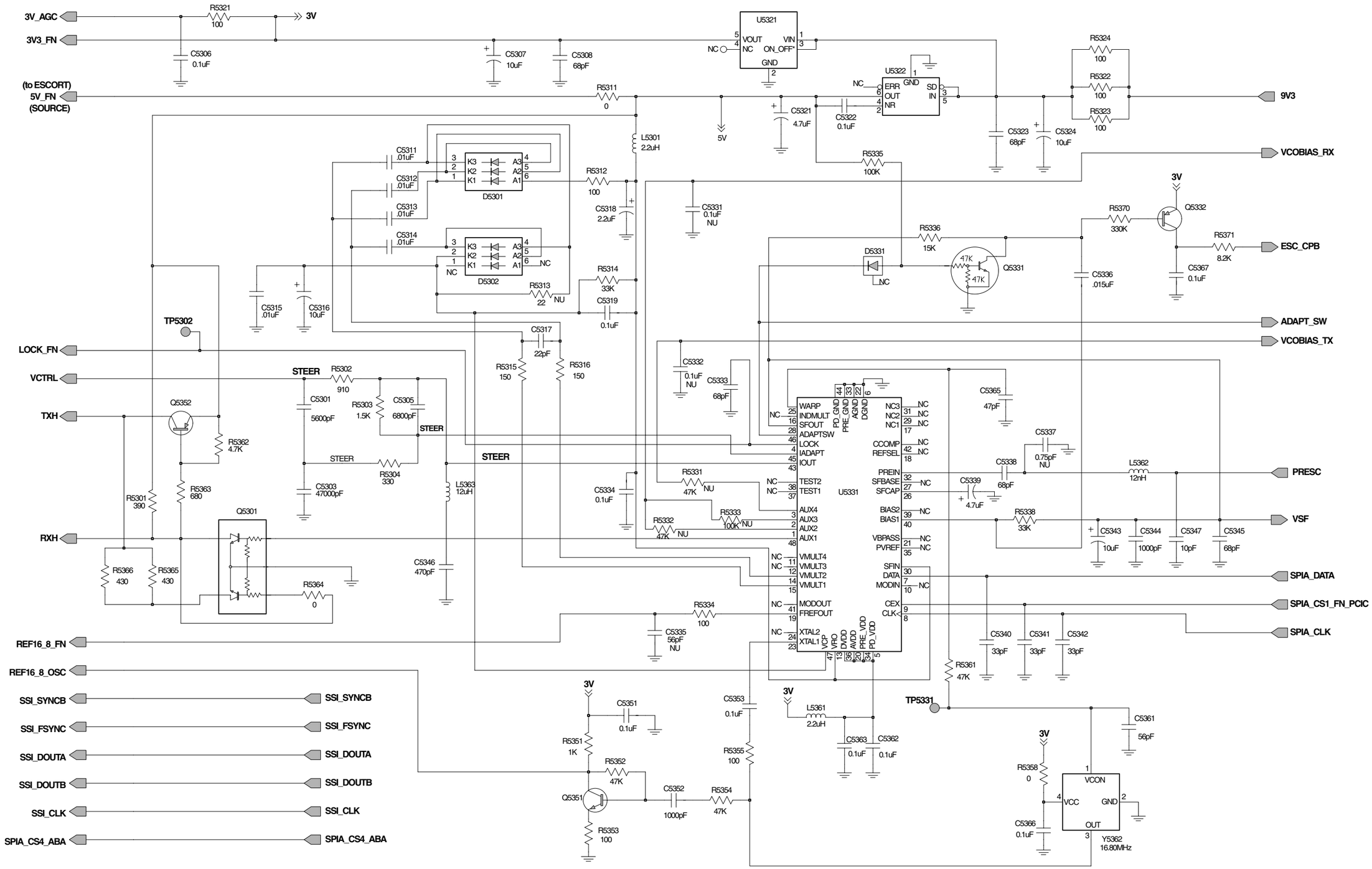
Main Board 8486079Z01_O / RF_ABACUS



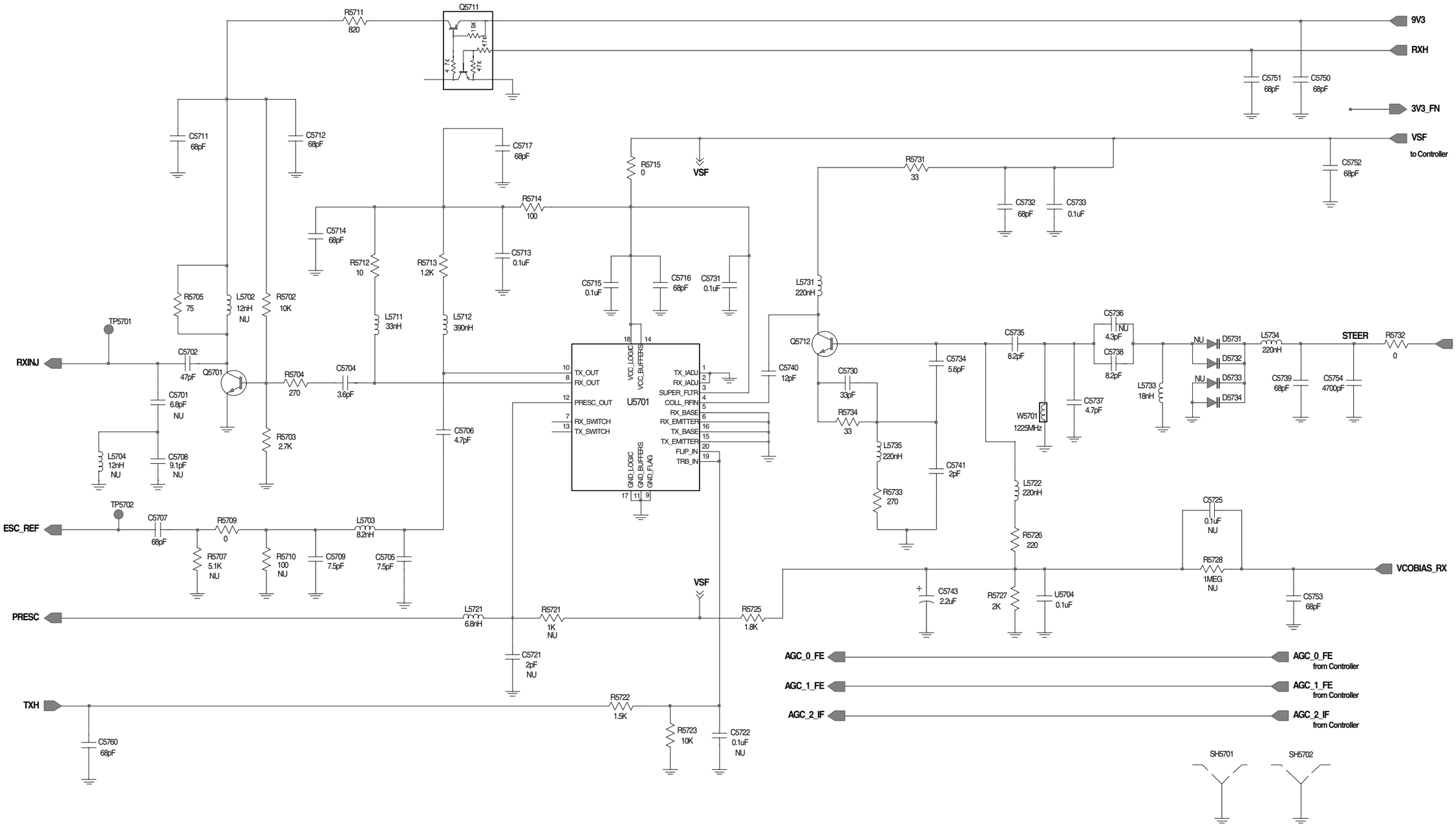
Main Board 8486079Z01_O / RF_Front_End



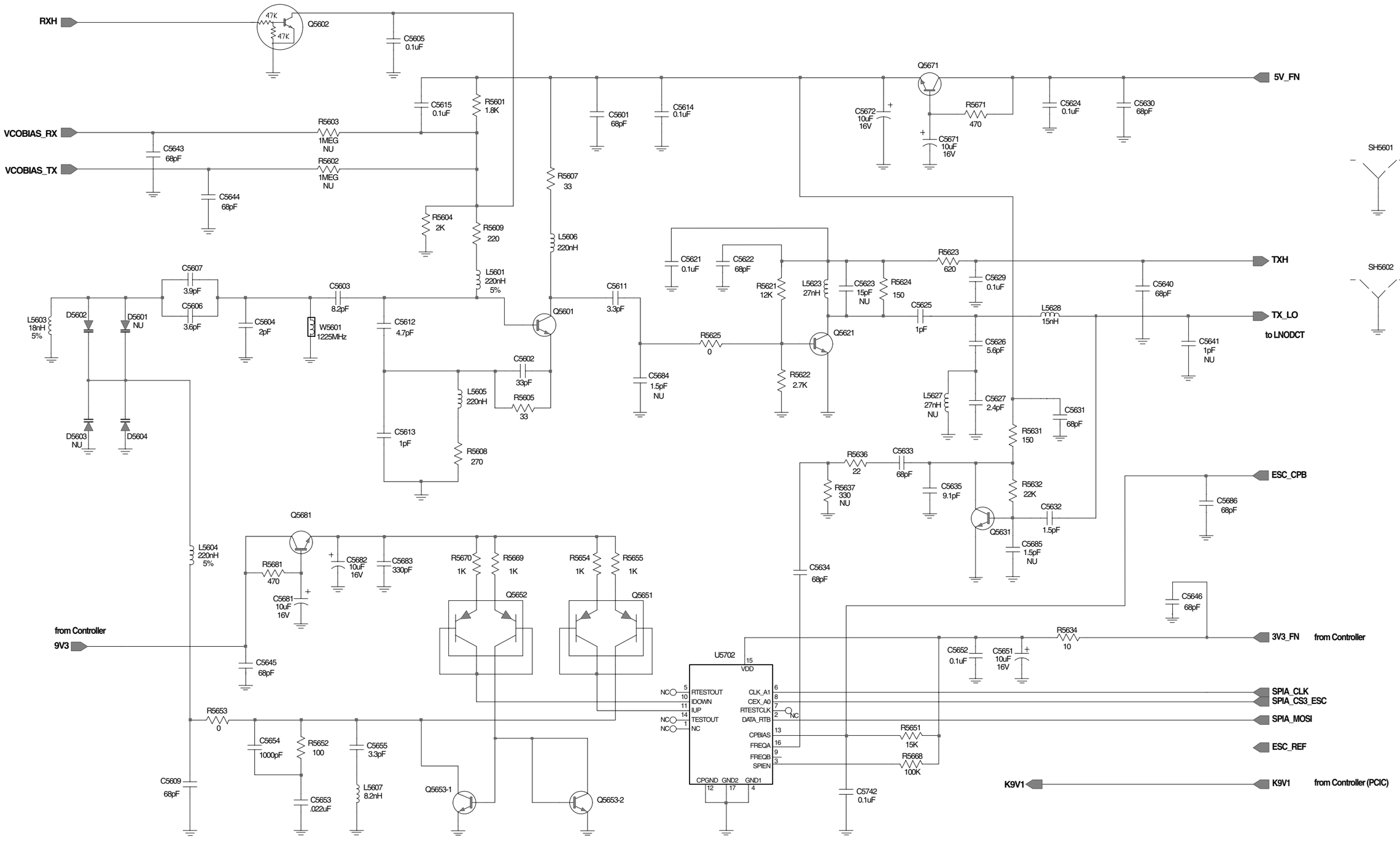
Main Board 8486079Z01_O / RF_IF



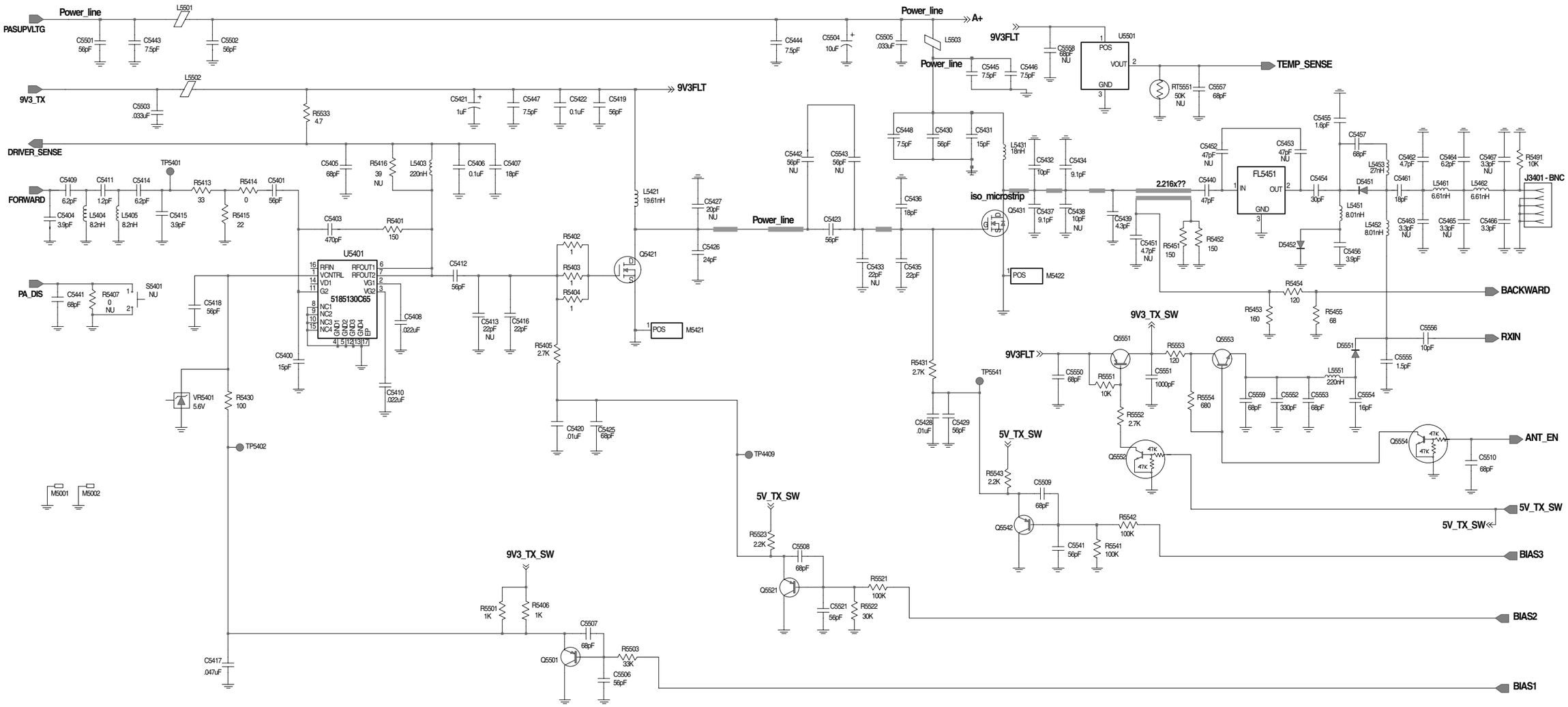
Main Board 8486079Z01_O / RF_FRACN



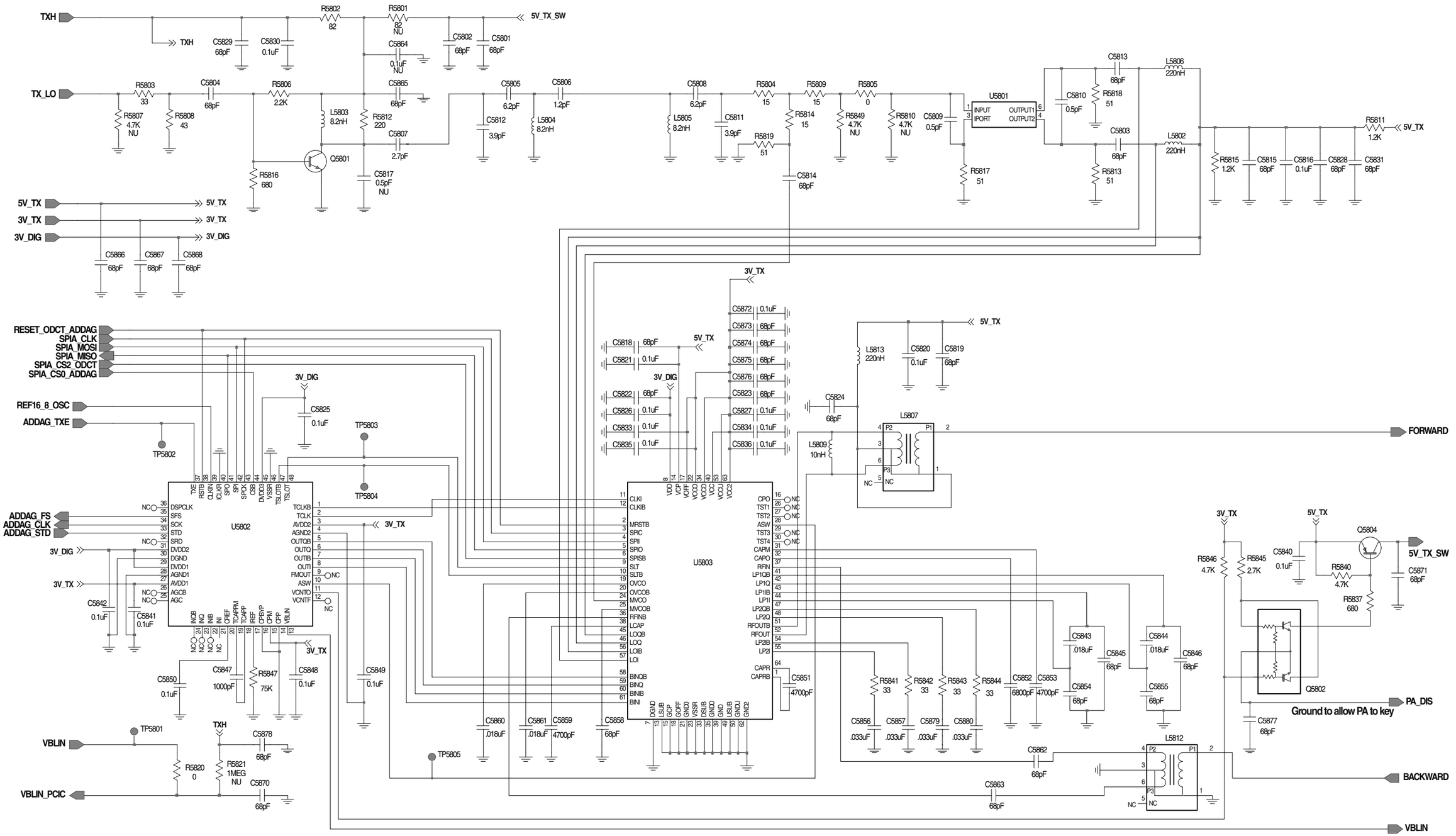
Main Board 8486079Z01_O / RF_RX_VCO



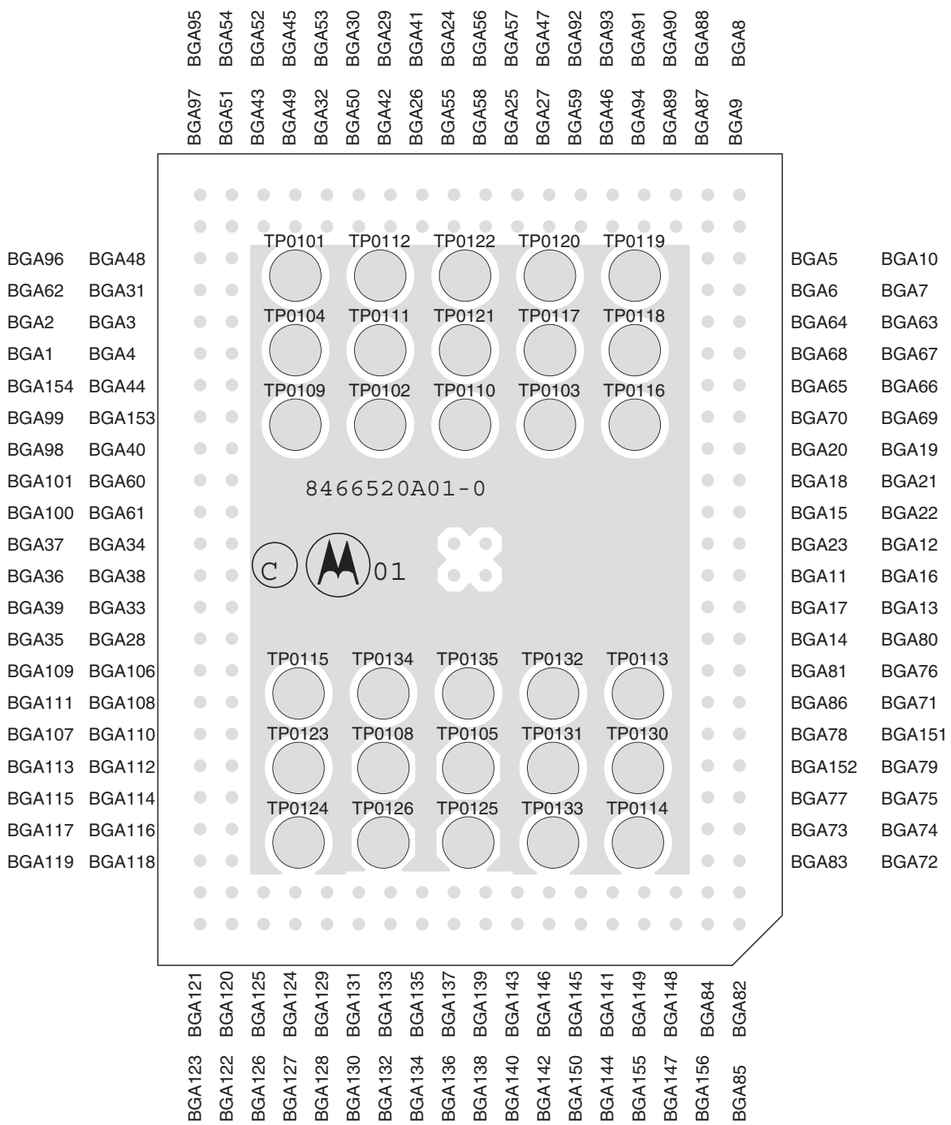
Main Board 8486079Z01_O / RF_TX_VCO

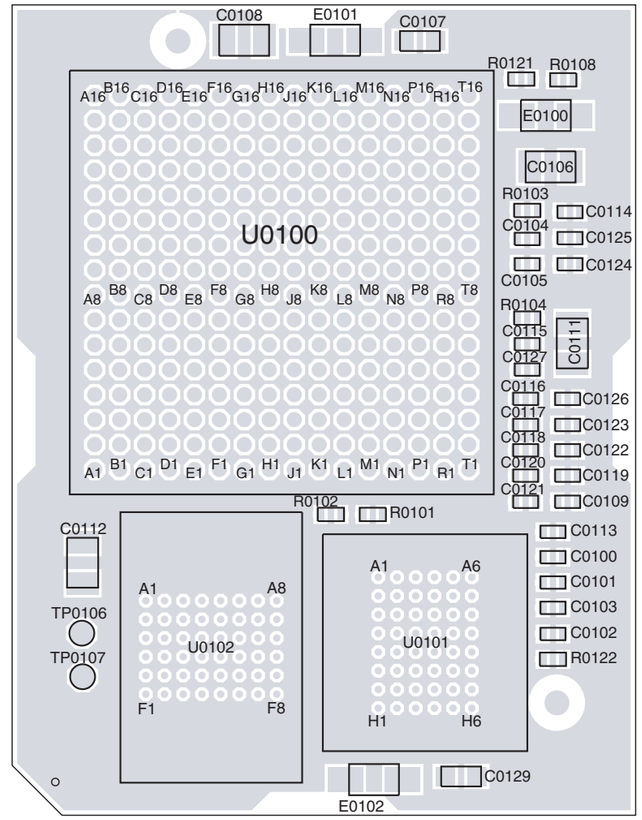


Main Board 8486079Z01_O / POWER_AMPLIFIER__PA

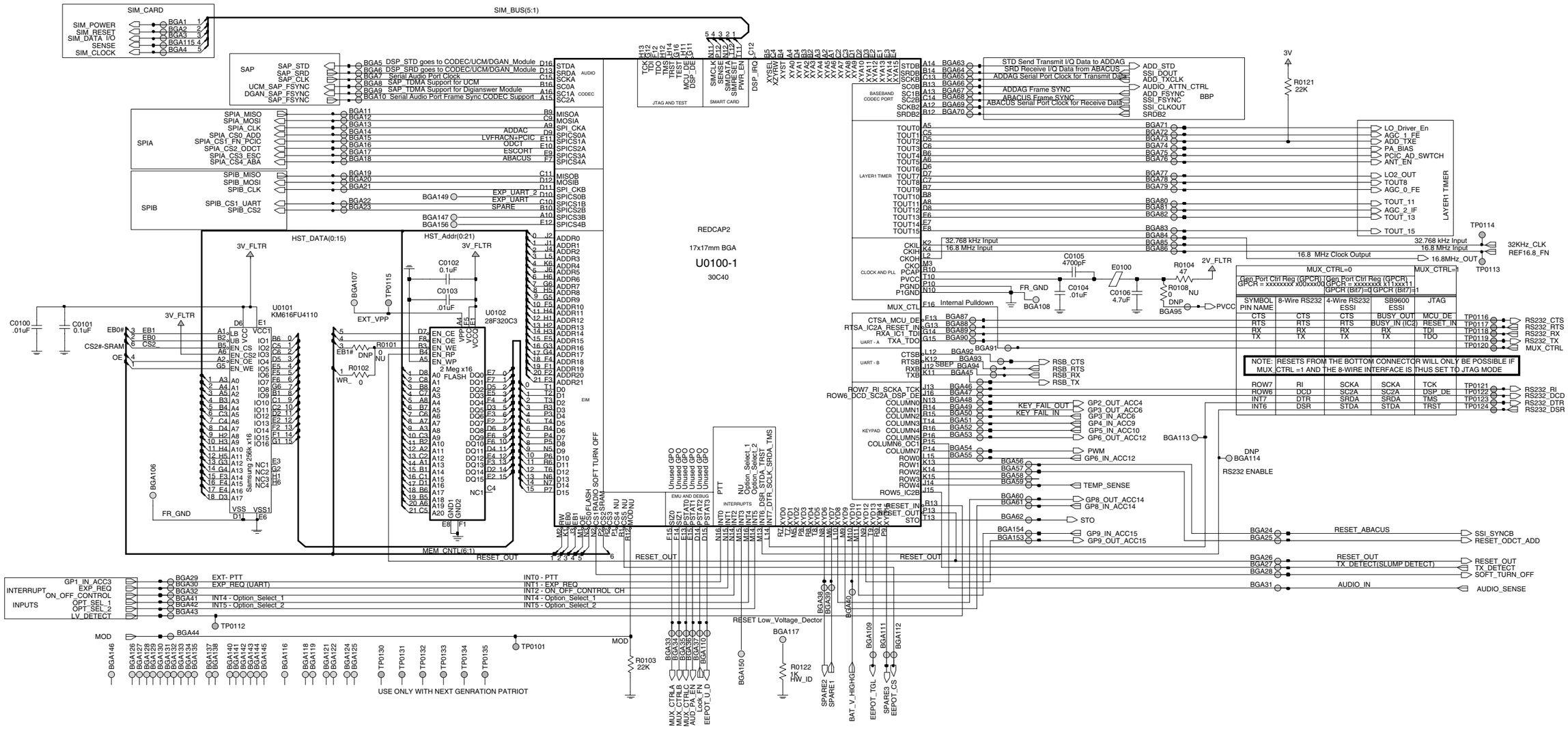


Main Board 8486079Z01_O / POWER_AMPLIFIER_LNODCT

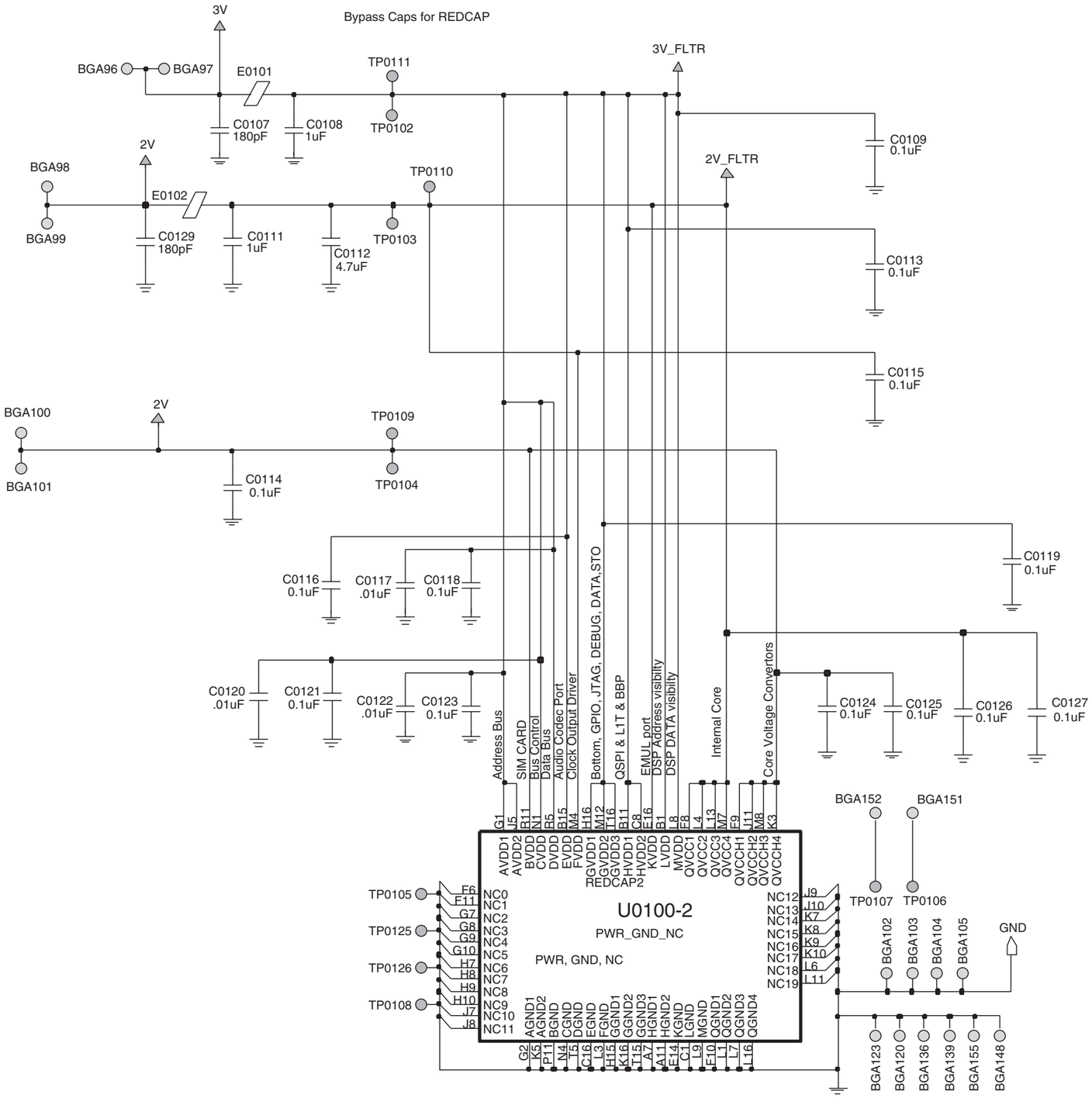




PCB / HDI_Controller 8466520A01_O / BOTTOM & TOP SIDE



HDI_Controller 8466520A01_O (Sheet 1)



HDI_Controller 8466520A01_O (Sheet 2)

ZWG0130878-O

Parts List

Parts on the Mainboard

Reference	Motorola PN	Value
F0301	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
F0302	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
		Capacitors:
C0100	2113743E20	Chip Capacitor. 10 UF 10%
C0101	2113743E20	Chip Capacitor. 10 UF 10%
C0102	2113743E20	Chip Capacitor. 10 UF 10%
C0103	2113743E20	Chip Capacitor. 10 UF 10%
C0104	2113743E20	Chip Capacitor. 10 UF 10%
C0105	2113743E20	Chip Capacitor. 10 UF 10%
C0110	2113743N14	Chip Capacitor 3.3 PF +-.25PF COG
C0113	2113743E07	Chip Capacitor, Ceramic .022UF
C0121	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0122	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0123	2113743E20	Chip Capacitor. 10 UF 10%
C0124	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0125	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0127	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0128	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0129	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0130	2113743L09	Chip Capacitor 470 PF 10% X7R
C0131	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0132	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0133	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0134	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0135	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0136	2113743N30	Chip Capacitor 15.0PF 5% COG
C0137	2113740F39	Chip Capacitor REEL CL1 +/-30 33
C0138	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0139	2113740F39	Chip Capacitor REEL CL1 +/-30 33
C0141	2113743E20	Chip Capacitor. 10 UF 10%
C0142	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0150	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0151	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0152	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0154	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0155	2113741F33	Chip Capacitor CL2 X7R REEL 2200
C0156	2311049A07	Tantalum Capacitor 10% 1.0UF
C0157	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0158	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0159	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0200	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C0201	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C0202	2113743E20	Chip Capacitor. 10 UF 10%
C0203	2113743E20	Chip Capacitor. 10 UF 10%
C0204	2113743E20	Chip Capacitor. 10 UF 10%
C0205	2113743E20	Chip Capacitor. 10 UF 10%
C0213	2113743E20	Chip Capacitor. 10 UF 10%
C0220	2113743E20	Chip Capacitor. 10 UF 10%
C0221	2311049A07	Tantalum Capacitor 10% 1.0UF
C0222	2113743E20	Chip Capacitor. 10 UF 10%
C0223	2113743E20	Chip Capacitor. 10 UF 10%
C0224	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C0225	2113743E20	Chip Capacitor. 10 UF 10%
C0226	2113743E20	Chip Capacitor. 10 UF 10%
C0227	2113743E20	Chip Capacitor. 10 UF 10%
C0228	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0229	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0230	2113741F37	Chip Capacitor CL2 X7R REEL 3300
C0231	2311049C05	Tantalum Capacitor CHIP 47UF 16V 10%
C0232	2113743E20	Chip Capacitor. 10 UF 10%
C0233	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C0234	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C0235	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C0300	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0301	2113741F17	Chip Capacitor CL2 X7R REEL 470
C0302	2311049C05	Tantalum Capacitor CHIP 47UF 16V 10%
C0303	2113743E20	Chip Capacitor. 10 UF 10%
C0304	2113741F17	Chip Capacitor CL2 X7R REEL 470
C0305	2380090M24	ALU CAP SOT 10,50V
C0306	2380090M24	ALU CAP SOT 10,50V
C0307	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C0308	2311049A97	Tantalum Capacitor CHIP 33 UF 16V 20%
C0309	2311049A97	Tantalum Capacitor CHIP 33 UF 16V 20%
C0310	2311049C06	Tantalum Capacitor CHIP 22 UF 35V 20%
C0312	2113743E20	Chip Capacitor. 10 UF 10%
C0313	2113743E20	Chip Capacitor. 10 UF 10%
C0315	2311049A97	Tantalum Capacitor CHIP 33 UF 16V 20%
C0316	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C0317	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0319	2113743E20	Chip Capacitor. 10 UF 10%
C0321	2113743E20	Chip Capacitor. 10 UF 10%
C0322	2311049A99	Tantalum Capacitor CHIP 47 UF 10V 20%
C0323	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C0324	2311049A09	Tantalum Capacitor 2.2 UF 10%
C0326	2113743E07	Chip Capacitor, Ceramic .022UF
C0327	2113743E07	Chip Capacitor, Ceramic .022UF
C0328	2311049A99	Tantalum Capacitor CHIP 47 UF 10V 20%
C0329	2311049A97	Tantalum Capacitor CHIP 33 UF 16V 20%
C0331	2311049A99	Tantalum Capacitor CHIP 47 UF 10V 20%
C0333	2113743E20	Chip Capacitor. 10 UF 10%
C0335	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0336	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0337	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0338	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0339	2113740F67	Chip Capacitor CL1 +/-30 470 5%
C0401	2113743E20	Chip Capacitor. 10 UF 10%
C0402	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0403	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0404	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C0405	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0406	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0407	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0408	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0409	2311049A09	Tantalum Capacitor 2.2 UF 10%
C0410	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0411	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0412	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0413	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0414	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0415	2113740F57	Chip Capacitor REEL CL1 +/-30 180

Reference	Motorola PN	Value
C0416	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0417	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C0418	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0419	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0502	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0503	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0504	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0505	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0506	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0507	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0508	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0510	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0511	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0513	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0515	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0517	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0519	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0520	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0521	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0522	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0523	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0524	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0525	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0526	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0527	2113743N46	Chip Capacitor 68.0 PF 5% COG

Reference	Motorola PN	Value
C0528	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0529	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0530	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0531	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0532	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0533	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0534	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0535	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0536	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0537	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0538	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0540	2113743N46	Chip Capacitor 68.0 PF 5% COG
C0551	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0552	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0553	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0555	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0556	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0557	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0558	2113740F49	Chip Capacitor REEL CL1 +/-30 82
C0560	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C0561	2113740F57	Chip Capacitor REEL CL1 +/-30 180
C5001	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5002	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5003	2311049A07	Tantalum Capacitor 10% 1.0UF
C5004	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V

Reference	Motorola PN	Value
C5005	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C5007	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5008	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C5009	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5010	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5011	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5012	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5013	2113743N08	Chip Capacitor 1.6 PF +- .25PF COG
C5015	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5016	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5017	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5018	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5019	2113743N09	Chip Capacitor 2.0PF +- .25PF COG
C5020	2113743N08	Chip Capacitor 1.6 PF +- .25PF COG
C5021	2113743N30	Chip Capacitor 15.0PF 5% COG
C5022	2113743N32	Chip Capacitor 18.0 PF 5% COG
C5023	2113743N42	Chip Capacitor 47.0 PF 5% COG
C5024	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5025	2113743N24	Chip Capacitor 8.2 PF + - .5PF COG
C5026	2113743N08	Chip Capacitor 1.6 PF +- .25PF COG
C5027	2113743N17	Chip Capacitor 4.3 PF +- ,25PF COG
C5028	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5029	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5030	2113743L05	Chip Capacitor 330 PF 10% X7R
C5031	2311049A07	Tantalum Capacitor 10% 1.0UF

Reference	Motorola PN	Value
C5032	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5033	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5034	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5035	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5036	2113743N32	Chip Capacitor 18.0 PF 5% COG
C5037	2113743L05	Chip Capacitor 330 PF 10% X7R
C5038	2113743N08	Chip Capacitor 1.6 PF +- .25PF COG
C5039	2113743N19	Chip Capacitor 5.1 PF +- .5PF COG
C5040	2113743N15	Chip Capacitor 3.6 PF +- .25PF COG
C5041	2113743N38	Chip Capacitor 33.0 PF 5% COG
C5042	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5043	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5044	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5045	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5046	2113743N19	Chip Capacitor 5.1 PF +- .5PF COG
C5101	2113740F63	Chip Capacitor CL1 +/-30 330 5%
C5103	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5104	2113743E20	Chip Capacitor. 10 UF 10%
C5111	2113743E20	Chip Capacitor. 10 UF 10%
C5122	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C5124	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5125	2113740F26	Chip Capacitor REEL CL1 +/-30 9.1
C5126	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5127	2113740F63	Chip Capacitor CL1 +/-30 330 5%
C5128	2113743E20	Chip Capacitor. 10 UF 10%
C5129	2113741F49	Chip Capacitor CL2 X7R REEL 10000

Reference	Motorola PN	Value
C5130	2113743E20	Chip Capacitor. 10 UF 10%
C5131	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5132	2113743E20	Chip Capacitor. 10 UF 10%
C5133	2113743E20	Chip Capacitor. 10 UF 10%
C5134	2113743E20	Chip Capacitor. 10 UF 10%
C5135	2113743E20	Chip Capacitor. 10 UF 10%
C5136	2113743E20	Chip Capacitor. 10 UF 10%
C5137	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5138	2113743E20	Chip Capacitor. 10 UF 10%
C5139	2113743E20	Chip Capacitor. 10 UF 10%
C5142	2113741F37	Chip Capacitor CL2 X7R REEL 3300
C5143	2113741F37	Chip Capacitor CL2 X7R REEL 3300
C5144	2113743E20	Chip Capacitor. 10 UF 10%
C5145	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5146	2113743E20	Chip Capacitor. 10 UF 10%
C5147	2113743E20	Chip Capacitor. 10 UF 10%
C5148	2113743E20	Chip Capacitor. 10 UF 10%
C5150	2113743E20	Chip Capacitor. 10 UF 10%
C5151	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5152	2113743E20	Chip Capacitor. 10 UF 10%
C5153	2113743E20	Chip Capacitor. 10 UF 10%
C5154	2113743E20	Chip Capacitor. 10 UF 10%
C5155	2113743E20	Chip Capacitor. 10 UF 10%
C5156	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5157	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5158	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C5159	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5160	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C5161	2113740F39	Chip Capacitor REEL CL1 +/-30 33
C5162	2113740F39	Chip Capacitor REEL CL1 +/-30 33
C5163	2113740F39	Chip Capacitor REEL CL1 +/-30 33

Reference	Motorola PN	Value
C5166	2311049A07	Tantalum Capacitor 10% 1.0UF
C5167	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C5168	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C5169	2311049A07	Tantalum Capacitor 10% 1.0UF
C5171	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5172	2113743E20	Chip Capacitor. 10 UF 10%
C5173	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5174	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5175	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5177	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5178	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5179	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5180	2113740F47	Chip Capacitor REEL CL1 +/-30 68
C5181	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5182	2113740F35	Chip Capacitor REEL CL1 +/-30 22
C5183	2113740F35	Chip Capacitor REEL CL1 +/-30 22
C5184	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5185	2113743E20	Chip Capacitor. 10 UF 10%
C5186	2113741F25	Chip Capacitor CL2 X7R REEL 1000
C5187	2113740F27	Chip Capacitor REEL CL1 +/-30 10
C5188	2113743A23	Chip Capacitor .220UF 10% X7R
C5189	2311049A09	Tantalum Capacitor 2.2 UF 10%
C5190	2113740F51	Chip Capacitor REEL CL1 +/-30 100
C5191	2113740F51	Chip Capacitor REEL CL1 +/-30 100
C5192	2113740F55	Chip Capacitor REEL CL1 +/-30 150
C5193	2113740F51	Chip Capacitor REEL CL1 +/-30 100

Reference	Motorola PN	Value
C5194	2113741F49	Chip Capacitor CL2 X7R REEL 10000
C5195	2113743E20	Chip Capacitor. 10 UF 10%
C5197	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5198	2113743A23	Chip Capacitor .220UF 10% X7R
C5199	2311049A09	Tantalum Capacitor 2.2 UF 10%
C5202	2113740F23	Chip Capacitor REEL CL1 +/-30 6.8
C5203	2113740F28	Chip Capacitor REEL CL1+/-30 11
C5204	2113740F29	Chip Capacitor REEL CL1 +/-30 12
C5205	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5206	2113740F37	Chip Capacitor REEL CL1+/-30 27
C5208	2113743E20	Chip Capacitor. 10 UF 10%
C5209	2113743E20	Chip Capacitor. 10 UF 10%
C5210	2113740F63	Chip Capacitor CL1 +/-30 330 5%
C5211	2113740F63	Chip Capacitor CL1 +/-30 330 5%
C5220	2113740L16	Chip Capacitor, Ceramic 8.2 PF+-0.1PF
C5221	2113740L22	Capacitor 15.0 PF 50V 2.0 %
C5301	2113741F43	Chip Capacitor CL2 X7R REEL 5600
C5303	0804533C33	Capacitor Metal/Poly Film 0.047
C5305	2113741F45	Chip Capacitor CL2 X7R REE L6800
C5306	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5307	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5308	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5311	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5312	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5313	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5314	2113743L41	Chip Capacitor 10000 PF 10% X7R

Reference	Motorola PN	Value
C5315	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5316	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5317	2113743N34	Chip Capacitor 22.0 PF 5% COG
C5318	2311049A40	GLOBAL Tantalum Capacitor 10% 2.2 UF
C5319	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5321	2311049A56	Capacitor TAN CHIP A/P 4.7 20 10
C5322	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5323	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5324	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5325	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5326	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5333	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5334	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5336	2113743E03	Chip Capacitor, Ceramic .015UF
C5338	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5339	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C5340	2113743N38	Chip Capacitor 33.0 PF 5% COG
C5341	2113743N38	Chip Capacitor 33.0 PF 5% COG
C5342	2113743N38	Chip Capacitor 33.0 PF 5% COG
C5343	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5344	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5345	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5346	2113741F17	Chip Capacitor CL2 X7R REEL 470
C5347	2113743N26	Chip Capacitor 10.0 PF 5% COG
C5351	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V

Reference	Motorola PN	Value
C5352	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5353	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5361	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5362	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5363	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5365	2113743N42	Chip Capacitor 47.0 PF 5% COG
C5366	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5400	2113743N30	Chip Capacitor 15.0PF 5% COG
C5401	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5403	2113743L09	Chip Capacitor 470 PF 10% X7R
C5404	2113743N16	Chip Capacitor 3.9 PF +-.25PF COG
C5405	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5406	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5407	2113743N32	Chip Capacitor 18.0 PF 5% COG
C5408	2113743M08	Chip Capacitor 22000PF +80-20% Y5V
C5409	2113743N21	Chip Capacitor 6.2 PF + -,5PF COG
C5410	2113743M08	Chip Capacitor 22000PF +80-20% Y5V
C5411	2113743N05	Chip Capacitor 1.2 PF +-.25PF COG
C5412	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5414	2113743N21	Chip Capacitor 6.2 PF + -,5PF COG
C5415	2113743N16	Chip Capacitor 3.9 PF +-.25PF COG
C5416	2103689A46	Chip Capacitor CLI 22+/-5%pf
C5417	2113743E12	Chip Capacitor .047UF 10% X7R
C5418	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5419	2113743N44	Chip Capacitor 56.0 PF 5% COG

Reference	Motorola PN	Value
C5420	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5421	2311049A08	KEMET CAPS
C5422	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5423	2113740F45	Chip Capacitor REEL CL1+/-30 56
C5425	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5426	2103689A47	SL240J HIGH - Q CAPACITOR, UCN
C5428	2113743L41	Chip Capacitor 10000 PF 10% X7R
C5429	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5430	2113740F45	Chip Capacitor REEL CL1+/-30 56
C5431	2113740F31	Chip Capacitor REEL CL1 +/-30 15
C5432	2111078B13	CAP ALT E16
C5434	2111078B12	Chip Capacitor RF 9.1 .5 NPO 100V
C5435	2111078B22	Chip Capacitor RF 22 5 NPO 100V
C5436	2111078B20	Chip Capacitor RF 18 5 NPO 100V
C5437	2111078B12	Chip Capacitor RF 9.1 .5 NPO 100V
C5439	2111078B04	Chip Capacitor RF 4.3 .25 NPO 100V
C5440	2111078B34	Chip Capacitor RF 47 5 NPO 100V
C5441	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5443	2113743N23	Chip Capacitor 7.5 PF +-.5PF COG
C5444	2113743N23	Chip Capacitor 7.5 PF +-.5PF COG
C5445	2113743N23	Chip Capacitor 7.5 PF +-.5PF COG
C5446	2113743N23	Chip Capacitor 7.5 PF +-.5PF COG
C5447	2113743N23	Chip Capacitor 7.5 PF +-.5PF COG
C5448	2113743N23	Chip Capacitor 7.5 PF +-.5PF COG
C5454	2111078B27	Chip Capacitor RF 30 5 NPO 100V
C5455	2113740A08	Chip Capacitor REEL CL1 +/-30 1.6

Reference	Motorola PN	Value
C5456	2111078B03	Chip Capacitor RF 3.9.25 NPO 100V
C5457	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5461	2111078B20	Chip Capacitor RF 18 5 NPO 100V
C5462	2111078B05	CAP ALT E19
C5464	2111078B08	Chip Capacitor RF 6.2 .25NPO 100V
C5466	2111078B01	Chip Capacitor RF 3.3 .25 NPO 100V
C5501	2113740F45	Chip Capacitor REEL CL1+/-30 56
C5502	2113740F45	Chip Capacitor REEL CL1+/-30 56
C5503	2113743L50	Chip Capacitor 33000 PF 10%
C5504	2311049A45	Tantalum Capacitor CHIP 10 10 35
C5505	2113741A57	Chip Capacitor 33K +-5% (2160521A31)
C5506	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5507	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5508	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5509	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5510	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5521	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5541	2113743N44	Chip Capacitor 56.0 PF 5% COG
C5550	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5551	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5552	2113743L05	Chip Capacitor 330 PF 10% X7R
C5553	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5554	2113743N31	Chip Capacitor 16.0 PF 5% COG
C5555	2113740F07	Chip Capacitor REEL CL1 +/-30 1.5
C5556	2113743N26	Chip Capacitor 10.0 PF 5% COG

Reference	Motorola PN	Value
C5557	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5559	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5601	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5602	2113743N38	Chip Capacitor 33.0 PF 5% COG
C5603	2113743N24	Chip Capacitor 8.2 PF + -.5PF COG
C5604	2113743N09	Chip Capacitor 2.0PF +-.25PF COG
C5605	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5606	2113743N15	Chip Capacitor 3.6 PF +-.25PF COG
C5607	2113743N16	Chip Capacitor 3.9 PF +-.25PF COG
C5609	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5611	2113743N14	Chip Capacitor 3.3 PF +-.25PF COG
C5612	2113743N18	Chip Capacitor 4.7 PF +-.25PF COG
C5613	2113743N03	Chip Capacitor 1.0 PF +-.25PF COG
C5614	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5615	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5621	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5622	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5624	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5625	2113743N03	Chip Capacitor 1.0 PF +-.25PF COG
C5626	2113743N20	Chip Capacitor 5.6 PF +-.5PF COG
C5627	2113743N11	Chip Capacitor 2.4 PF +-.25PF COG
C5629	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5630	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5631	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5632	2113743N07	Chip Capacitor 1.5PF +-.25PF COG

Reference	Motorola PN	Value
C5633	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5634	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5635	2113743N25	Chip Capacitor 9.1 PF +- .5PF COG
C5640	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5643	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5644	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5645	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5646	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5651	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5652	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5653	2113741F45	Chip Capacitor, Ceramic 6800PF
C5654	2113740F39	Chip Capacitor CL2 X7R REEL 33PF
C5655	2113743N14	Chip Capacitor 3.3 PF +- .25PF COG
C5671	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5672	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5681	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5682	2311049A57	Tantalum Capacitor CHIP A/P 10UF 10% 16V
C5683	2113743L05	Chip Capacitor 330 PF 10% X7R
C5702	2113743N42	Chip Capacitor 47.0 PF 5% COG
C5704	2113743N15	Chip Capacitor 3.6 PF +- .25PF COG
C5705	2113743N23	Chip Capacitor 7.5 PF +- .5PF COG
C5706	2113743N18	Chip Capacitor 4.7 PF +- .25PF COG
C5707	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5709	2113743N23	Chip Capacitor 7.5 PF +- .5PF COG
C5711	2113743N46	Chip Capacitor 68.0 PF 5% COG

Reference	Motorola PN	Value
C5712	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5713	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5714	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5715	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5716	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5717	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5730	2113743N38	Chip Capacitor 33.0 PF 5% COG
C5731	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5732	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5733	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5734	2113743N20	Chip Capacitor 5.6 PF +- .5PF COG
C5735	2113743N24	Chip Capacitor 8.2 PF + - .5PF COG
C5737	2113743N18	Chip Capacitor 4.7 PF +- .25PF COG
C5738	2113743N24	Chip Capacitor 8.2 PF + - .5PF COG
C5739	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5740	2113743N28	Chip Capacitor 12.0 PF 5% COG
C5741	2113743N09	Chip Capacitor 2.0PF +- .25PF COG
C5742	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
C5743	2311049A40	GLOBAL Tantalum Capacitor 10% 2.2 UF
C5750	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5751	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5752	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5753	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5754	2113743L33	Chip Capacitor 4700 PF 10% X7R
C5760	2113743N46	Chip Capacitor 68.0 PF 5% COG

Reference	Motorola PN	Value
C5801	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5802	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5803	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5804	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5805	2113743N21	Chip Capacitor 6.2 PF + - ,5PF COG
C5806	2113743N05	Chip Capacitor 1.2 PF +- .25PF COG
C5807	2113743N12	Chip Capacitor 2.7 PF +- .25PF COG
C5808	2113743N21	Chip Capacitor 6.2 PF + - ,5PF COG
C5809	2113743N01	Chip Capacitor 0.5 PF +-.25 PF COG
C5810	2113743N01	Chip Capacitor 0.5 PF +-.25 PF COG
C5811	2113743N16	Chip Capacitor 3.9 PF +- .25PF COG
C5812	2113743N16	Chip Capacitor 3.9 PF +- .25PF COG
C5813	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5814	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5815	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5816	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5818	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5819	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5820	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5821	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5822	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5823	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5824	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5825	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5826	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3

Reference	Motorola PN	Value
C5827	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5828	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5829	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5830	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5831	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5833	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5834	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5835	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5836	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5840	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5841	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5842	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5843	2113743E05	Chip Capacitor, Ceramic .018UF
C5844	2113743E05	Chip Capacitor, Ceramic .018UF
C5845	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5846	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5847	2113743L17	Chip Capacitor 1000 PF 10% X7R
C5848	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5849	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5850	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5851	2113743L33	Chip Capacitor 4700 PF 10% X7R
C5852	2113743L37	Chip Capacitor 6800 PF 10% X7R
C5853	2113743L33	Chip Capacitor 4700 PF 10% X7R
C5854	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5855	2113743N46	Chip Capacitor 68.0 PF 5% COG

Reference	Motorola PN	Value
C5856	2113743E10	Chip Capacitor .033 UF 10% X 7R
C5857	2113743E10	Chip Capacitor .033 UF 10% X 7R
C5858	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5859	2113743L33	Chip Capacitor 4700 PF 10% X7R
C5860	2113743M06	Chip Capacitor 18000 PF +80-20% Y5V
C5861	2113743M06	Chip Capacitor 18000 PF +80-20% Y5V
C5862	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5863	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5865	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5866	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5867	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5868	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5870	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5871	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5872	2113928N01	Chip Capacitor, Ceramic 0.1UF 10% 6.3
C5873	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5874	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5875	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5876	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5877	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5878	2113743N46	Chip Capacitor 68.0 PF 5% COG
C5879	2113743E10	Chip Capacitor .033 UF 10% X 7R
C5880	2113743E10	Chip Capacitor .033 UF 10% X 7R
		Diodes:
D0100	4813833C02	DIODE DUAL 70V '5B' COMM CATH
D0102	4880154K03	SOT MMBD353 RH DIODE DUAL SCHT
D0161	4813833C02	DIODE DUAL 70V '5B' COMM CATH
D0300	4813833C02	DIODE DUAL 70V '5B' COMM CATH
D0301	4813833C02	DIODE DUAL 70V '5B' COMM CATH
D0303	4813833C02	DIODE DUAL 70V '5B' COMM CATH
D0304	4813833C02	DIODE DUAL 70V '5B' COMM CATH
D5001	4880142L01	SOT MMBV109 RH
D5002	4880154K03	SOT MMBD353 RH DIODE DUAL SCHT
D5003	4880142L01	SOT MMBV109 RH
D5004	4880142L01	SOT MMBV109 RH
D5121	4880154K03	SOT MMBD353 RH DIODE DUAL SCHT
D5180	4862824C01	DIODE VARACTOR
D5190	4805649Q13	DIODE VCTR ISV 228
D5301	4802233J09	DIODE TRIPLE SOT25-RH
D5302	4802233J09	DIODE TRIPLE SOT25-RH
D5331	4813825A05	DIODE 30V HOT CARRIER MMBD301L
D5451	4880973Z02	PIN DIODE
D5452	4880973Z02	PIN DIODE
D5551	4880973Z02	PIN DIODE
D5602	4862824C01	DIODE VARACTOR
D5604	4862824C01	DIODE VARACTOR
D5732	4862824C01	DIODE VARACTOR
D5734	4862824C01	DIODE VARACTOR
		Bead, Inductor:
E0100	GMZN4001A	HDI CONTROLLER MODULE
E0300	2484657R01	INDUCTOR BEAD CHIP
		Filters:
FL0200	5105109Z38	3 VOLT LINEAR PCM CODEC FILTER
FL5001	9186076Z01	FILTER, BP 3-POLE CER 851-870
FL5002	9186076Z01	FILTER, BP 3-POLE CER 851-870
FL5451	5886077Z01	ISOLATOR, 10W-F 3W-R 806-870 M
		Connectors, Receptacle:
J0301	0986165B01	MOBILE DC POWER CONNECTOR
J0400	0986105B01	20 POS. 0,64 SQ CONNECTOR
J0450	0905505Y04	CONN ZIF HORIZONTAL
J0500	0905505Y04	CONN ZIF HORIZONTAL
J0550	0902636Y02	12 POS. FLEX CONNECTOR
J0570	0905505Y03	CONN ZIF HORIZONTAL
J5401	0986166B01	MOBILE RF CONNECTOR (BNC)
		Coil, Inductor:
L0231	2484657R01	INDUCTOR BEAD CHIP
L0232	2484657R01	INDUCTOR BEAD CHIP
L5001	2462587V22	CHIP IND 8.2NH 5% 0805
L5002	2462587Q20	IND CHIP 2,200NH 20%
L5004	2462587V26	CHIP IND 22 NH 5% 0805
L5005	2462587V22	CHIP IND 8.2NH 5% 0805
L5006	2462587V23	CHIP IND 12 NH 5% 0805
L5007	2462587V28	CHIP IND 33 NH 5% 0805
L5008	2462587V21	CHIP IND 6.8NH 5% 0805
L5009	2413926G06	IND 8.2 NH 5%
L5011	2462587V43	IND CHIP 560 NH 10%
L5012	2462587V59	IND CHIP 390 NH 5%
L5013	2413926G08	IND 12.0 NH 5%
L5014	2413926G08	IND 12.0 NH 5%
L5015	2462587V38	CHIP IND 220 NH 5% 0805
L5016	2462587V38	CHIP IND 220 NH 5% 0805
L5017	2413926G08	IND 12.0 NH 5%
L5018	2462587V38	CHIP IND 220 NH 5% 0805
L5019	2409154M11	IND CER MLTILYR 6.8NH 1005
L5126	2462587T23	IND CHIP 470NH 5% LOW PRO
L5180	2462587T19	IND CHIP 220NH 5% LOW PRO
L5190	2462587T30	IND CHIP 1000NH 5% LOW PRO
L5201	2462587N57	CHIP IND 220 NH 5%
L5203	2462587V38	CHIP IND 220 NH 5% 0805
L5204	2462587N57	CHIP IND 220 NH 5%
L5219	2413923B08	IND CHIP 220 NH 2%
L5301	2462587Q20	IND CHIP 2,200NH 20%
L5361	2462587Q20	IND CHIP 2,200NH 20%
L5362	2462587V23	CHIP IND 12 NH 5% 0805
L5363	2462587P25	CHIP IND 12000 NH 5%
L5403	2462587V38	CHIP IND 220 NH 5% 0805
L5404	2462587V22	CHIP IND 8.2NH 5% 0805
L5405	2462587V22	CHIP IND 8.2NH 5% 0805
L5421	2479990B02	AIR WOUND COIL/GREEN COLOR 19.
L5431	2485873L01	ENCAPSULATED AIR WOUND COIL
L5451	2460591A49	COIL AIR WOUND INDUC 8.01
L5452	2460591A49	COIL AIR WOUND INDUC 8.01
L5453	2462587V27	CHIP IND 27 NH 5% 0805
L5461	2460591A29	COIL AIRWOUND INDUC 6.61
L5462	2460591A29	COIL AIRWOUND INDUC 6.61
L5501	2484657R01	INDUCTOR BEAD CHIP
L5502	2484657R01	INDUCTOR BEAD CHIP
L5503	2484657R01	INDUCTOR BEAD CHIP
L5551	2462587V38	CHIP IND 220 NH 5% 0805
L5601	2462587V38	CHIP IND 220 NH 5% 0805
L5603	2462587V25	CHIP IND 18 NH 5% 0805
L5604	2462587V38	CHIP IND 220 NH 5% 0805
L5605	2462587V38	CHIP IND 220 NH 5% 0805
L5606	2462587V38	CHIP IND 220 NH 5% 0805
L5607	2462587V22	CHIP IND 8.2NH 5% 0805
L5623	2462587V27	CHIP IND 27 NH 5% 0805
L5628	2462587V24	CHIP IND 15NH 5% 0805
L5703	2462587V22	CHIP IND 8.2NH 5% 0805
L5711	2462587V28	CHIP IND 33 NH 5% 0805
L5712	2462587V41	IND CHIP 390 NH 10%
L5721	2462587V21	CHIP IND 6.8NH 5% 0805
L5722	2462587V38	CHIP IND 220 NH 5% 0805
L5731	2462587V38	CHIP IND 220 NH 5% 0805
L5733	2462587V25	CHIP IND 18 NH 5% 0805
L5734	2462587V38	CHIP IND 220 NH 5% 0805
L5735	2462587V38	CHIP IND 220 NH 5% 0805
L5802	2462587V38	CHIP IND 220 NH 5% 0805
L5803	2462587V22	CHIP IND 8.2NH 5% 0805
L5804	2462587V22	CHIP IND 8.2NH 5% 0805
L5805	2462587V22	CHIP IND 8.2NH 5% 0805

Reference	Motorola PN	Value
L5806	2462587V38	CHIP IND 220 NH 5% 0805
L5807	2585959A01	TRANSFORMER BALUN CERAMIC
L5809	2413926G07	IND 10.0 NH 5%
L5812	2585959A01	Transformer Balun Ceramic
L5813	2462587V38	Chip Inductor 220 NH 5% 0805
		Meters:
M0301	3980502Z01	CONTACT, BACKUP B+
M0302	3980501Z01	CONTACT, BACKUP B-
M5421	2686201B01	HEAT SPREADER WM
M5422	2686201B01	HEAT SPREADER WM
		Transistors:
Q0100	4880214G02	TSTR MMBT3904
Q0150	4880048M01	TSTR NPN DIG 47K/47K
Q0151	4880214G02	TSTR MMBT3904
Q0152	4880048M01	TSTR NPN DIG 47K/47K
Q0153	4880214G02	TSTR MMBT3904
Q0156	4880048M01	TSTR NPN DIG 47K/47K
Q0157	4880048M01	TSTR NPN DIG 47K/47K
Q0158	4880048M01	TSTR NPN DIG 47K/47K
Q0159	4880052M01	TSTR NPN DRLNGTN MXTA27
Q0160	4880048M01	TSTR NPN DIG 47K/47K
Q0161	4805921T02	XISTOR FMC2 RH
Q0200	4880048M01	TSTR NPN DIG 47K/47K
Q0201	4802245J54	UMG5N DIGITAL TRANSISTOR
Q0202	4880048M01	TSTR NPN DIG 47K/47K
Q0203	4880048M01	TSTR NPN DIG 47K/47K
Q0300	4880214G02	TSTR MMBT3904
Q0301	4805921T02	XISTOR FMC2 RH
Q0302	4880214G02	TSTR MMBT3904
Q0303	4880048M01	TSTR NPN DIG 47K/47K
Q0305	4880214G02	TSTR MMBT3904
Q5001	4880214G02	TSTR MMBT3904
Q5002	4805921T02	XISTOR FMC2 RH
Q5101	4813827A07	TSTR NPN SML SIG MMBR941LT1 7Y
Q5180	4813827A07	TSTR NPN SML SIG MMBR941LT1 7Y
Q5190	4813827A07	TSTR NPN SML SIG MMBR941LT1 7Y

Reference	Motorola PN	Value
Q5201	4813827A07	TSTR NPN SML SIG MMBR941LT1 7Y
Q5301	4802245J54	UMG5N DIGITAL TRANSISTOR
Q5331	4880048M01	TSTR NPN DIG 47K/47K
Q5351	4813827A07	TSTR NPN SML SIG MMBR941LT1 7Y
Q5352	4813824A17	XSTR PNP40V .2A GENPB=100-300
Q5421	4813828A09	TSTR 8W 450MHZ 7.5V
Q5431	4813828C41	TSTR 945MHZ 45W 28V
Q5501	4813824A17	XSTR PNP40V .2A GENPB=100-300
Q5521	4813824A17	XSTR PNP40V .2A GENPB=100-300
Q5542	4813824A17	XSTR PNP40V .2A GENPB=100-300
Q5551	4813824A17	XSTR PNP40V .2A GENPB=100-300
Q5552	4880048M01	TSTR NPN DIG 47K/47K
Q5553	4880214G02	TSTR MMBT3904
Q5554	4880048M01	TSTR NPN DIG 47K/47K
Q5601	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5602	4880048M01	TSTR NPN DIG 47K/47K
Q5621	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5631	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5651	4805723X02	TRANS DUAL PNP UMT1N ROHM
Q5652	4805723X02	TRANS DUAL PNP UMT1N ROHM
Q5653	4805921T07	XSTR DUAL R OHM IMX1
Q5671	4880214G02	TSTR MMBT3904
Q5681	4880214G02	TSTR MMBT3904
Q5701	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5711	4809939C05	TSTR DUAL NPN/PNP UMH 5
Q5712	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5801	4813827A07	TSTR NPN SML SIG MMBR941LT1 7Y
Q5802	4802245J54	UMG5N DIGITAL TRANSISTOR
Q5804	4813824A17	XSTR PNP40V .2A GENPB=100-300

Reference	Motorola PN	Value
		Resistors, Fixed:
R0100	0662057A89	Chip Resistor 47K Ohms 5%
R0103	0662057A01	Chip Resistor 10 Ohms 5%
R0104	0662057A01	Chip Resistor 10 Ohms 5%
R0105	0662057A01	Chip Resistor 10 Ohms 5%
R0106	0662057A89	Chip Resistor 47K Ohms 5%
R0108	0662057A89	Chip Resistor 47K Ohms 5%
R0109	0662057A01	Chip Resistor 10 Ohms 5%
R0111	0662057A01	Chip Resistor 10 Ohms 5%
R0113	0662057A73	Chip Resistor 10K Ohms 5%
R0115	0662057A94	Chip Resistor 75K Ohms 5%
R0116	0662057A73	Chip Resistor 10K Ohms 5%
R0117	0662057A84	Chip Resistor 30K Ohms 5%
R0118	0662057A77	Chip Resistor 15K Ohms 5%
R0119	0662057A73	Chip Resistor 10K Ohms 5%
R0120	0662057A65	Chip Resistor 4700 Ohms 5%
R0121	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R0125	0662057A65	Chip Resistor 4700 Ohms 5%
R0128	0662057A49	Chip Resistor 1000 Ohms 5%
R0132	0662057A45	Chip Resistor 680 Ohms 5%
R0133	0662057A89	Chip Resistor 47K Ohms 5%
R0134	0662057A45	Chip Resistor 680 Ohms 5%
R0136	0662057A89	Chip Resistor 47K Ohms 5%
R0150	0662057A89	Chip Resistor 47K Ohms 5%
R0151	0662057A65	Chip Resistor 4700 Ohms 5%
R0152	0662057A73	Chip Resistor 10K Ohms 5%
R0153	0662057A89	Chip Resistor 47K Ohms 5%
R0154	0662057A65	Chip Resistor 4700 Ohms 5%
R0155	0662057A73	Chip Resistor 10K Ohms 5%
R0156	0662057A89	Chip Resistor 47K Ohms 5%
R0159	0662057A89	Chip Resistor 47K Ohms 5%
R0160	0662057A65	Chip Resistor 4700 Ohms 5%
R0161	0662057A89	Chip Resistor 47K Ohms 5%
R0162	0662057A89	Chip Resistor 47K Ohms 5%
R0163	0662057A89	Chip Resistor 47K Ohms 5%
R0165	0662057A65	Chip Resistor 4700 Ohms 5%

Reference	Motorola PN	Value
R0166	0662057A73	Chip Resistor 10K Ohms 5%
R0167	0662057A89	Chip Resistor 47K Ohms 5%
R0168	0662057A73	Chip Resistor 10K Ohms 5%
R0170	0662057A73	Chip Resistor 10K Ohms 5%
R0171	0662057A73	Chip Resistor 10K Ohms 5%
R0172	0662057A79	Chip Resistor 18K Ohms 5%
R0200	0662057A43	Chip Resistor 560 Ohms 5%
R0201	0662057A25	Chip Resistor 100 Ohms 5%
R0202	0662057A25	Chip Resistor 100 Ohms 5%
R0203	0662057A43	Chip Resistor 560 Ohms 5%
R0204	0662057B08	Chip Resistor 270K Ohms 5%
R0205	0662057B08	Chip Resistor 270K Ohms 5%
R0206	0662057A89	Chip Resistor 47K Ohms 5%
R0207	0662057A89	Chip Resistor 47K Ohms 5%
R0208	0662057A89	Chip Resistor 47K Ohms 5%
R0218	0662057A73	Chip Resistor 10K Ohms 5%
R0220	0662057A49	Chip Resistor 1000 Ohms 5%
R0221	0662057A25	Chip Resistor 100 Ohms 5%
R0222	0662057A73	Chip Resistor 10K Ohms 5%
R0223	0662057A65	Chip Resistor 4700 Ohms 5%
R0224	0662057A77	Chip Resistor 15K Ohms 5%
R0225	0662057A49	Chip Resistor 1000 Ohms 5%
R0228	0662057A73	Chip Resistor 10K Ohms 5%
R0237	0662057A77	Chip Resistor 15K Ohms 5%
R0238	0662057A83	Chip Resistor 27K Ohms 5%
R0239	0662057A73	Chip Resistor 10K Ohms 5%
R0240	0662057A97	Chip Resistor 100K OHM 5%
R0241	0662057A77	Chip Resistor 15K Ohms 5%
R0242	0662057A99	Chip Resistor 120K OHM 5%
R0243	0662057A82	Chip Resistor 24K Ohms 5%
R0244	0662057A73	Chip Resistor 10K Ohms 5%
R0245	0662057A53	Chip Resistor 1500 Ohms 5%
R0300	0662057A49	Chip Resistor 1000 Ohms 5%
R0301	0662057B02	Chip Resistor 150K Ohms 5%

Reference	Motorola PN	Value
R0302	0662057A73	Chip Resistor 10K Ohms 5%
R0303	0662057A91	Chip Resistor 56K Ohms 5%
R0304	0662057A65	Chip Resistor 4700 Ohms 5%
R0305	0660076E70	Chip Resistor FILM 7500 1 1/8
R0306	0660076E51	Chip Resistor 1200 1 1/8
R0307	0660076E70	Chip Resistor FILM 7500 1 1/8
R0308	0660076E51	Chip Resistor 1200 1 1/8
R0309	0662057A73	Chip Resistor 10K Ohms 5%
R0310	0662057A89	Chip Resistor 47K Ohms 5%
R0311	0662057A53	Chip Resistor 1500 Ohms 5%
R0313	0662057A73	Chip Resistor 10K Ohms 5%
R0314	0662057A49	Chip Resistor 1000 Ohms 5%
R0317	0662057A85	Chip Resistor 33K OHM 5%
R0318	0662057A87	Chip Resistor 39K Ohms 5%
R0319	0662057A83	Chip Resistor 27K Ohms 5%
R0320	0662057A89	Chip Resistor 47K Ohms 5%
R0400	0662057A89	Chip Resistor 47K Ohms 5%
R0402	0662057A65	Chip Resistor 4700 Ohms 5%
R0403	0662057A73	Chip Resistor 10K Ohms 5%
R0404	0662057A65	Chip Resistor 4700 Ohms 5%
R0405	0662057A51	Chip Resistor 1200 Ohms 5%
R0406	0662057A73	Chip Resistor 10K Ohms 5%
R0407	0662057A33	Chip Resistor 220 Ohms 5%
R0408	0662057A33	Chip Resistor 220 Ohms 5%
R0409	0662057A43	Chip Resistor 560 Ohms 5%
R0410	0662057A97	Chip Resistor 100K OHM 5%
R0411	0662057A33	Chip Resistor 220 Ohms 5%
R0412	0662057A33	Chip Resistor 220 Ohms 5%
R0413	0662057A73	Chip Resistor 10K Ohms 5%
R0505	0662057A09	Chip Resistor 22 Ohms 5%
R0527	0662057A65	Chip Resistor 4700 Ohms 5%
R0557	0662057A01	Chip Resistor 10 Ohms 5%
R0559	0662057A01	Chip Resistor 10 Ohms 5%
R0562	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms

Reference	Motorola PN	Value
R0571	0662057A89	Chip Resistor 47K Ohms 5%
R5001	0662057M98	Chip Resistor 10K 5% 20X40
R5004	0662057M47	Chip Resistor 75 5% 20X40
R5006	0662057M74	Chip Resistor 1000 5% 20X40
R5007	0662057M26	Chip Resistor 10 5% 20X40
R5009	0662057M01	Chip Resistor 0 5% 20X40
R5010	0662057M98	Chip Resistor 10K 5% 20X40
R5011	0662057M74	Chip Resistor 1000 5% 20X40
R5012	0662057M01	Chip Resistor 0 5% 20X40
R5013	0662057N15	Chip Resistor 47K 5% 20X40
R5014	0662057M70	Chip Resistor 680 5% 20X40
R5015	0662057M43	Chip Resistor 51 5% 20X40
R5017	0662057M74	Chip Resistor 1000 5% 20X40
R5018	0662057M42	Chip Resistor 47 5% 20X40
R5019	0662057M64	Chip Resistor 390 5% 20X40
R5020	0662057M64	Chip Resistor 390 5% 20X40
R5021	0662057M78	Chip Resistor 1500 5% 20X40
R5022	0662057M60	Chip Resistor 270 5% 20X40
R5023	0662057M90	Chip Resistor 4700 5% 20X40
R5024	0662057M86	Chip Resistor 3300 5% 20X40
R5026	0662057M26	Chip Resistor 10 5% 20X40
R5100	0662057A18	Chip Resistor 51 Ohms 5%
R5101	0662057A75	Chip Resistor 12K Ohms 5%
R5102	0662057A83	Chip Resistor 27K Ohms 5%
R5104	0662057A47	Chip Resistor 820 Ohms 5%
R5105	0662057A09	Chip Resistor 22 Ohms 5%
R5106	0662057A17	Chip Resistor 47 Ohms 5%
R5121	0662057A63	Chip Resistor 3900 Ohms 5%
R5122	0662057A39	Chip Resistor 390 Ohms 5%
R5125	0662057A18	Chip Resistor 51 Ohms 5%
R5131	0662057A01	Chip Resistor 10 Ohms 5%
R5132	0662057A01	Chip Resistor 10 Ohms 5%

Reference	Motorola PN	Value
R5133	0662057A01	Chip Resistor 10 Ohms 5%
R5134	0662057A01	Chip Resistor 10 Ohms 5%
R5140	0662057A09	Chip Resistor 22 Ohms 5%
R5141	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5142	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5144	0662057A57	Chip Resistor 2200 Ohms 5%
R5145	0662057A27	Chip Resistor 120 Ohms 5%
R5146	0662057A25	Chip Resistor 100 Ohms 5%
R5149	0662057A80	Chip Resistor 20K Ohms 5%
R5150	0662057A01	Chip Resistor 10 Ohms 5%
R5151	0662057A01	Chip Resistor 10 Ohms 5%
R5152	0662057A01	Chip Resistor 10 Ohms 5%
R5153	0662057A01	Chip Resistor 10 Ohms 5%
R5154	0662057A01	Chip Resistor 10 Ohms 5%
R5155	0662057A01	Chip Resistor 10 Ohms 5%
R5157	0662057A89	Chip Resistor 47K Ohms 5%
R5158	0662057A35	Chip Resistor 270 Ohms 5%
R5159	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5160	0662057A49	Chip Resistor 1000 Ohms 5%
R5161	0662057A09	Chip Resistor 22 Ohms 5%
R5162	0662057A09	Chip Resistor 22 Ohms 5%
R5163	0662057A09	Chip Resistor 22 Ohms 5%
R5166	0662057A01	Chip Resistor 10 Ohms 5%
R5176	0662057A85	Chip Resistor 33K OHM 5%
R5177	0662057A41	Chip Resistor 470 Ohms 5%
R5178	0662057A01	Chip Resistor 10 Ohms 5%
R5179	0662057A35	Chip Resistor 270 Ohms 5%
R5180	0662057A61	Chip Resistor 3300 Ohms 5%
R5181	0662057A91	Chip Resistor 56K Ohms 5%
R5182	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5183	0662057A25	Chip Resistor 100 Ohms 5%
R5184	0662057A51	Chip Resistor 1200 Ohms 5%
R5185	0662057A09	Chip Resistor 22 Ohms 5%
R5186	0662057B05	Chip Resistor 200K Ohms 5%
R5187	0662057A35	Chip Resistor 270 Ohms 5%

Reference	Motorola PN	Value
R5189	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5190	0662057A80	Chip Resistor 20K Ohms 5%
R5191	0662057A85	Chip Resistor 33K OHM 5%
R5192	0662057A69	Chip Resistor 6800 OHM 5 1/8W
R5193	0662057A25	Chip Resistor 100 Ohms 5%
R5194	0662057A51	Chip Resistor 1200 Ohms 5%
R5195	0662057A09	Chip Resistor 22 Ohms 5%
R5196	0662057B05	Chip Resistor 200K Ohms 5%
R5197	0662057A35	Chip Resistor 270 Ohms 5%
R5199	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5204	0662057A60	Chip Resistor 3000 Ohms 5%
R5205	0662057A75	Chip Resistor 12K Ohms 5%
R5206	0662057A44	Chip Resistor 620 Ohms 5%
R5207	0662057A49	Chip Resistor 1000 Ohms 5%
R5208	0662057A40	Chip Resistor 430 Ohms 5%
R5209	0662057A37	Chip Resistor 330 Ohms 5%
R5210	0662057A13	Chip Resistor 33 Ohms 5%
R5218	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5220	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5222	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
R5301	0662057A39	Chip Resistor 390 Ohms 5%
R5302	0662057M73	Chip Resistor 910 5% 20X40
R5303	0662057M78	Chip Resistor 1500 5% 20X40
R5304	0662057M62	Chip Resistor 330 5% 20X40
R5311	0662057M01	Chip Resistor 0 5% 20X40
R5312	0662057M50	Chip Resistor 100 5% 20X40
R5314	0662057N11	Chip Resistor 33K 5% 20X40
R5315	0662057M54	Chip Resistor 150 5% 20X40
R5316	0662057M54	Chip Resistor 150 5% 20X40
R5321	0662057A25	Chip Resistor 100 Ohms 5%

Reference	Motorola PN	Value
R5322	0662057A25	Chip Resistor 100 Ohms 5%
R5323	0662057A25	Chip Resistor 100 Ohms 5%
R5324	0662057A25	Chip Resistor 100 Ohms 5%
R5334	0662057M50	Chip Resistor 100 5% 20X40
R5335	0662057N23	Chip Resistor 100K 5% 20X40
R5336	0662057N03	Chip Resistor 15K 5% 20X40
R5338	0662057N11	Chip Resistor 33K 5% 20X40
R5351	0662057M74	Chip Resistor 1000 5% 20X40
R5352	0662057N15	Chip Resistor 47K 5% 20X40
R5353	0662057M50	Chip Resistor 100 5% 20X40
R5354	0662057N15	Chip Resistor 47K 5% 20X40
R5355	0662057M50	Chip Resistor 100 5% 20X40
R5358	0662057M01	Chip Resistor 0 5% 20X40
R5361	0662057N15	Chip Resistor 47K 5% 20X40
R5362	0662057M90	Chip Resistor 4700 5% 20X40
R5363	0662057M70	Chip Resistor 680 5% 20X40
R5364	0662057M01	Chip Resistor 0 5% 20X40
R5365	0662057A40	Chip Resistor 430 Ohms 5%
R5366	0662057A40	Chip Resistor 430 Ohms 5%
R5401	0662057M54	Chip Resistor 150 5% 20X40
R5402	0662057M02	Chip Resistor 1.0 5% 20X40
R5403	0662057M02	Chip Resistor 1.0 5% 20X40
R5404	0662057M02	Chip Resistor 1.0 5% 20X40
R5405	0662057M84	Chip Resistor 2700 5% 20X40
R5406	0662057A49	Chip Resistor 1000 Ohms 5%
R5413	0662057M38	Chip Resistor 33 5% 20X40
R5414	0662057M01	Chip Resistor 0 5% 20X40
R5415	0662057M34	Chip Resistor 22 5% 20X 40
R5430	0662057M50	Chip Resistor 100 5% 20X40
R5431	0662057M84	Chip Resistor 2700 5% 20X40

Reference	Motorola PN	Value
R5451	0662057A29	Chip Resistor 150 Ohms 5%
R5452	0662057A29	Chip Resistor 150 Ohms 5%
R5453	0662057A30	Chip Resistor 160 Ohms 5%
R5454	0662057A27	Chip Resistor 120 Ohms 5%
R5455	0662057A21	Chip Resistor 68 Ohms 5%
R5491	0662057M98	Chip Resistor 10K 5% 20X40
R5501	0662057A49	Chip Resistor 1000 Ohms 5%
R5503	0662057N11	Chip Resistor 33K 5% 20X40
R5521	0662057N23	Chip Resistor 100K 5% 20X40
R5522	0662057N10	Chip Resistor 30K 5% 20X40
R5523	0662057M82	Chip Resistor 2200 5% 20X40
R5533	0662057C19	Chip Resistor 4.7 Ohms 5%
R5541	0662057N23	Chip Resistor 100K 5% 20X40
R5542	0662057N23	Chip Resistor 100K 5% 20X40
R5543	0662057M82	Chip Resistor 2200 5% 20X40
R5551	0662057M98	Chip Resistor 10K 5% 20X40
R5552	0662057M84	Chip Resistor 2700 5% 20X40
R5553	0683962T51	Chip Resistor 120 5-1
R5554	0662057C71	Chip Resistor 680 Ohms 5%
R5601	0662057M80	Chip Resistor 1800 5% 20X40
R5604	0662057M81	Chip Resistor 2000 5% 20X40
R5605	0662057M38	Chip Resistor 33 5% 20X40
R5607	0662057M38	Chip Resistor 33 5% 20X40
R5608	0662057M60	Chip Resistor 270 5% 20X40
R5609	0662057M58	Chip Resistor 220 5% 20X40
R5621	0662057N01	Chip Resistor 12K 5% 20X40
R5622	0662057M84	Chip Resistor 2700 5% 20X40
R5623	0662057M69	Chip Resistor 620 5% 20X40
R5624	0662057M54	Chip Resistor 150 5% 20X40

Reference	Motorola PN	Value
R5625	0662057M01	Chip Resistor 0 5% 20X40
R5631	0662057M54	Chip Resistor 150 5% 20X40
R5632	0662057N07	Chip Resistor 22K 5% 20X40
R5634	0662057M26	Chip Resistor 10 5% 20X40
R5636	0662057M34	Chip Resistor 22 5% 20X 40
R5651	0662057M98	Chip Resistor 10K 5% 20X40
R5652	0662057M58	Chip Resistor 220 5% 20X40
R5653	0662057M01	Chip Resistor 0 5% 20X40
R5654	0662057M74	Chip Resistor 1000 5% 20X40
R5655	0662057M74	Chip Resistor 1000 5% 20X40
R5668	0662057N23	Chip Resistor 100K 5% 20X40
R5669	0662057M74	Chip Resistor 1000 5% 20X40
R5670	0662057M74	Chip Resistor 1000 5% 20X40
R5671	0662057M66	Chip Resistor 470 5% 20X40
R5681	0662057M66	Chip Resistor 470 5% 20X40
R5702	0662057M98	Chip Resistor 10K 5% 20X40
R5703	0662057M84	Chip Resistor 2700 5% 20X40
R5704	0662057M60	Chip Resistor 270 5% 20X40
R5705	0662057M47	Chip Resistor 75 5% 20X40
R5709	0662057M01	Chip Resistor 0 5% 20X40
R5711	0662057M72	RES.CHIP 820 5% 20X40
R5712	0662057M26	Chip Resistor 10 5% 20X40
R5713	0662057M76	Chip Resistor 1200 5% 20X40
R5714	0662057M50	Chip Resistor 100 5% 20X40
R5715	0662057M01	Chip Resistor 0 5% 20X40
R5722	0662057M78	Chip Resistor 1500 5% 20X40
R5723	0662057M98	Chip Resistor 10K 5% 20X40
R5725	0662057M80	Chip Resistor 1800 5% 20X40

Reference	Motorola PN	Value
R5726	0662057M58	Chip Resistor 220 5% 20X40
R5727	0662057M81	Chip Resistor 2000 5% 20X40
R5731	0662057M38	Chip Resistor 33 5% 20X40
R5732	0662057M01	Chip Resistor 0 5% 20X40
R5733	0662057M60	Chip Resistor 270 5% 20X40
R5734	0662057M38	Chip Resistor 33 5% 20X40
R5802	0662057A23	Chip Resistor 82 Ohms 5%
R5803	0662057M38	Chip Resistor 33 5% 20X40
R5804	0662057M30	Chip Resistor 15 5% 20X40
R5805	0662057M01	Chip Resistor 0 5% 20X40
R5806	0662057M82	Chip Resistor 2200 5% 20X40
R5808	0662057M41	Chip Resistor 43 5% 20X40
R5809	0662057M30	Chip Resistor 15 5% 20X40
R5811	0662057M76	Chip Resistor 1200 5% 20X40
R5812	0662057M58	Chip Resistor 220 5% 20X40
R5813	0662057M43	Chip Resistor 51 5% 20X40
R5814	0662057M30	Chip Resistor 15 5% 20X40
R5815	0662057M76	Chip Resistor 1200 5% 20X40
R5816	0662057M70	Chip Resistor 680 5% 20X40
R5817	0662057M43	Chip Resistor 51 5% 20X40
R5818	0662057M43	Chip Resistor 51 5% 20X40
R5819	0662057M43	Chip Resistor 51 5% 20X40
R5820	0662057M01	Chip Resistor 0 5% 20X40
R5837	0662057M70	Chip Resistor 680 5% 20X40
R5840	0662057M90	Chip Resistor 4700 5% 20X40
R5841	0662057M38	Chip Resistor 33 5% 20X40
R5842	0662057M38	Chip Resistor 33 5% 20X40
R5843	0662057M38	Chip Resistor 33 5% 20X40
R5844	0662057M38	Chip Resistor 33 5% 20X40
R5845	0662057M84	Chip Resistor 2700 5% 20X40
R5846	0662057M90	Chip Resistor 4700 5% 20X40
R5847	0662057N20	Chip Resistor 75K 5% 20X40

Reference	Motorola PN	Value
		Shields:
SH5601	2666500A01	VCO Shield
SH5602	2666500A01	VCO Shield
SH5701	2666500A01	VCO Shield
SH5702	2666500A01	VCO Shield
		Integrated Circuits:
U0100	5109841C40	IC SER RTC/CAL DS1306 20TSSOP
U0102	5113820A02	IC DUAL SING SPLY LO PWP 2903
U0103	5113820A02	IC DUAL SING SPLY LO PWP 2903
U0104	5187423J01	LV UHS ANALOG SW 2CH
U0135	0662057B47	Chip Resistor 0 Ohms +-.050 Ohms
U0150	5185765B28	IC POWER CONTROL PASS
U0201	5184704M60	IC-CMOS 04M60 ANALOS
U0202	5105750U28	IC CMOS BILATERAL SW
U0203	5185963A52	IC NONVOLATILE DIGITAL POTENTI
U0204	5185963A52	IC NONVOLATILE DIGITAL POTENTI
U0205	5109699X01	AUDIO PA TDA1519A
U0206	5183222M49	IC AMP_3403_
U0300	5183308X01	IC, LM2941, TO DRPOUT RGTR
U0301	5183308X01	IC, LM2941, TO DRPOUT RGTR
U0302	5183308X01	IC, LM2941, TO DRPOUT RGTR
U0303	5113816A07	REG 5V POS 500MA MC78M05BDTRK
U0304	5105469E65	IC VLTG REGLTR
U0305	5105469E65	IC VLTG REGLTR
U0306	5105469E65	IC VLTG REGLTR
U0307	5113816A62	IC LDO VOLTAGE REG 3V 300MA
U5001	5102463J58	3.3V REGULATOR IN SOT23-5 PKG
U5002	5109940K28	IC MMIC GAAS MXR W/IF TQ5M31
U5003	5185368C01	IC 3V LOW NOISE AMP
U5101	5185963A83	IC ABACUS III HP
U5102	5102463J58	3.3V REGULATOR IN SOT23-5 PKG

Reference	Motorola PN	Value
U5103	5102463J58	3.3V REGULATOR IN SOT23-5 PKG
U5201	9102867C12	73.35MHZ CRYSTAL FILTER
U5321	5102463J58	3.3V REGULATOR IN SOT23-5 PKG
U5322	5105739X05	IC SOT 5V HI-PRECISION REGULAT
U5331	5185963A27	IC TESTED AT25016 48 PIN GFP
U5401	5185130C65	IC VHF/UHF/800 MHZ LDMOS DRIVE
U5501	5185963A15	IC TEMPERATURE SENSOR 1M50C
U5701	5105750U54	IC PKG DIE VCO BUFFER
U5702	5185368C18	ESCORT IC IN 16 PIN QFN PACKAG
U5704	2113743M24	Chip Capacitor 100000 PF +80-20% Y5V
U5801	5880334L12	800/900MHz chip multilayer 90d
U5802	5105457W85	CC ADDAG IC
U5803	5108428S43	LOW NOISE ODCT
		Voltage Regulators:
VR0101	4813830A14	DIODE 5.1V 5% 225MW MMBZ5231B_
VR0163	4813830A15	TSTR 5.6V 5% 20MA 225MW
VR0300	4813832C77	TRANS SUP. 24V HIGH PWR
VR0301	4880140L15	10V ZENER
VR0401	4805656W09	DIODE QUAD 20 VOLT ZENER
VR0402	4805656W09	DIODE QUAD 20 VOLT ZENER
VR0403	4805656W09	DIODE QUAD 20 VOLT ZENER
VR0404	4813830A15	TSTR 5.6V 5% 20MA 225MW
VR0405	4813830A15	TSTR 5.6V 5% 20MA 225MW
VR0406	4813830A40	SOC23 AUTO SDN
VR0407	4813830A40	SOC23 AUTO SDN
VR0408	4813830A15	TSTR 5.6V 5% 20MA 225MW
VR0409	4813830A15	TSTR 5.6V 5% 20MA 225MW

Reference	Motorola PN	Value
VR5401	4813830A15	TSTR 5.6V 5% 20MA 225MW
		Cable Assemblies:
W5601	4802245J57	COAXIAL CERAMIC INDUCTOR SMD
W5701	4802245J57	COAXIAL CERAMIC INDUCTOR SMD
		Crystals:
Y0101	4809995L05	XTAL QUARTZ 32.768KHZ CC4V-T1
Y5362	5102463J88	REF OSC, 16.8 MHz, 0.8PPM, SMD

Parts on the HDI Controller Board

Reference	Motorola PN	Value
C0100	2113743L41	.01uF
C0101	2113743M24	0.1uF
C0102	2113743M24	0.1uF
C0103	2113743L41	.01uF
C0104	2113743L41	.01uF
C0105	2113743L33	4700pF
C0106	2113928C04	4.7uF
C0107	2113740F57	180pF
C0108	2113928E01	1uF
C0109	2113743M24	0.1uF
C0111	2113928E01	1uF
C0112	2113928C04	4.7uF
C0113	2113743M24	0.1uF
C0114	2113743M24	0.1uF
C0115	2113743M24	0.1uF
C0116	2113743M24	0.1uF
C0117	2113743L41	.01uF
C0118	2113743M24	0.1uF
C0119	2113743M24	0.1uF
C0120	2113743L41	.01uF
C0121	2113743M24	0.1uF
C0122	2113743L41	.01uF
C0123	2113743M24	0.1uF
C0124	2113743M24	0.1uF
C0125	2113743M24	0.1uF
C0126	2113743M24	0.1uF

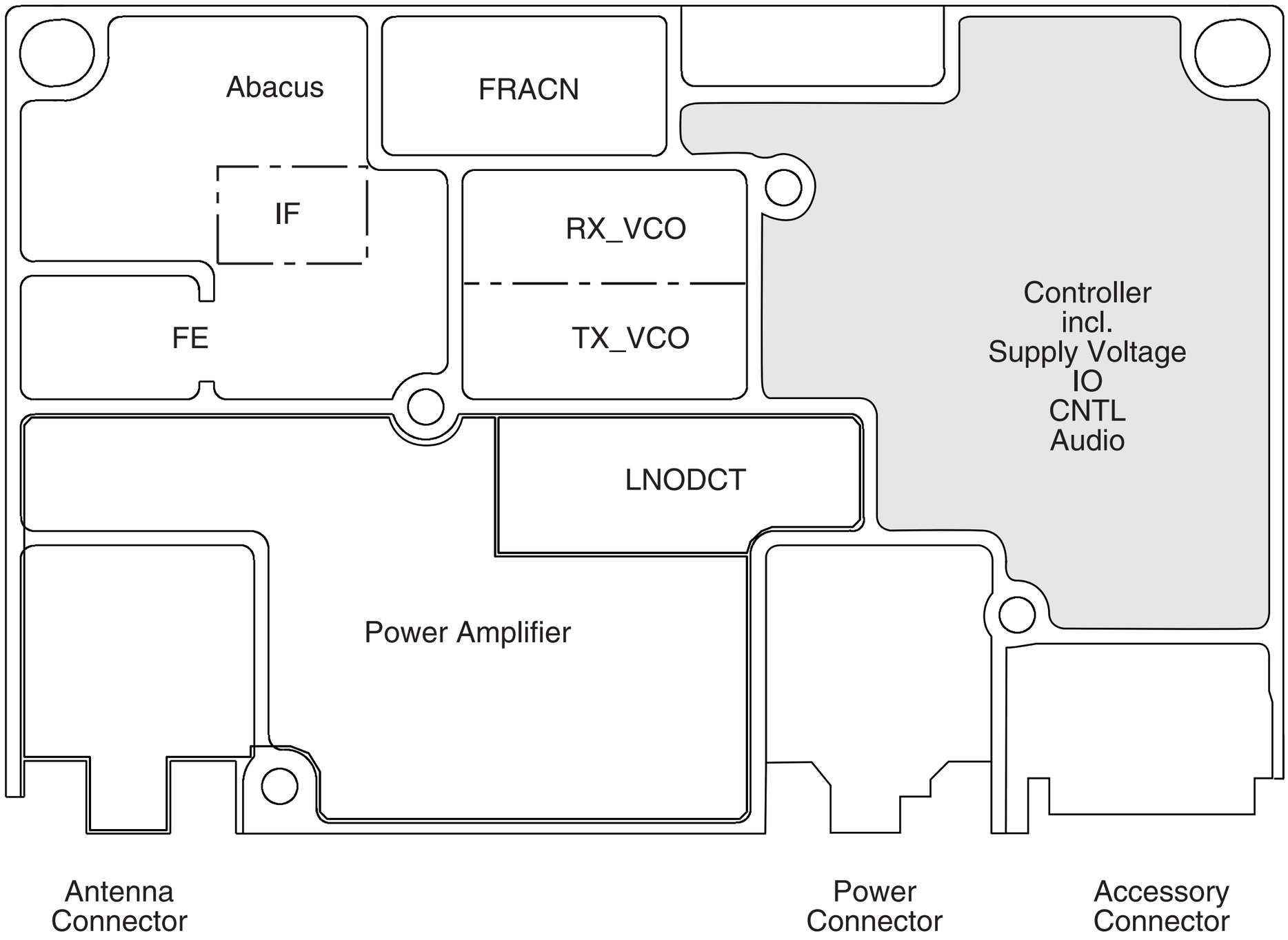
Reference	Motorola PN	Value
C0127	2113743M24	0.1uF
C0129	2113740F57	180pF
E0100	2480067M02	ind0805"
E0101	2480067M02	ind0805"
E0102	2480067M02	ind0805"
R0101	0662057M01	0 NU
R0102	0662057M01	0
R0103	0662057N07	22K
R0104	0662057M42	47
R0108	0662057M01	0 NU
R0121	0662057N07	22K
R0122	0662057M74	1K
U0100	5185130C40	30C40
U0101	5186249J25	KM616FU4110
U0102	5199420A01	28F320C3

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

CHAPTER 8.2.2

Transceiver 800MHz (PCB No. 8486079Z02_A): SCHEMATICS, PCBs and PARTS LISTS

SCHEMATICS and PCBS



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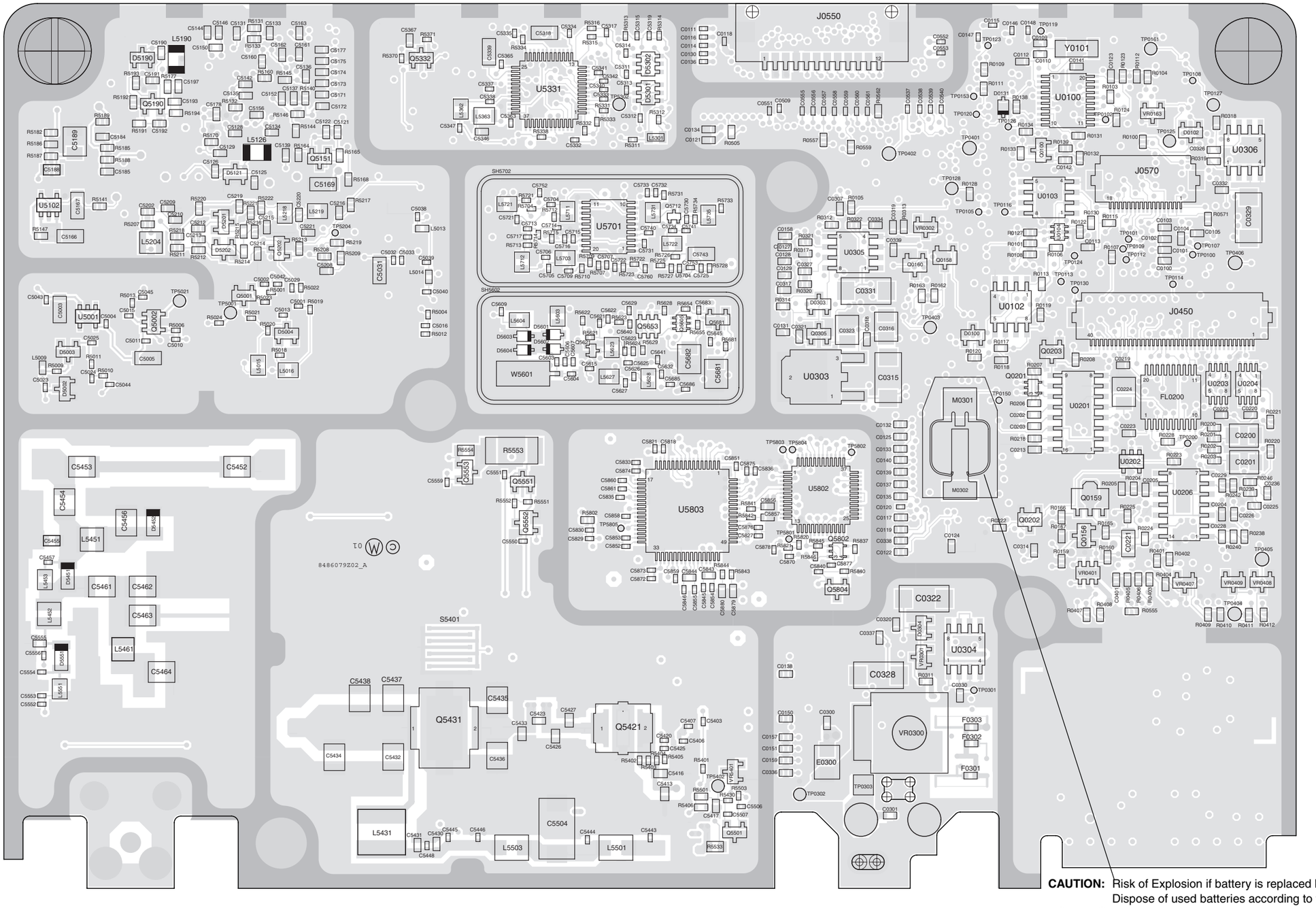
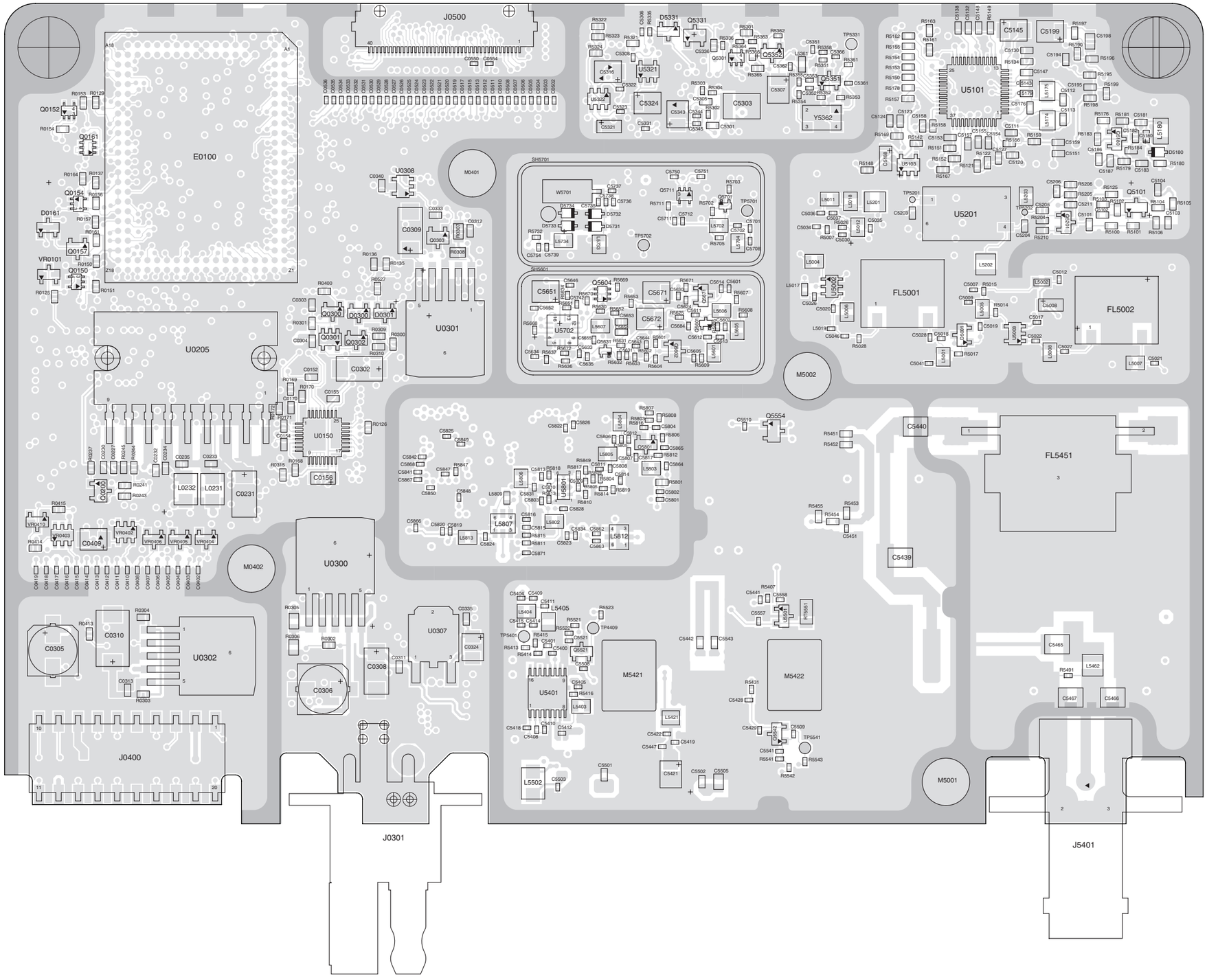
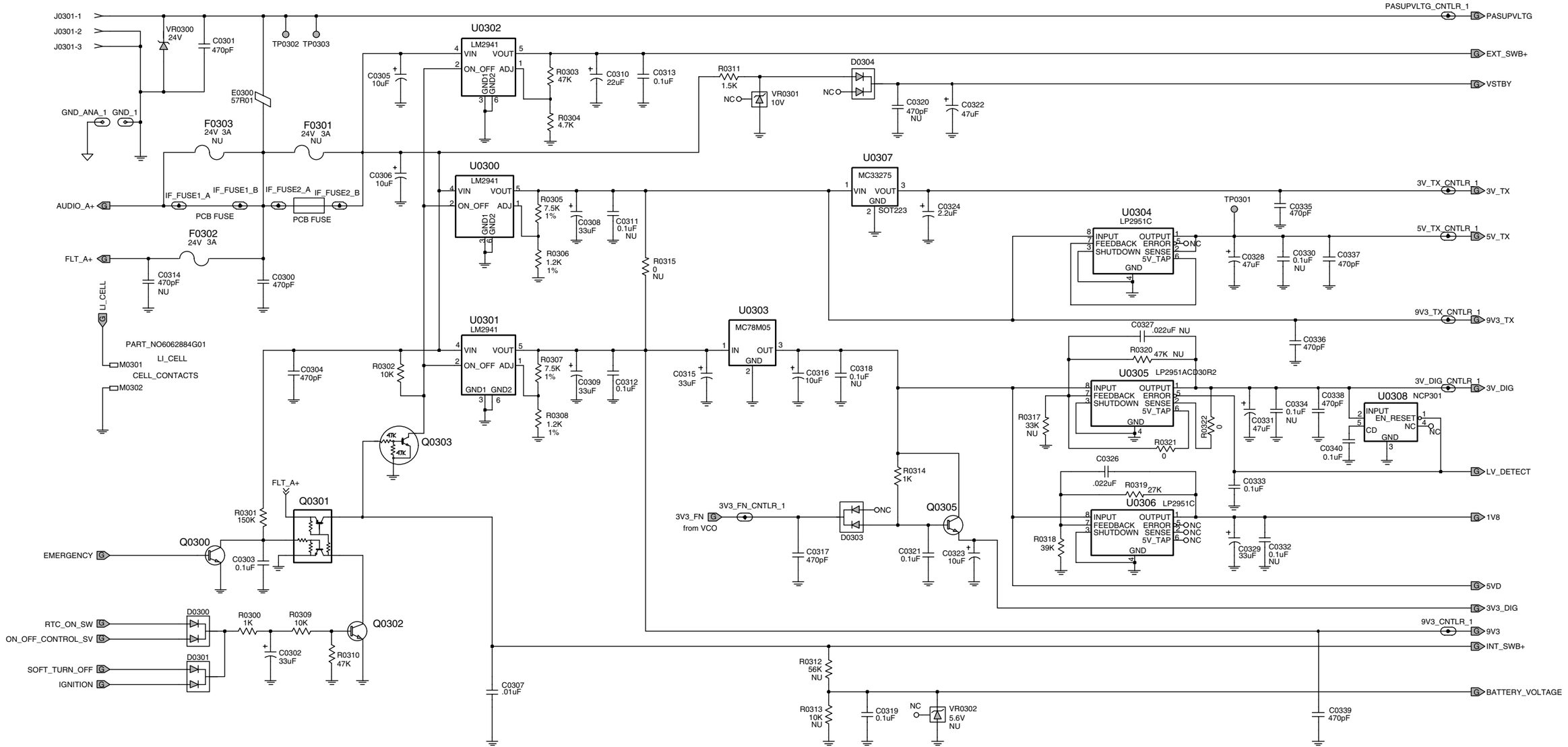


PCB / Main Board 8486079Z02_A / BOTTOM SIDE



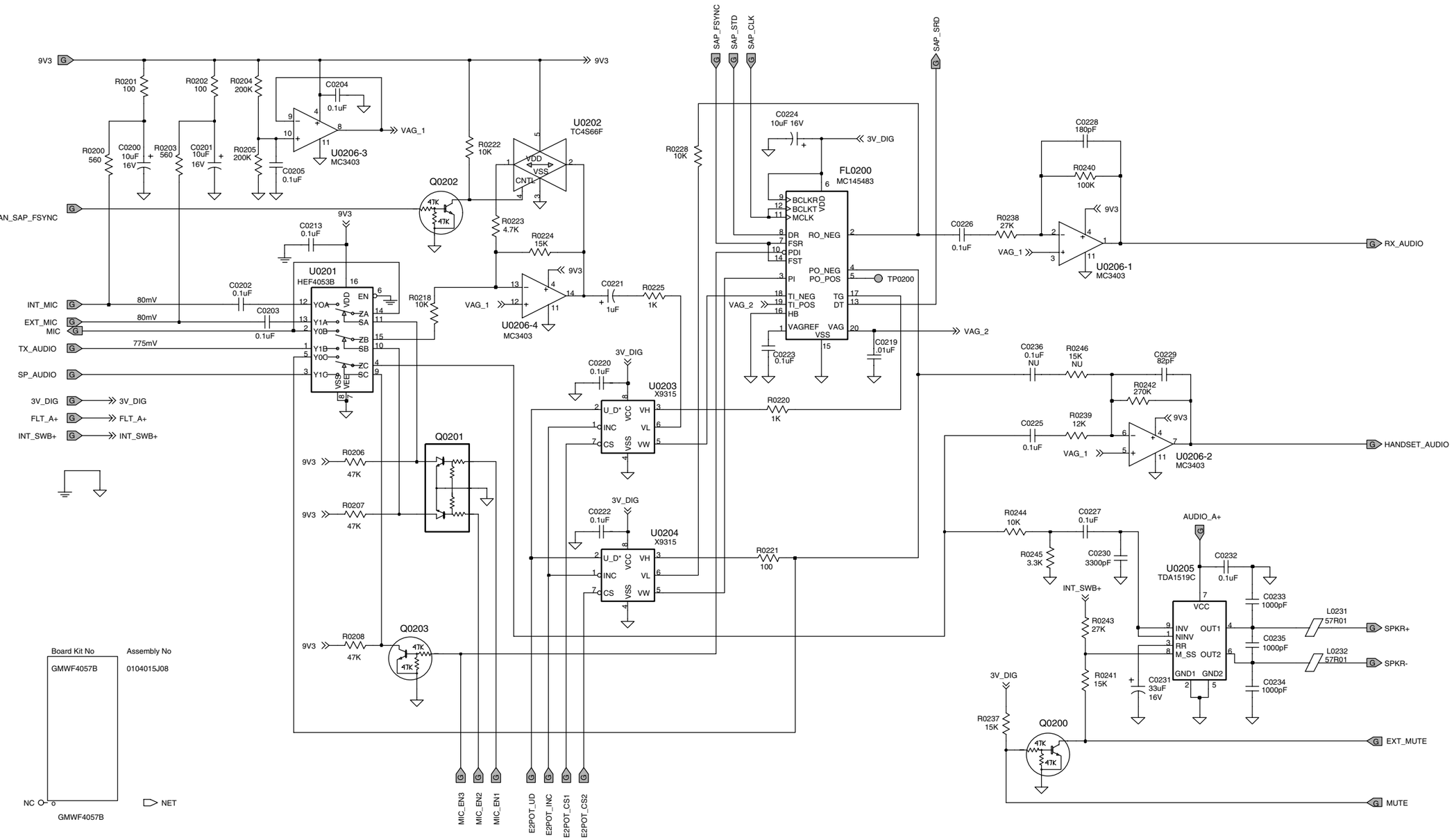
ZWG0131099-A

PCB / Main Board 8486079Z02_A / TOP SIDE



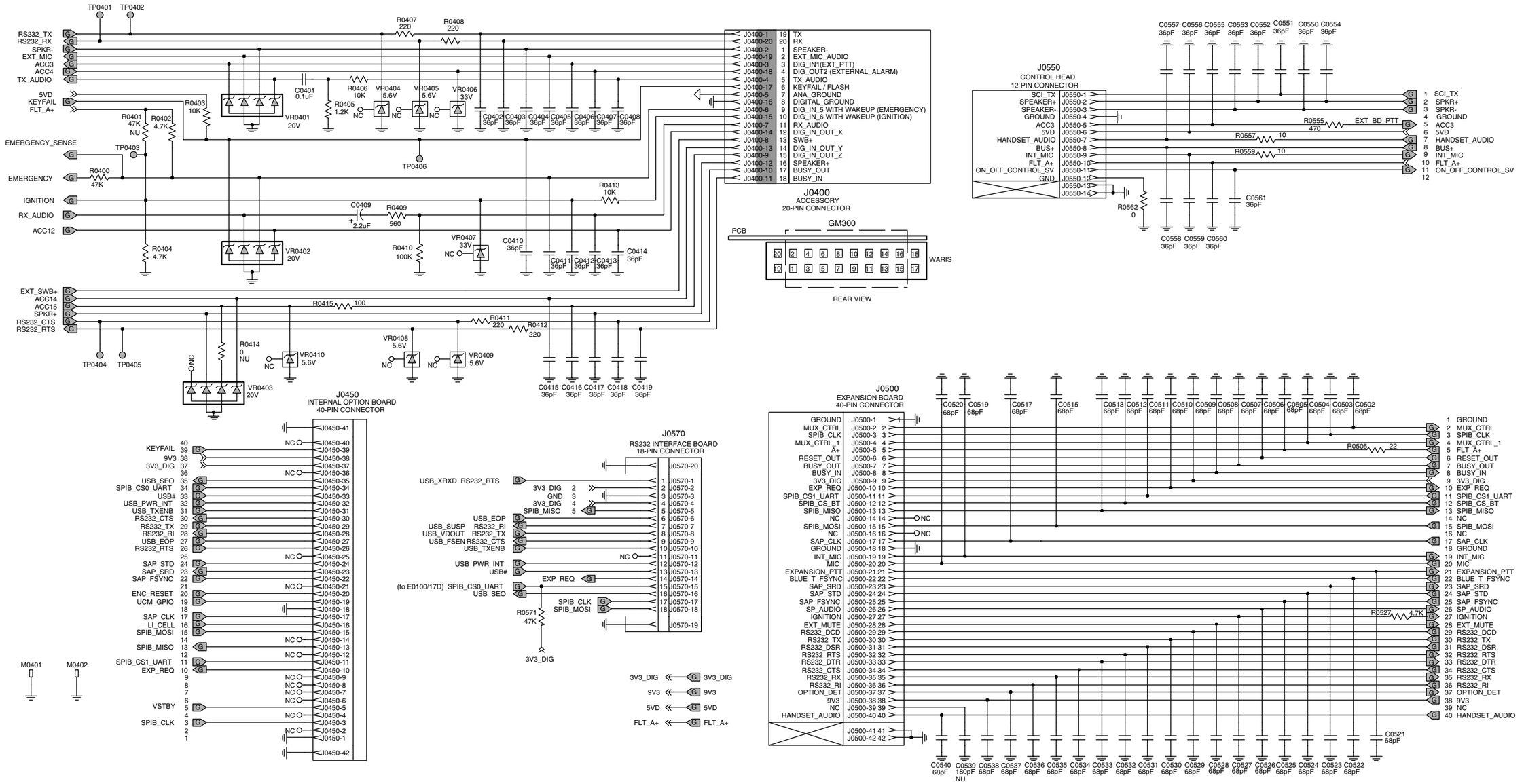
ZWG0131101-A

Main Board 8486079Z02_A / CNTRL_SUPPLY_VOLTAGE



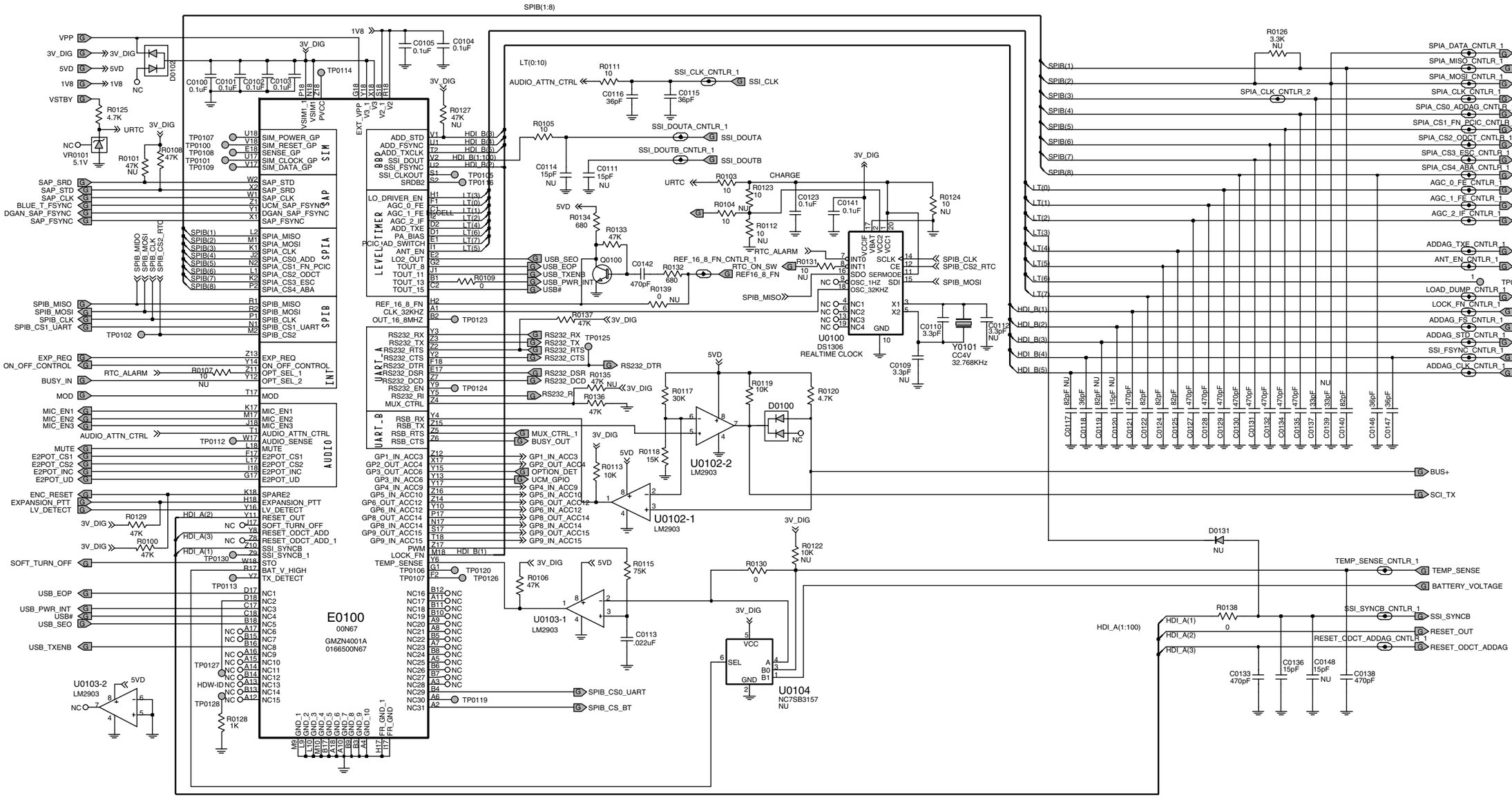
ZWG0131105-A

Main Board 8486079Z02_A / CNTRL_AUDIO_POWER_AMPLIFIER



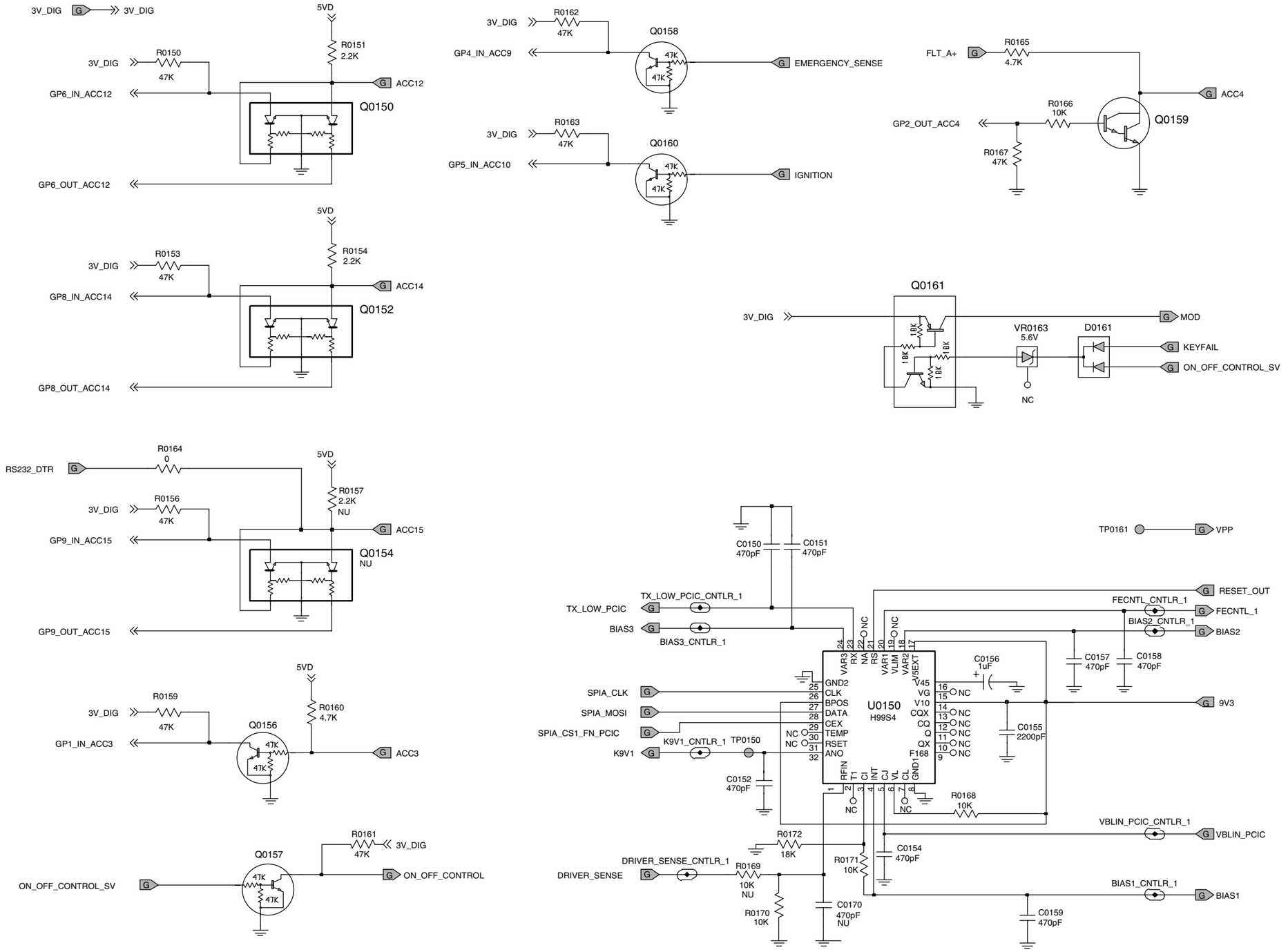
ZWG0131102-A

Main Board 8486079Z02_A / CNTRL_I/O

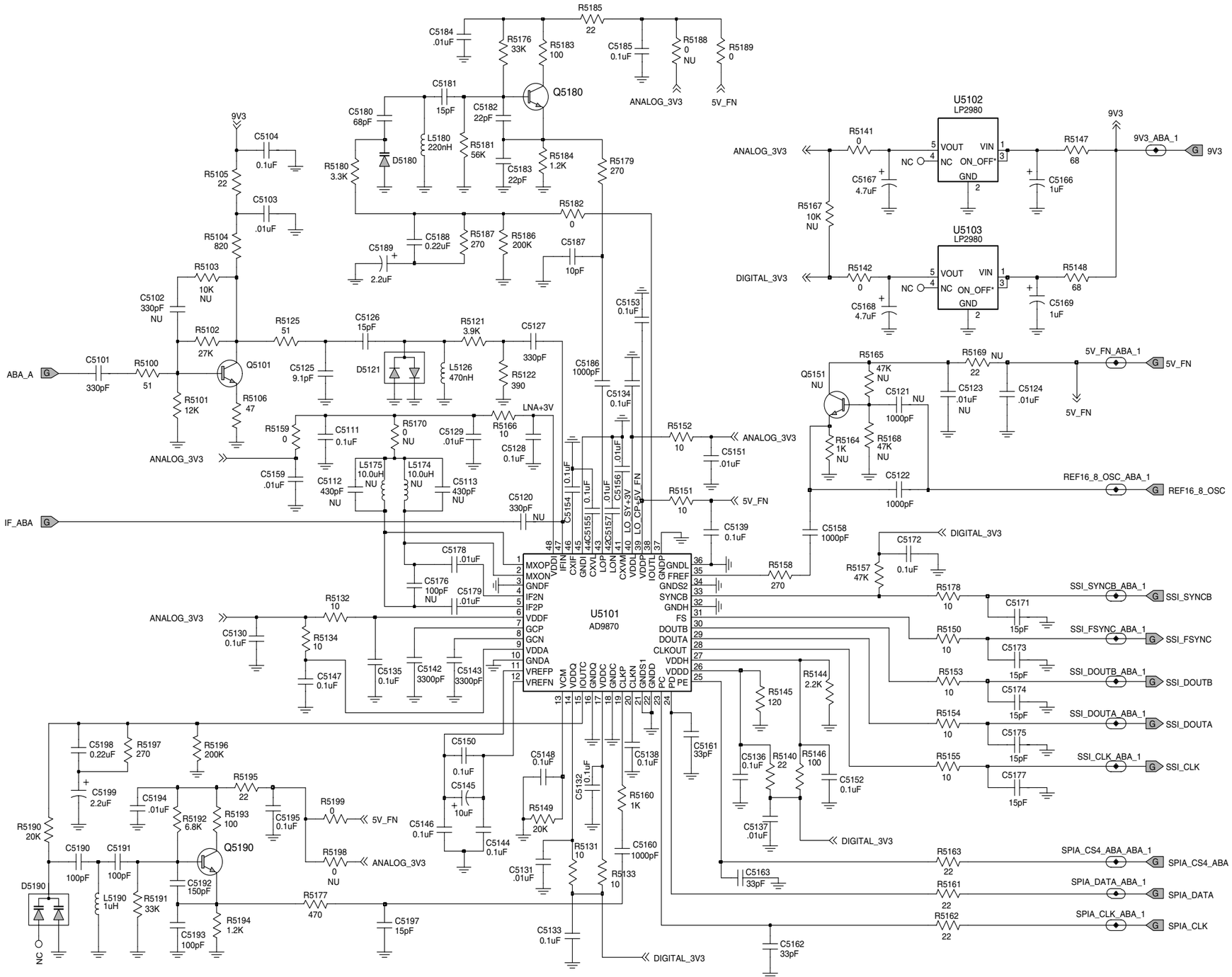


ZWG0131103A

Main Board 8486079Z02_A / CNTRL_CNTL (Sheet1)

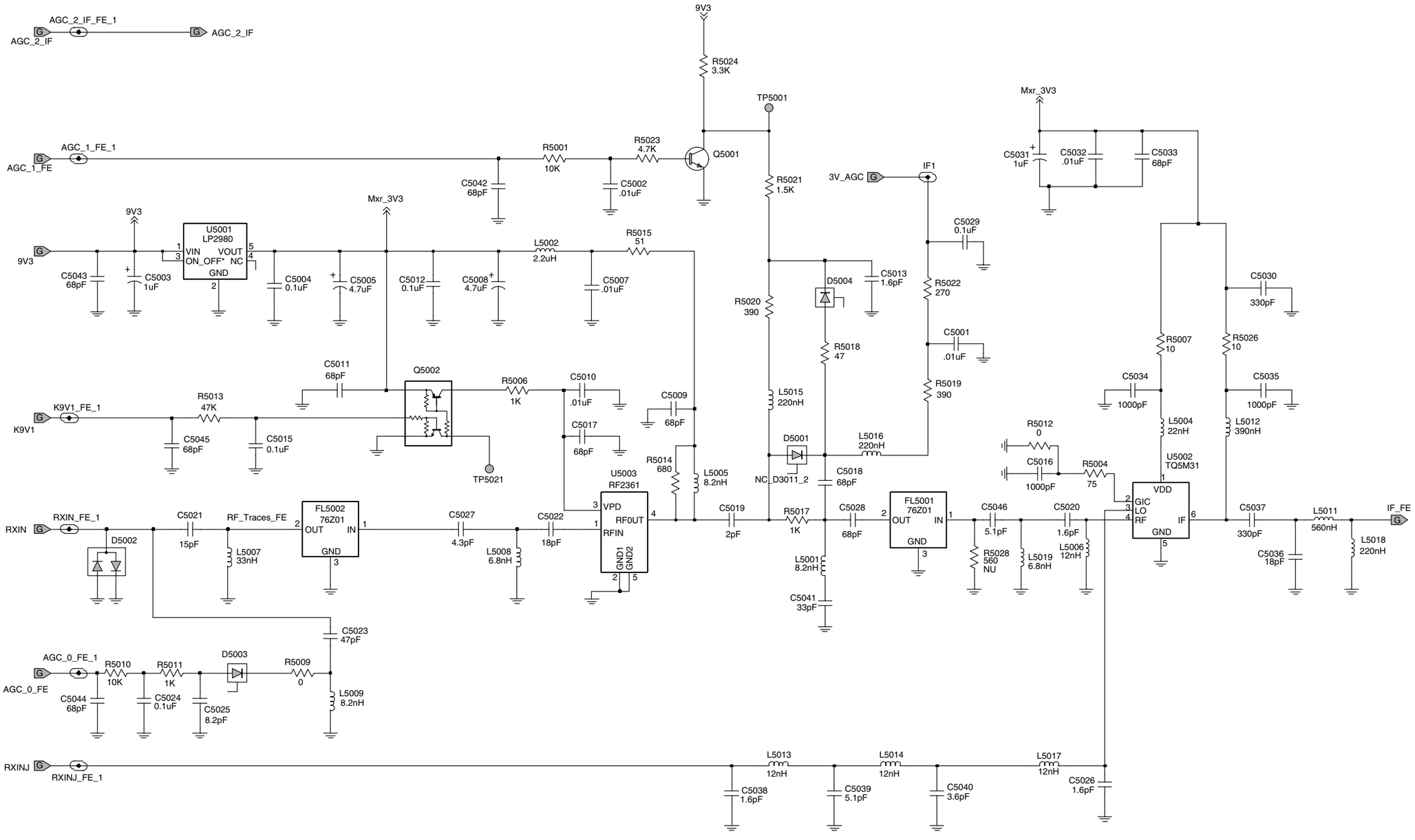


Main Board 8486079Z02_A / CNTRL_CNTL (Sheet 2)



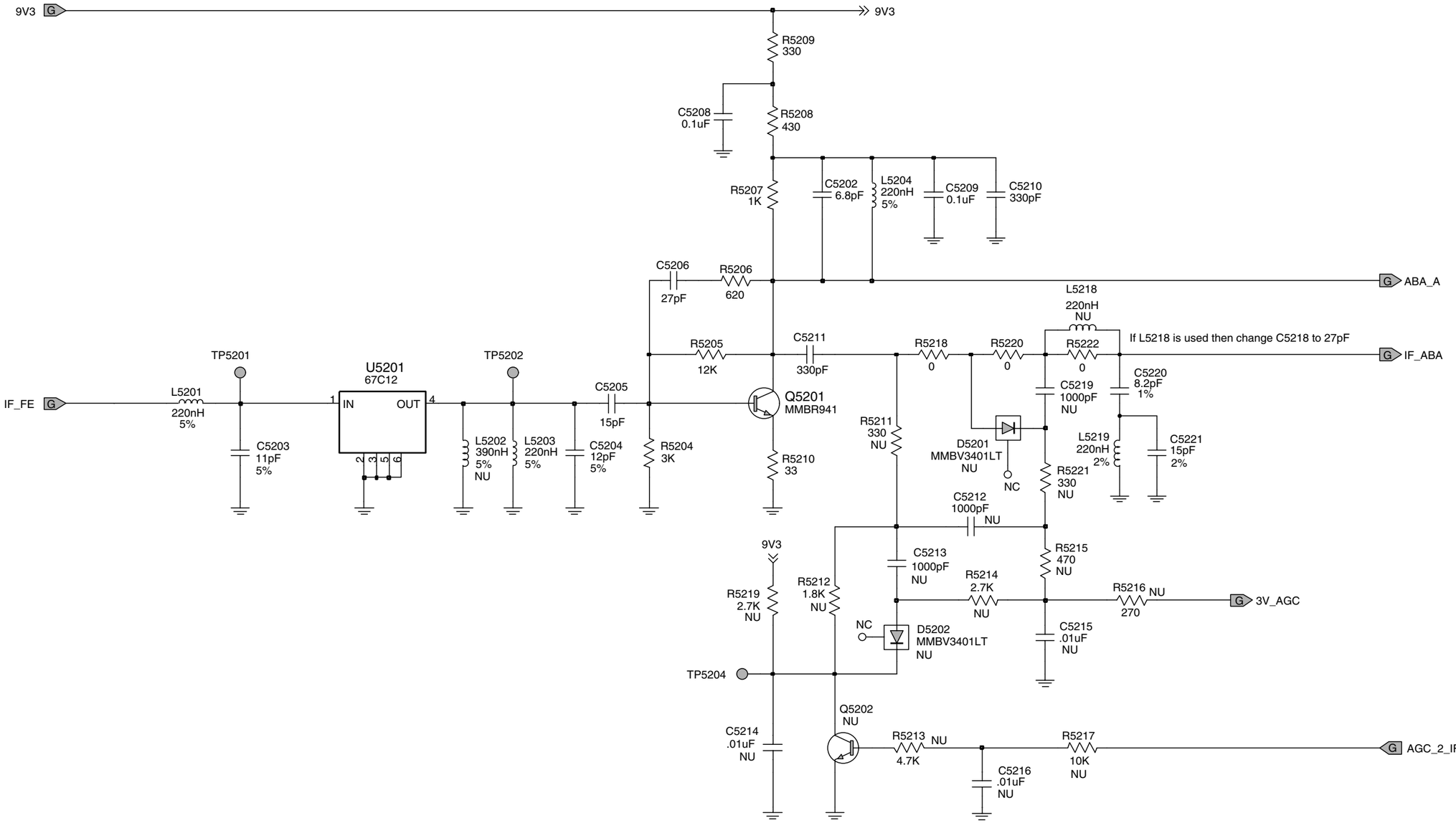
ZWG0131082A

Main Board 8486079Z02_A / RF_ABACUS



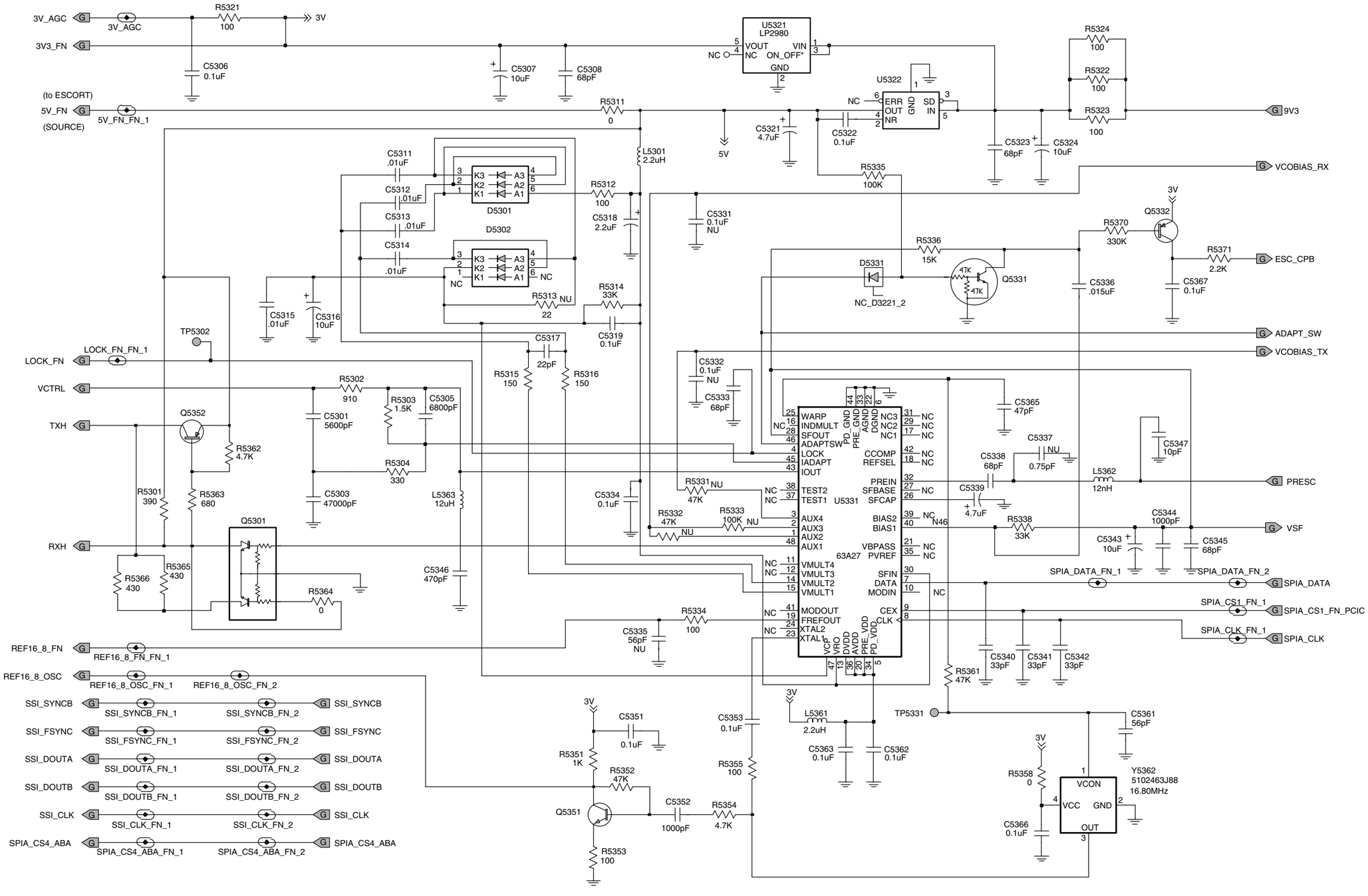
ZWG0131083A

Main Board 8486079Z02_A / RF_Front_End



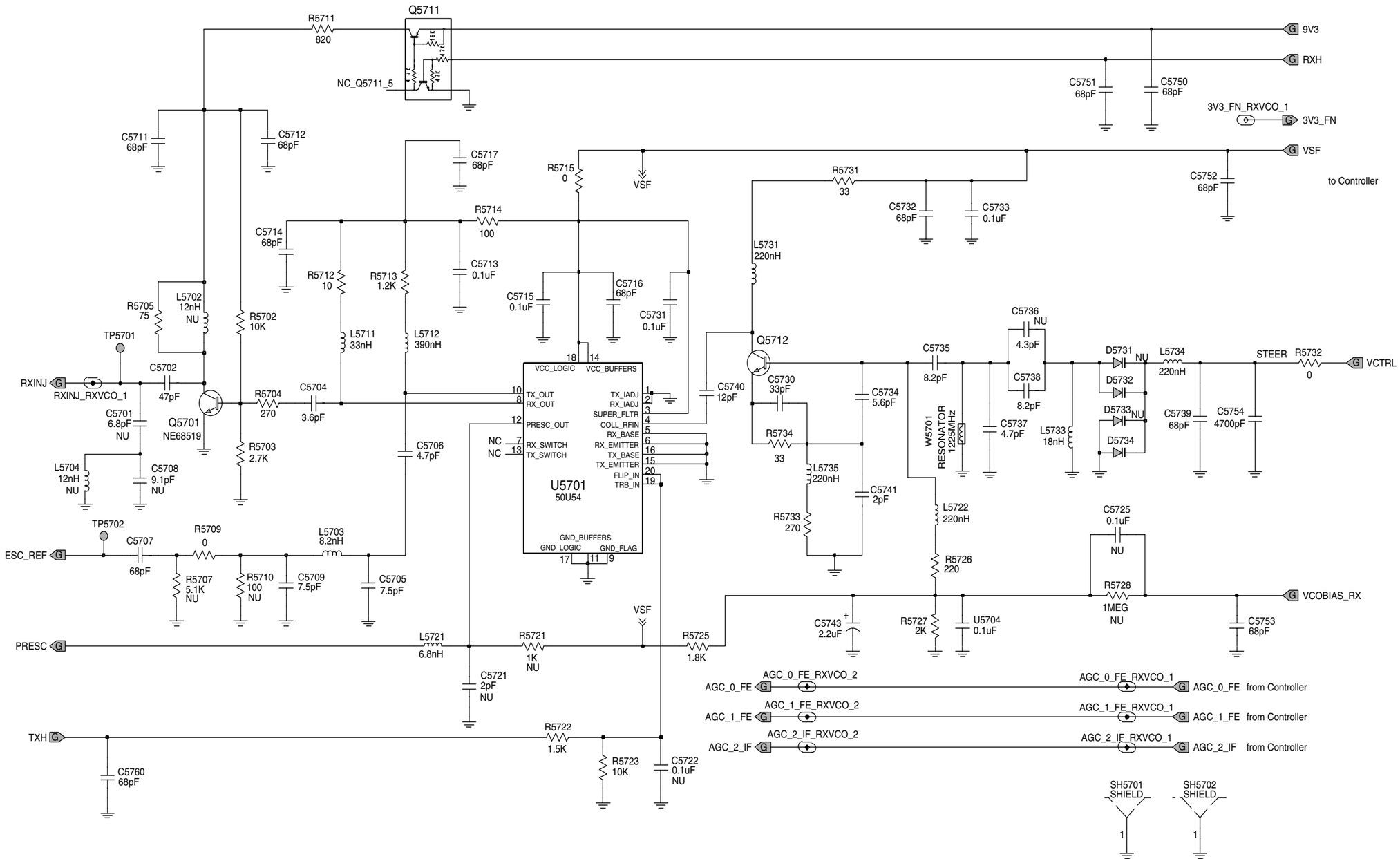
ZWG0131085A

Main Board 8486079Z02_A / RF_IF



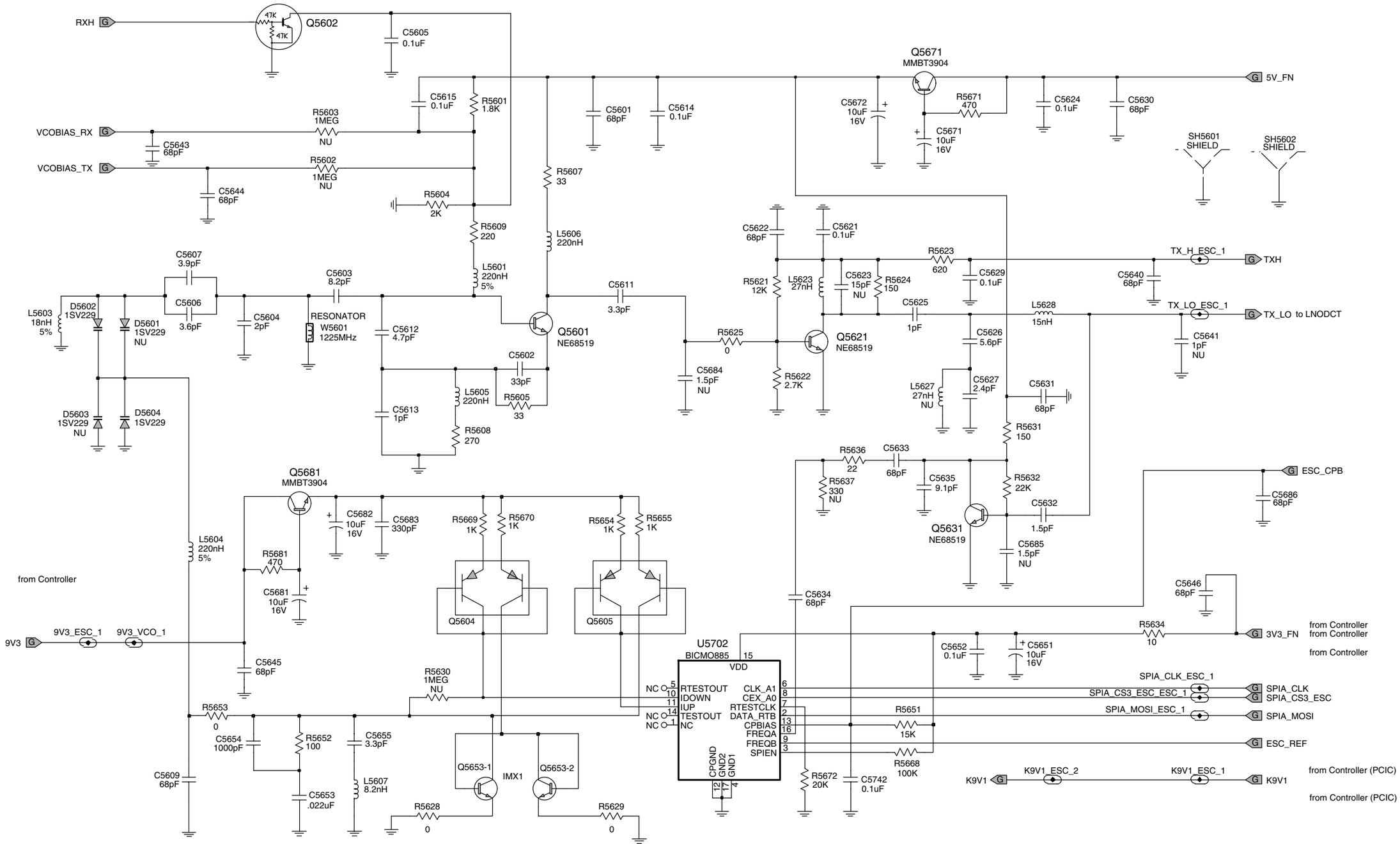
ZWG0131084A

Main Board 8486079Z02_A / RF_FRACN



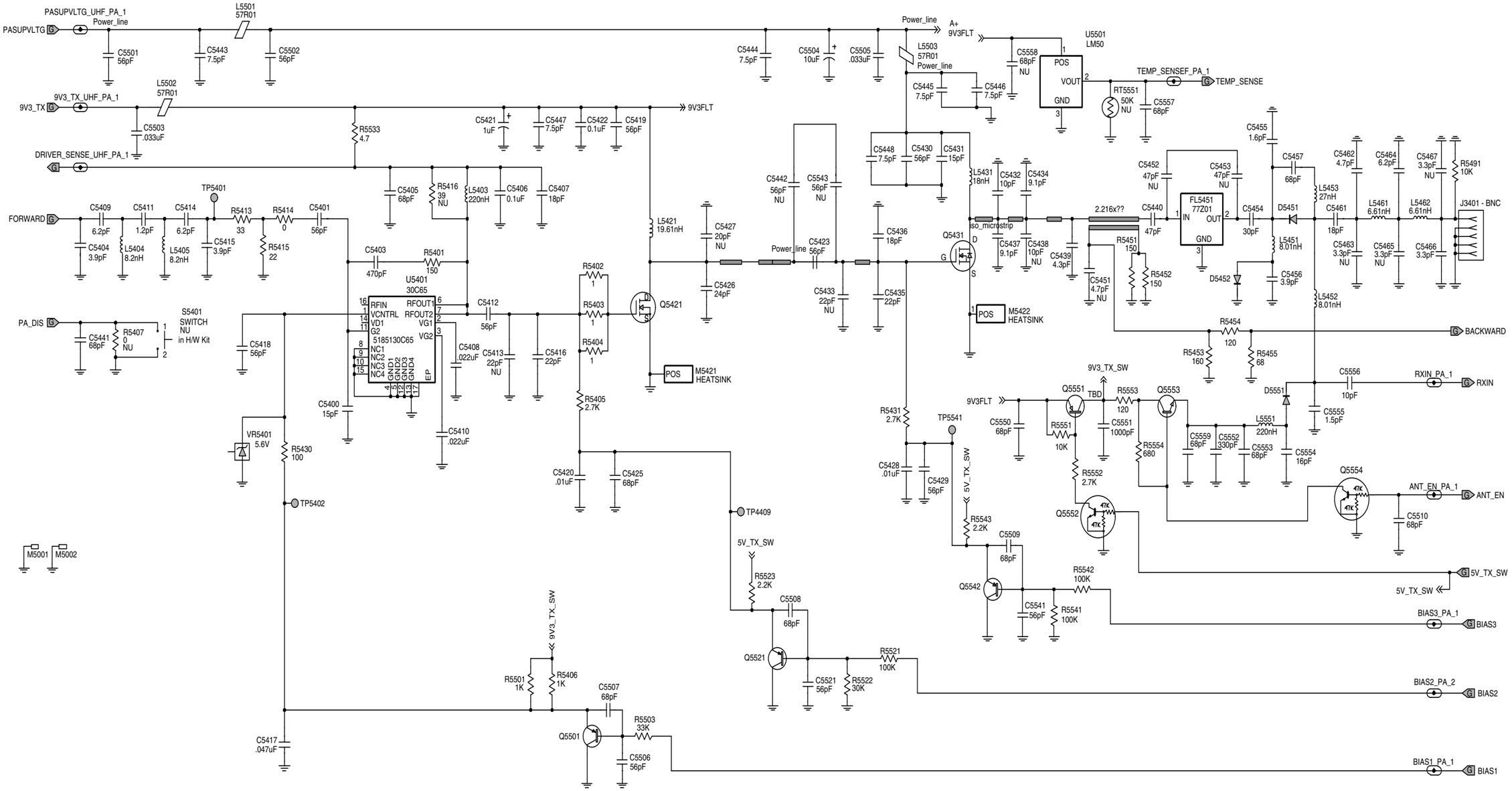
ZWG0131088A

Main Board 8486079Z02_A / RF_RX_VCO



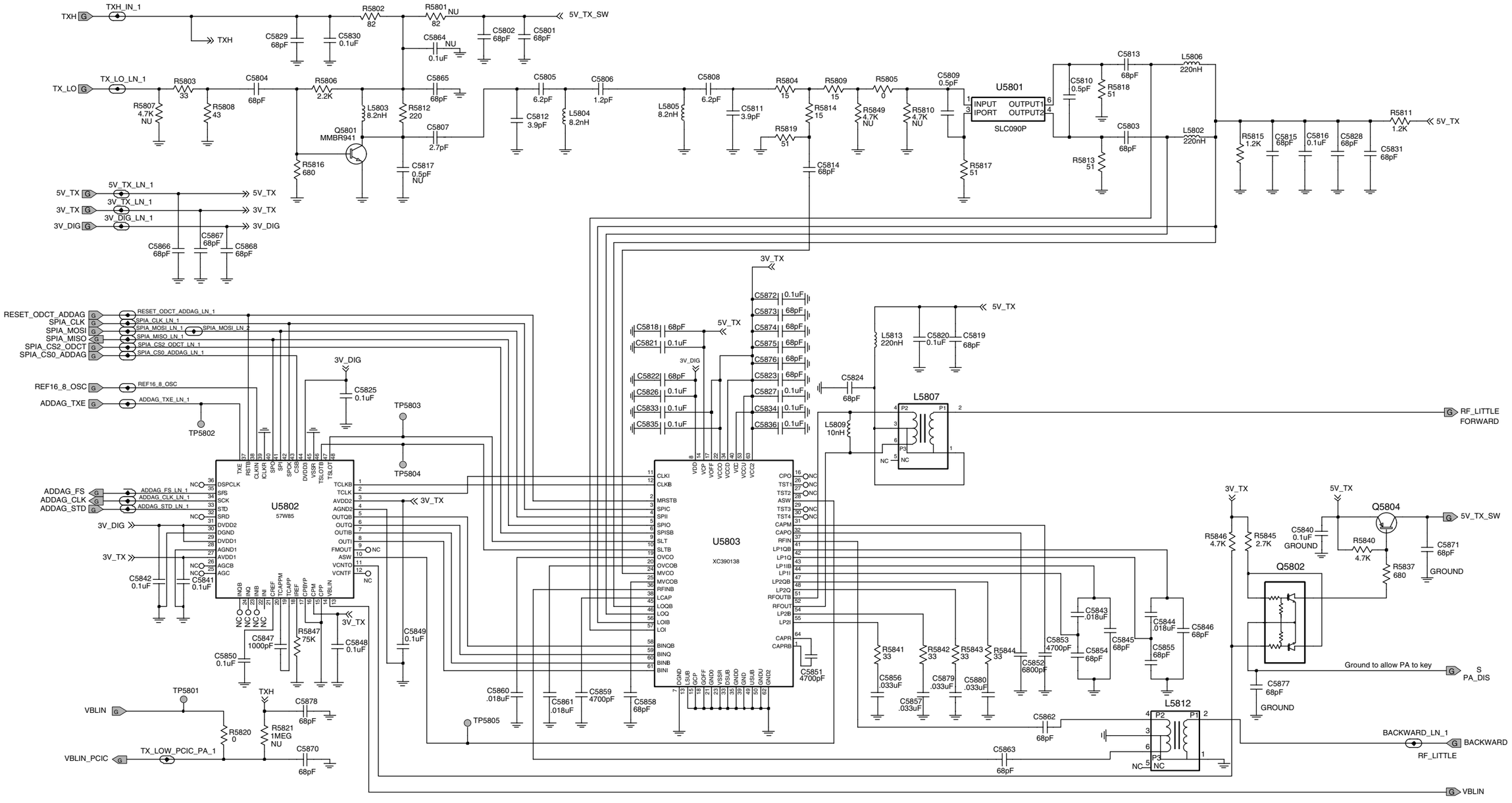
ZWG0131089A

Main Board 8486079Z02_A / RF_TX_VCO



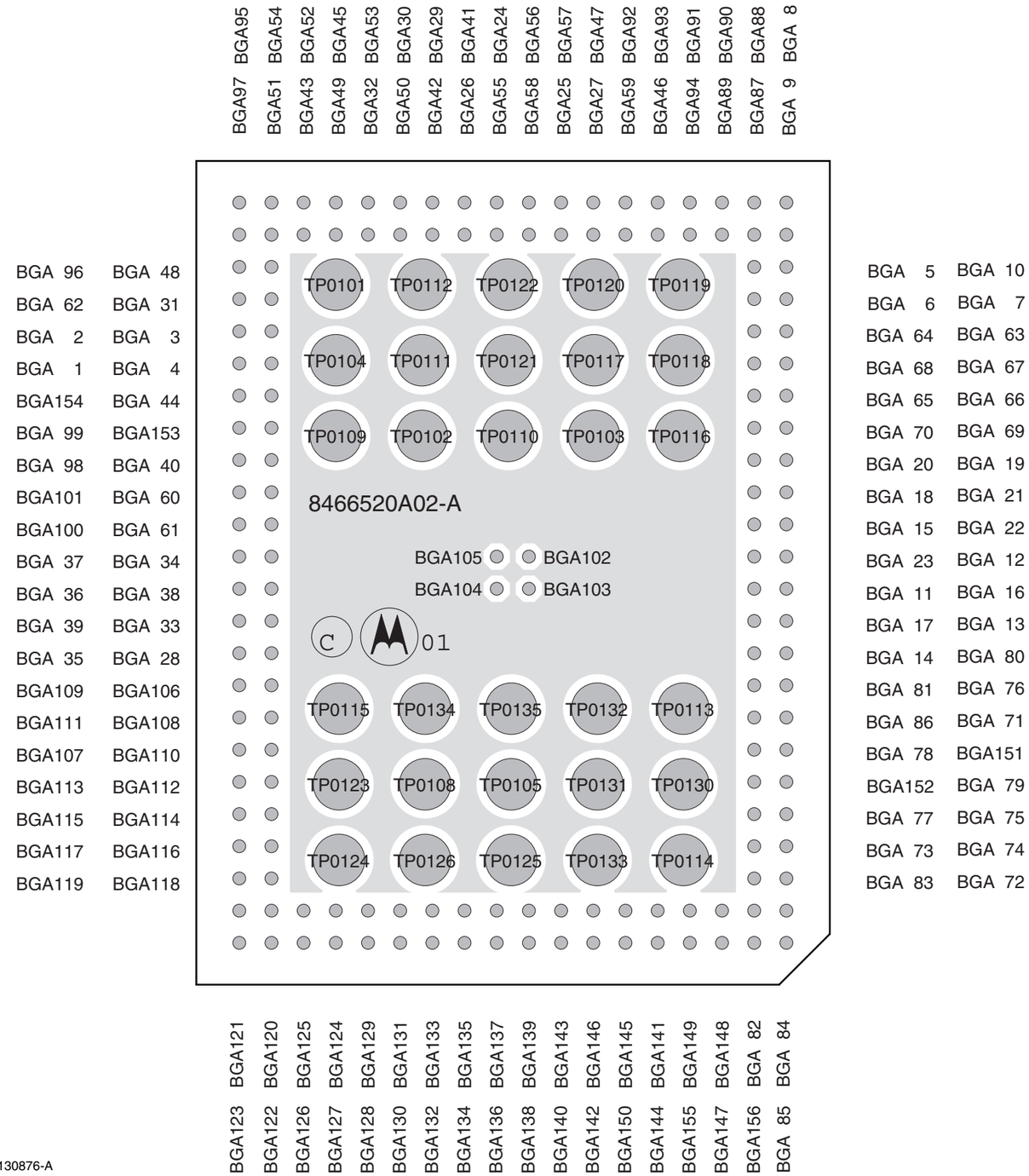
ZWG0131086A

Main Board 8486079Z02_A / POWER_AMPLIFIER__PA

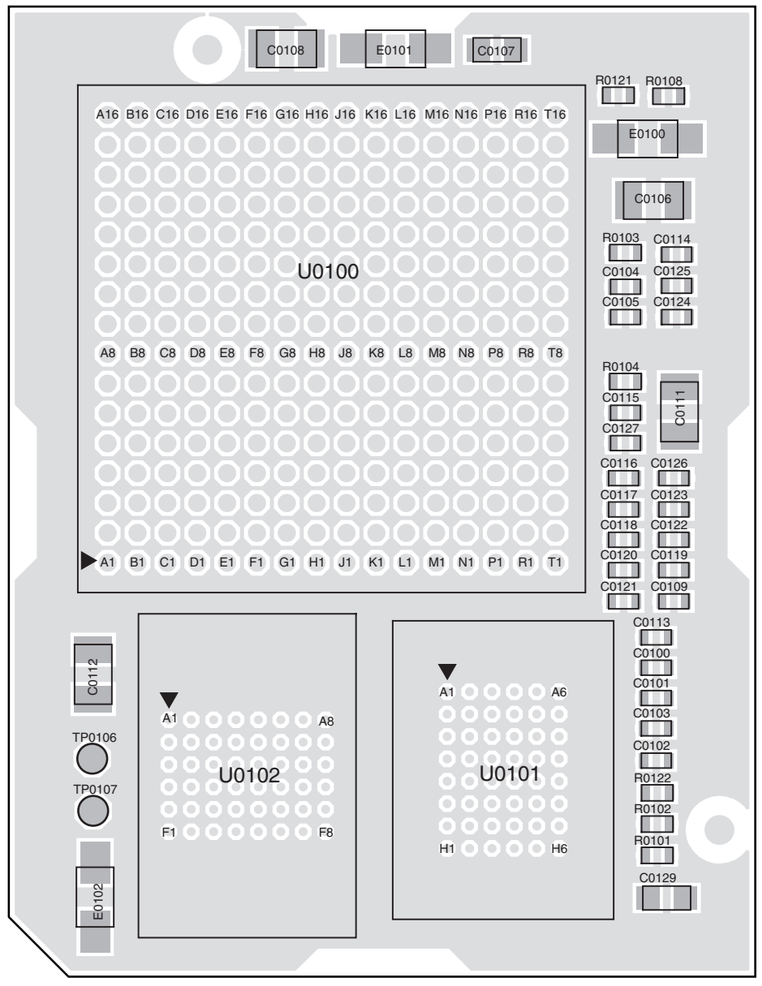


ZWG0131087A

Main Board 8486079Z02_A / POWER_AMPLIFIER_LNODCT

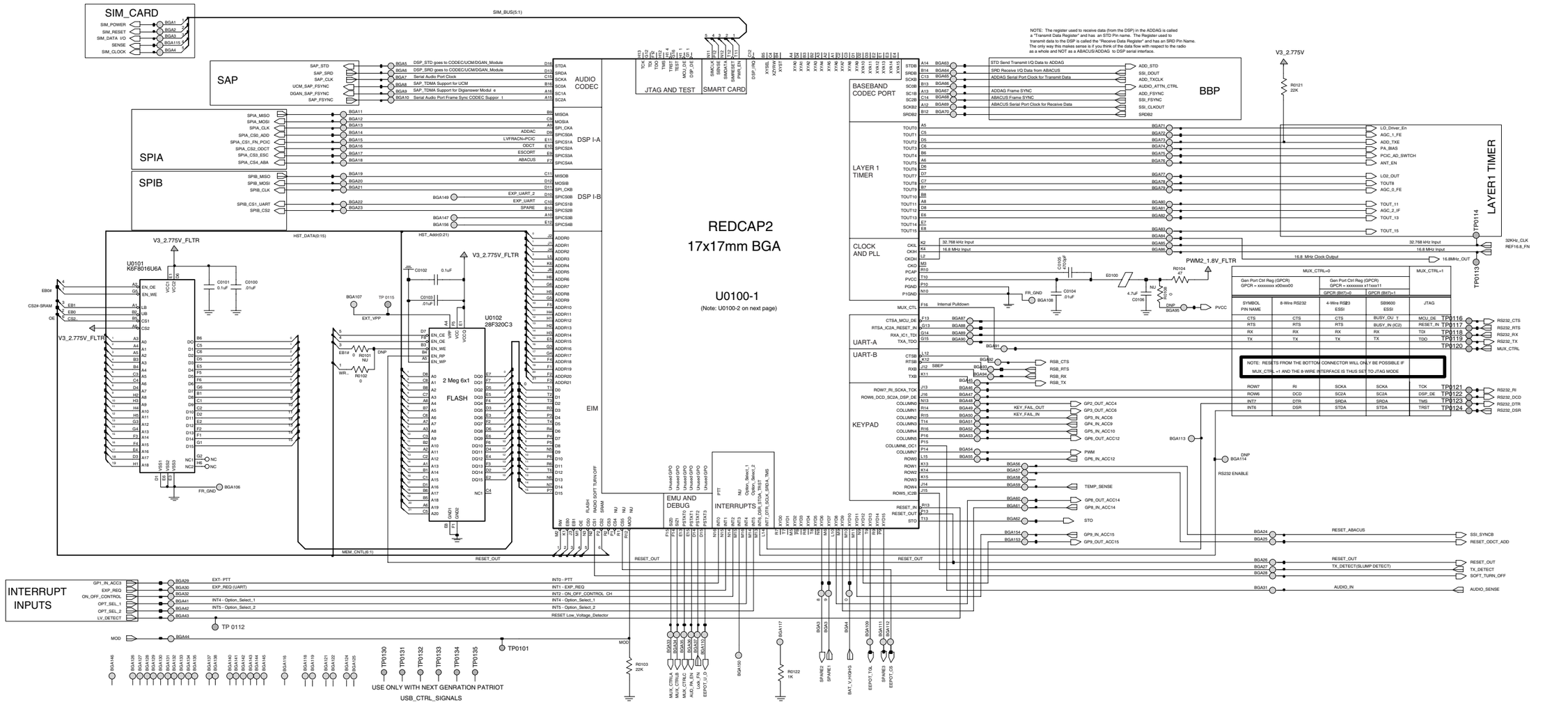


ZWG0130876-A



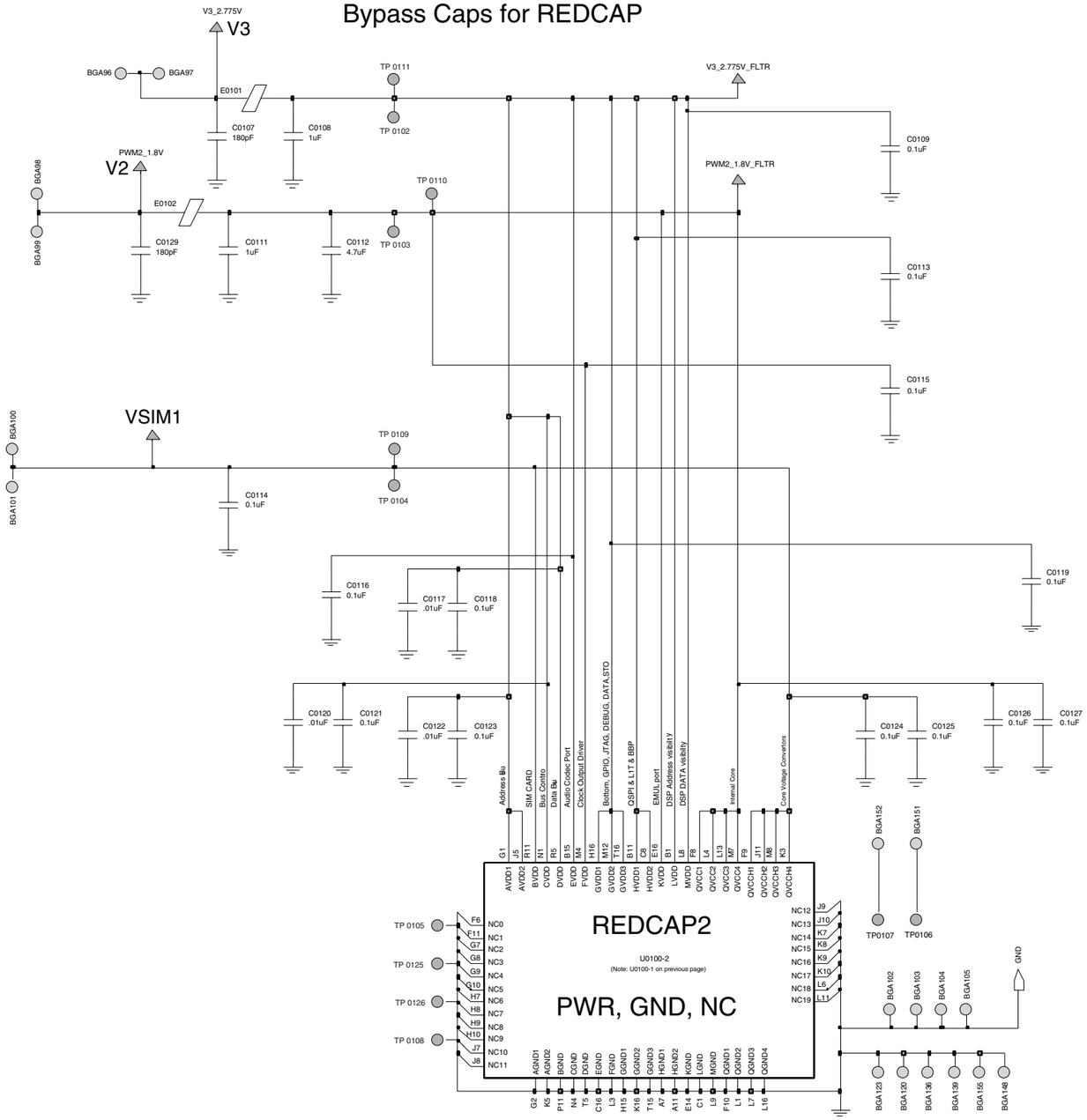
ZWG0130875-A

PCB / HDI_Controller 8466520A02_A / BOTTOM & TOP SIDE



ZWG0130877-A

HDI_Controller 8466520A02_A (Sheet 1)



ZWG0130878-A

HDI_Controller 8466520A02_A (Sheet 2)

Parts List

Parts on the Mainboard

Reference	Motorola PN	Value
C5001	2113743L41	10000 PF 10%
C5002	2113743L41	10000 PF 10%
C5003	2311049A07	CAP TANT CP 1uF 10% 16V
C5004	2113743M24	100000 PF +80-20% Y5V
C5005	2311049A56	CAP TANT CP 4.7uF 20% 10V
C5007	2113743L41	10000 PF 10%
C5008	2311049A56	CAP TANT CP 4.7uF 20% 10V
C5009	2113743N46	68.0 PF 5%
C5010	2113743L41	10000 PF 10%
C5011	2113743N46	68.0 PF 5%
C5012	2113928N01	0.1UF 10% 6.3
C5013	2113743N08	1.6 PF +-.25PF
C5015	2113743M24	100000 PF +80-20% Y5V
C5016	2113743L17	1000 PF 10%
C5017	2113743N46	68.0 PF 5%
C5018	2113743N46	68.0 PF 5%
C5019	2113743N09	2.0 PF +-.25PF
C5020	2113743N08	1.6 PF +-.25PF
C5021	2113743N30	15.0PF 5%
C5022	2113743N32	18.0 PF 5%
C5023	2113743N42	47.0 PF 5%
C5024	2113928N01	0.1UF 10% 6.3
C5025	2113743N24	8.2 PF + -.5PF
C5026	2113743N08	1.6 PF +-.25PF
C5027	2113743N17	4.3 PF +-.25PF
C5028	2113743N46	68.0 PF 5%
C5029	2113928N01	0.1UF 10% 6.3
C5030	2113743L05	330 PF 10%
C5031	2311049A07	CAP TANT CP 1uF 10% 16V
C5032	2113743L41	10000 PF 10%
C5033	2113743N46	68.0 PF 5%
C5034	2113743L17	1000 PF 10%
C5035	2113743L17	1000 PF 10%
C5036	2113743N32	18.0 PF 5%
C5037	2113743L05	330 PF 10%
C5038	2113743N08	1.6 PF +-.25PF
C5039	2113743N19	5.1 PF +-.25PF
C5040	2113743N15	3.6 PF +-.25PF
C5041	2113743N38	33.0 PF 5%
C5042	2113743N46	68.0 PF 5%
C5043	2113743N46	68.0 PF 5%
C5044	2113743N46	68.0 PF 5%
C5045	2113743N46	68.0 PF 5%
C5046	2113743N19	5.1 PF +-.25PF
C5101	2113740F63	330pF 5% 50V NP0
C5103	2113741F49	10nF 50V
C5104	2113743E20	100nF 16V
C5111	2113743E20	100nF 16V
C5122	2113741F25	1nF 50V
C5124	2113741F49	10nF 50V
C5125	2113740F26	9.1pF 5% 50V NP0
C5126	2113740F31	15pF 5% 50V NP0
C5127	2113740F63	330pF 5% 50V NP0
C5128	2113743E20	100nF 16V
C5129	2113741F49	10nF 50V
C5130	2113743E20	100nF 16V
C5131	2113741F49	10nF 50V
C5132	2113743E20	100nF 16V
C5133	2113743E20	100nF 16V
C5134	2113743E20	100nF 16V
C5135	2113743E20	100nF 16V
C5136	2113743E20	100nF 16V
C5137	2113741F49	10nF 50V
C5138	2113743E20	100nF 16V
C5139	2113743E20	100nF 16V
C5142	2113741F37	3.3nF 50V
C5143	2113741F37	3.3nF 50V
C5144	2113743E20	100nF 16V
C5145	2311049A57	CAP TANT CP 10uF 10% 16V
C5146	2113743E20	100nF 16V
C5147	2113743E20	100nF 16V
C5148	2113743E20	100nF 16V
C5150	2113743E20	100nF 16V
C5151	2113741F49	10nF 50V
C5152	2113743E20	100nF 16V
C5153	2113743E20	100nF 16V
C5154	2113743E20	100nF 16V
C5155	2113743E20	100nF 16V
C5156	2113741F49	10nF 50V
C5157	2113741F49	10nF 50V
C5158	2113741F25	1nF 50V
C5159	2113741F49	10nF 50V
C5160	2113741F25	1nF 50V
C5161	2113740F39	33pF 5% 50V NP0
C5162	2113740F39	33pF 5% 50V NP0
C5163	2113740F39	33pF 5% 50V NP0
C5166	2311049A07	CAP TANT CP 1uF 10% 16V
C5167	2311049A56	CAP TANT CP 4.7uF 20% 10V
C5168	2311049A56	CAP TANT CP 4.7uF 20% 10V
C5169	2311049A07	CAP TANT CP 1uF 10% 16V
C5171	2113740F31	15pF 5% 50V NP0
C5172	2113743E20	100nF 16V
C5173	2113740F31	15pF 5% 50V NP0
C5174	2113740F31	15pF 5% 50V NP0
C5175	2113740F31	15pF 5% 50V NP0
C5177	2113740F31	15pF 5% 50V NP0
C5178	2113741F49	10nF 50V
C5179	2113741F49	10nF 50V
C5180	2113740F47	68pF 5% 50V NP0
C5181	2113740F31	15pF 5% 50V NP0
C5182	2113740F35	22pF 5% 50V NP0
C5183	2113740F35	22pF 5% 50V NP0
C5184	2113741F49	10nF 50V
C5185	2113743E20	100nF 16V
C5186	2113741F25	1nF 50V
C5187	2113740F27	10pF 5% 50V NP0
C5188	2113743A23	220nF 16V
C5189	2311049A09	CAP TANT CP 2.2uF 10% 20V
C5190	2113740F51	100pF 5% 50V NP0
C5191	2113740F51	100pF 5% 50V NP0
C5192	2113740F55	150pF 5% 50V NP0
C5193	2113740F51	100pF 5% 50V NP0
C5194	2113741F49	10nF 50V
C5195	2113743E20	100nF 16V
C5197	2113740F31	15pF 5% 50V NP0
C5198	2113743A23	220nF 16V
C5199	2311049A09	CAP TANT CP 2.2uF 10% 20V
C5202	2113740F23	6.8pF 5% 50V NP0
C5203	2113740F28	11pF 5% 50V NP0
C5204	2113740F29	12pF 5% 50V NP0
C5205	2113740F31	15pF 5% 50V NP0
C5206	2113740F37	27pF 5% 50V NP0
C5208	2113743E20	100nF 16V
C5209	2113743E20	100nF 16V
C5210	2113740F63	330pF 5% 50V NP0
C5211	2113740F63	330pF 5% 50V NP0
C5220	2113740L16	8.2pF +-0.1pF
C5221	2113740L22	CAP 15.0 PF 50V 2.0%
C5301	2113741F43	5.6nF 50V
C5303	0804533C33	CAP METAL/POLY FILM 47nF
C5305	2113741F45	6.8nF 50V
C5306	2113743M24	100000 PF +80-20% Y5V
C5307	2311049A57	CAP TANT CP 10uF 10% 16V
C5308	2113743N46	68.0 PF 5%
C5311	2113743L41	10000 PF 10%
C5312	2113743L41	10000 PF 10%
C5313	2113743L41	10000 PF 10%
C5314	2113743L41	10000 PF 10%
C5315	2113743L41	10000 PF 10%
C5316	2311049A57	CAP TANT CP 10uF 10% 16V
C5317	2113743N34	22.0 PF 5%
C5318	2311049A40	CAP TANT CP 2.2uF 10% 10V
C5319	2113743M24	100000 PF +80-20% Y5V
C5321	2311049A56	CAP TANT CP 4.7uF 20% 10V
C5322	2113743M24	100000 PF +80-20% Y5V
C5323	2113743N46	68.0 PF 5%
C5324	2311049A57	CAP TANT CP 10uF 10% 16V
C5333	2113743N46	68.0 PF 5%
C5334	2113743M24	100000 PF +80-20% Y5V
C5336	2113743E03	15nF 16V
C5338	2113743N46	68.0 PF 5%
C5339	2311049A56	CAP TANT CP 4.7uF 20% 10V

Reference	Motorola PN	Value
C5340	2113743N38	33.0 PF 5%
C5341	2113743N38	33.0 PF 5%
C5342	2113743N38	33.0 PF 5%
C5343	2311049A57	CAP TANT CP 10uF 10% 16V
C5344	2113743L17	1000 PF 10%
C5345	2113743N46	68.0 PF 5%
C5346	2113741F17	470pF 50V
C5347	2113743N26	10.0 PF 5%
C5351	2113743M24	100000 PF +80-20% Y5V
C5352	2113743L17	1000 PF 10%
C5353	2113743M24	100000 PF +80-20% Y5V
C5361	2113743N44	56.0 PF 5%
C5362	2113743M24	100000 PF +80-20% Y5V
C5363	2113743M24	100000 PF +80-20% Y5V
C5365	2113743N42	47.0 PF 5%
C5366	2113743M24	100000 PF +80-20% Y5V
C5367	2113743E20	100nF 16V
C5400	2113743N30	15.0PF 5%
C5401	2113743N44	56.0 PF 5%
C5403	2113743L09	470 PF 10%
C5404	2113743N16	3.9 PF +-.25PF
C5405	2113743N46	68.0 PF 5%
C5406	2113743M24	100000 PF +80-20% Y5V
C5407	2113743N32	18.0 PF 5%
C5408	2113743M08	22000PF +80-20% Y5V
C5409	2113743N21	6.2 PF +-.25PF
C5410	2113743M08	22000PF +80-20% Y5V
C5411	2113743N05	1.2 PF +-.25PF
C5412	2113743N44	56.0 PF 5%
C5414	2113743N21	6.2 PF +-.25PF
C5415	2113743N16	3.9 PF +-.25PF
C5416	2103689A46	CL1 22+/-5%PF
C5417	2113743E12	47nF 10%
C5418	2113743N44	56.0 PF 5%
C5419	2113743N44	56.0 PF 5%
C5420	2113743L41	10000 PF 10%
C5421	2311049A08	CAP TANT CP 1uF 10% 35V
C5422	2113743M24	100000 PF +80-20% Y5V
C5423	2113740F45	56pF 5% 50V NP0
C5425	2113743N46	68.0 PF 5%

Reference	Motorola PN	Value
C5426	2103689A47	CL1 24+/-5%PF
C5428	2113743L41	10000 PF 10%
C5429	2113743N44	56.0 PF 5%
C5430	2113740F45	56pF 5% 50V NP0
C5431	2113740F31	15pF 5% 50V NP0
C5432	2111078B13	HQ 10pF 5% NP0
C5434	2111078B12	HQ 9.1pF 5% NP0
C5435	2111078B22	HQ 22pF 5% NP0
C5436	2111078B20	HQ 18pF 5% NP0
C5437	2111078B12	HQ 9.1pF 5% NP0
C5439	2111078B04	HQ 4.3pF 5% NP0
C5440	2111078B34	HQ 47pF 5% NP0
C5441	2113743N46	68.0 PF 5%
C5443	2113743N23	7.5 PF +-.5PF
C5444	2113743N23	7.5 PF +-.5PF
C5445	2113743N23	7.5 PF +-.5PF
C5446	2113743N23	7.5 PF +-.5PF
C5447	2113743N23	7.5 PF +-.5PF
C5448	2113743N23	7.5 PF +-.5PF
C5454	2111078B27	HQ 30pF 5% NP0
C5455	2113740A08	1.6pF 5% 50V NP0
C5456	2111078B03	HQ 3.9pF 5% NP0
C5457	2113743N46	68.0 PF 5%
C5461	2111078B20	HQ 18pF 5% NP0
C5462	2111078B05	HQ 4.7pF 5% NP0
C5464	2111078B08	HQ 6.2pF 5% NP0
C5466	2111078B01	HQ 3.3pF 5% NP0
C5501	2113740F45	56pF 5% 50V NP0
C5502	2113740F45	56pF 5% 50V NP0
C5503	2113743L50	33nF 10%
C5504	2311049A45	CAP TANT CP 10uF 10% 35V
C5505	2113741A57	33nF 50V
C5506	2113743N44	56.0 PF 5%
C5507	2113743N46	68.0 PF 5%
C5508	2113743N46	68.0 PF 5%
C5509	2113743N46	68.0 PF 5%
C5510	2113743N46	68.0 PF 5%
C5521	2113743N44	56.0 PF 5%
C5541	2113743N44	56.0 PF 5%
C5550	2113743N46	68.0 PF 5%

Reference	Motorola PN	Value
C5551	2113743L17	1000 PF 10%
C5552	2113743L05	330 PF 10%
C5553	2113743N46	68.0 PF 5%
C5554	2113743N31	16.0 PF 5%
C5555	2113740F07	1.5pF 5% 50V NP0
C5556	2113743N26	10.0 PF 5%
C5557	2113743N46	68.0 PF 5%
C5559	2113743N46	68.0 PF 5%
C5601	2113743N46	68.0 PF 5%
C5602	2113743N38	33.0 PF 5%
C5603	2113743N24	8.2 PF + -.5PF
C5604	2113743N09	2.0 PF +-.25PF
C5605	2113743M24	100000 PF +80-20% Y5V
C5606	2113743N15	3.6 PF +-.25PF
C5607	2113743N16	3.9 PF +-.25PF
C5609	2113743N46	68.0 PF 5%
C5611	2113743N14	3.3 PF +-.25PF
C5612	2113743N18	4.7 PF +-.25PF
C5613	2113743N03	1.0 PF +-.25PF
C5614	2113743M24	100000 PF +80-20% Y5V
C5615	2113743M24	100000 PF +80-20% Y5V
C5621	2113743M24	100000 PF +80-20% Y5V
C5622	2113743N46	68.0 PF 5%
C5624	2113743M24	100000 PF +80-20% Y5V
C5625	2113743N03	1.0 PF +-.25PF
C5626	2113743N20	5.6 PF +-.5PF
C5627	2113743N11	2.4 PF +-.25PF
C5629	2113743M24	100000 PF +80-20% Y5V
C5630	2113743N46	68.0 PF 5%
C5631	2113743N46	68.0 PF 5%
C5632	2113743N07	1.5 PF +-.25PF
C5633	2113743N46	68.0 PF 5%
C5634	2113743N46	68.0 PF 5%
C5635	2113743N25	9.1 PF +-.25PF
C5640	2113743N46	68.0 PF 5%
C5643	2113743N46	68.0 PF 5%
C5644	2113743N46	68.0 PF 5%
C5645	2113743N46	68.0 PF 5%
C5646	2113743N46	68.0 PF 5%
C5651	2311049A57	CAP TANT CP 10uF 10% 16V

Reference	Motorola PN	Value
C5652	2113743M24	100000 PF +80-20% Y5V
C5653	2113743E07	22nF 16V
C5654	2113741F25	1nF 50V
C5655	2113743N14	3.3 PF +-.25PF
C5671	2311049A57	CAP TANT CP 10uF 10% 16V
C5672	2311049A57	CAP TANT CP 10uF 10% 16V
C5681	2311049A57	CAP TANT CP 10uF 10% 16V
C5682	2311049A57	CAP TANT CP 10uF 10% 16V
C5683	2113743L05	330 PF 10%
C5686	2113743N46	68.0 PF 5%
C5702	2113743N42	47.0 PF 5%
C5704	2113743N15	3.6 PF +-.25PF
C5705	2113743N23	7.5 PF +-.5PF
C5706	2113743N18	4.7 PF +-.25PF
C5707	2113743N46	68.0 PF 5%
C5709	2113743N23	7.5 PF +-.5PF
C5711	2113743N46	68.0 PF 5%
C5712	2113743N46	68.0 PF 5%
C5713	2113743M24	100000 PF +80-20% Y5V
C5714	2113743N46	68.0 PF 5%
C5715	2113743M24	100000 PF +80-20% Y5V
C5716	2113743N46	68.0 PF 5%
C5717	2113743N46	68.0 PF 5%
C5730	2113743N38	33.0 PF 5%
C5731	2113743M24	100000 PF +80-20% Y5V
C5732	2113743N46	68.0 PF 5%
C5733	2113743M24	100000 PF +80-20% Y5V
C5734	2113743N20	5.6 PF +-.5PF
C5735	2113743N24	8.2 PF + -.5PF
C5737	2113743N18	4.7 PF +-.25PF
C5738	2113743N24	8.2 PF + -.5PF
C5739	2113743N46	68.0 PF 5%
C5740	2113743N28	12.0 PF 5%
C5741	2113743N09	2.0 PF +-.25PF
C5742	2113743M24	100000 PF +80-20% Y5V
C5743	2311049A40	CAP TANT CP 2.2uF 10% 10V
C5750	2113743N46	68.0 PF 5%
C5751	2113743N46	68.0 PF 5%

Reference	Motorola PN	Value
C5752	2113743N46	68.0 PF 5%
C5753	2113743N46	68.0 PF 5%
C5754	2113743L33	4700PF 10%
C5760	2113743N46	68.0 PF 5%
C5801	2113743N46	68.0 PF 5%
C5802	2113743N46	68.0 PF 5%
C5803	2113743N46	68.0 PF 5%
C5804	2113743N46	68.0 PF 5%
C5805	2113743N21	6.2 PF +-.25PF
C5806	2113743N05	1.2 PF +-.25PF
C5807	2113743N12	2.7 PF +-.25PF
C5808	2113743N21	6.2 PF +-.25PF
C5809	2113743N01	0.5 PF +-.25PF
C5810	2113743N01	0.5 PF +-.25PF
C5811	2113743N16	3.9 PF +-.25PF
C5812	2113743N16	3.9 PF +-.25PF
C5813	2113743N46	68.0 PF 5%
C5814	2113743N46	68.0 PF 5%
C5815	2113743N46	68.0 PF 5%
C5816	2113928N01	0.1UF 10% 6.3
C5818	2113743N46	68.0 PF 5%
C5819	2113743N46	68.0 PF 5%
C5820	2113928N01	0.1UF 10% 6.3
C5821	2113928N01	0.1UF 10% 6.3
C5822	2113743N46	68.0 PF 5%
C5823	2113743N46	68.0 PF 5%
C5824	2113743N46	68.0 PF 5%
C5825	2113928N01	0.1UF 10% 6.3
C5826	2113928N01	0.1UF 10% 6.3
C5827	2113928N01	0.1UF 10% 6.3
C5828	2113743N46	68.0 PF 5%
C5829	2113743N46	68.0 PF 5%
C5830	2113928N01	0.1UF 10% 6.3
C5831	2113743N46	68.0 PF 5%
C5833	2113928N01	0.1UF 10% 6.3
C5834	2113928N01	0.1UF 10% 6.3
C5835	2113928N01	0.1UF 10% 6.3
C5836	2113928N01	0.1UF 10% 6.3
C5840	2113928N01	0.1UF 10% 6.3
C5841	2113928N01	0.1UF 10% 6.3
C5842	2113928N01	0.1UF 10% 6.3

Reference	Motorola PN	Value
C5843	2113743E05	18nF 16V
C5844	2113743E05	18nF 16V
C5845	2113743N46	68.0 PF 5%
C5846	2113743N46	68.0 PF 5%
C5847	2113743L17	1000 PF 10%
C5848	2113928N01	0.1UF 10% 6.3
C5849	2113928N01	0.1UF 10% 6.3
C5850	2113928N01	0.1UF 10% 6.3
C5851	2113743L33	4700PF 10%
C5852	2113743L37	6.8nF 10%
C5853	2113743L33	4700PF 10%
C5854	2113743N46	68.0 PF 5%
C5855	2113743N46	68.0 PF 5%
C5856	2113743E10	.033UF 10%
C5857	2113743E10	.033UF 10%
C5858	2113743N46	68.0 PF 5%
C5859	2113743L33	4700PF 10%
C5860	2113743M06	18000 PF +80-20% Y5V
C5861	2113743M06	18000 PF +80-20% Y5V
C5862	2113743N46	68.0 PF 5%
C5863	2113743N46	68.0 PF 5%
C5865	2113743N46	68.0 PF 5%
C5866	2113743N46	68.0 PF 5%
C5867	2113743N46	68.0 PF 5%
C5868	2113743N46	68.0 PF 5%
C5870	2113743N46	68.0 PF 5%
C5871	2113743N46	68.0 PF 5%
C5872	2113928N01	0.1UF 10% 6.3
C5873	2113743N46	68.0 PF 5%
C5874	2113743N46	68.0 PF 5%
C5875	2113743N46	68.0 PF 5%
C5876	2113743N46	68.0 PF 5%
C5877	2113743N46	68.0 PF 5%
C5878	2113743N46	68.0 PF 5%
C5879	2113743E10	.033UF 10%
C5880	2113743E10	.033UF 10%
D5001	4880142L01	DIODE PIN
D5002	4880154K03	DIODE DUAL SCHOTTKY SOT23
D5003	4880142L01	DIODE PIN
D5004	4880142L01	DIODE PIN

Reference	Motorola PN	Value
D5121	4880154K03	DIODE DUAL SCHOTTKY SOT23
D5180	4862824C01	DIODE VARACTOR CHIP
D5190	4805649Q13	DIODE VCTR 1SV228 SOT23
D5301	4802233J09	DIODE TRIPLE SOT143-RH
D5302	4802233J09	DIODE TRIPLE SOT143-RH
D5331	4813825A05	DIODE 30V HOT CARRIER MMBD301L
D5451	4880973Z02	PIN DIODE
D5452	4880973Z02	PIN DIODE
D5551	4880973Z02	PIN DIODE
D5602	4862824C01	DIODE VARACTOR CHIP
D5604	4862824C01	DIODE VARACTOR CHIP
D5732	4862824C01	DIODE VARACTOR CHIP
D5734	4862824C01	DIODE VARACTOR CHIP
FL5001	9186076Z01	FILTER, BP 3-POLE CER 851-870 M
FL5002	9186076Z01	FILTER, BP 3-POLE CER 851-870 M
FL5451	5886077Z01	ISOLATOR, 10W-F 3W-R 806-870 MH
J5401	0986166B01	RF CONN BNC
L5001	2462587V22	CHIP IND 8.2NH 5%
L5002	2462587Q20	IND CHIP 2.2uH 20%
L5004	2462587V26	CHIP IND 22 NH 5%
L5005	2462587V22	CHIP IND 8.2NH 5%
L5006	2462587V23	CHIP IND 12 NH 5%
L5007	2462587V28	CHIP IND 33 NH 5%
L5008	2462587V21	CHIP IND 6.8 NH 5%
L5009	2413926G06	IND 8.2 NH 5%
L5011	2462587V43	IND CHIP 560 NH 10%
L5012	2462587V59	IND CHIP 390 NH 5%
L5013	2413926G08	IND 12 NH 5%
L5014	2413926G08	IND 12 NH 5%
L5015	2462587V38	IND CHIP 220 NH 5%
L5016	2462587V38	IND CHIP 220 NH 5%
L5017	2413926G08	IND 12 NH 5%
L5018	2462587V38	IND CHIP 220 NH 5%
L5019	2409154M11	IND CER MLTILYR 6.8NH 1005
L5126	2462587T23	COIL CHIP 470nH
L5180	2462587T19	IND CHIP 220NH 5% LOW PRO

Reference	Motorola PN	Value
L5190	2462587T30	COIL CHIP 1uH
L5201	2462587N57	CHIP IND 220 NH 5%
L5203	2462587V38	IND CHIP 220 NH 5%
L5204	2462587N57	CHIP IND 220 NH 5%
L5219	2413923B08	IND CHIP 220 NH 2%
L5301	2462587Q20	IND CHIP 2.2uH 20%
L5361	2462587Q20	IND CHIP 2.2uH 20%
L5362	2462587V23	CHIP IND 12 NH 5%
L5363	2462587P25	CHIP IND 12000 NH 5%
L5403	2462587V38	IND CHIP 220 NH 5%
L5404	2462587V22	CHIP IND 8.2NH 5%
L5405	2462587V22	CHIP IND 8.2NH 5%
L5421	2479990B02	AIR WND COIL/GREEN COLOR 19.61
L5431	2485873L01	COIL SQ 18nH 3TNS
L5451	2460591A49	SQUARE COIL 8nH 10% 3T AWG22
L5452	2460591A49	SQUARE COIL 8nH 10% 3T AWG22
L5453	2462587V27	CHIP IND 27 NH 5%
L5461	2460591A29	COIL AIR WOUND INDUC 6.61
L5462	2460591A29	COIL AIR WOUND INDUC 6.61
L5501	2484657R01	Ferrite Bead
L5502	2484657R01	Ferrite Bead
L5503	2484657R01	Ferrite Bead
L5551	2462587V38	IND CHIP 220 NH 5%
L5601	2462587V38	IND CHIP 220 NH 5%
L5603	2462587V25	CHIP IND 18 NH 5%
L5604	2462587V38	IND CHIP 220 NH 5%
L5605	2462587V38	IND CHIP 220 NH 5%
L5606	2462587V38	IND CHIP 220 NH 5%
L5607	2462587V22	CHIP IND 8.2NH 5%
L5623	2462587V27	CHIP IND 27 NH 5%
L5628	2462587V24	CHIP IND 15NH 5%
L5703	2462587V22	CHIP IND 8.2NH 5%
L5711	2462587V28	CHIP IND 33 NH 5%
L5712	2462587V41	IND CHIP 390 NH 10%
L5721	2462587V21	CHIP IND 6.8 NH 5%
L5722	2462587V38	IND CHIP 220 NH 5%
L5731	2462587V38	IND CHIP 220 NH 5%
L5733	2462587V25	CHIP IND 18 NH 5%

Reference	Motorola PN	Value
L5734	2462587V38	IND CHIP 220 NH 5%
L5735	2462587V38	IND CHIP 220 NH 5%
L5802	2462587V38	IND CHIP 220 NH 5%
L5803	2462587V22	CHIP IND 8.2NH 5%
L5804	2462587V22	CHIP IND 8.2NH 5%
L5805	2462587V22	CHIP IND 8.2NH 5%
L5806	2462587V38	IND CHIP 220 NH 5%
L5807	2585959A01	TRANSFORMER BALUN CERAMIC
L5809	2413926G07	IND 10 NH 5%
L5812	2585959A01	TRANSFORMER BALUN CERAMIC
L5813	2462587V38	IND CHIP 220 NH 5%
M5421	2686201B01	HEAT SPREADER
M5422	2686201B01	HEAT SPREADER
Q5001	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5002	4805921T02	TSTR DUAL ROHM FMC2 RH
Q5101	4813827A07	TSTR NPN SML SIG MMBR941
Q5180	4813827A07	TSTR NPN SML SIG MMBR941
Q5190	4813827A07	TSTR NPN SML SIG MMBR941
Q5201	4813827A07	TSTR NPN SML SIG MMBR941
Q5301	4802245J54	UMG5N DIGITAL TSTR
Q5331	4880048M01	TSTR NPN DIG 47k/47k
Q5332	4813824A17	TSTR PNP 40V .2A B=100-
Q5351	4813827A07	TSTR NPN SML SIG MMBR941
Q5352	4813824A17	TSTR PNP 40V .2A B=100-
Q5421	4813828A09	TSTR 8W 450MHZ 7.5V
Q5431	4813828C41	TSTR 945MHZ 45W 28V
Q5501	4813824A17	TSTR PNP 40V .2A B=100-
Q5521	4813824A17	TSTR PNP 40V .2A B=100-
Q5542	4813824A17	TSTR PNP 40V .2A B=100-
Q5551	4813824A17	TSTR PNP 40V .2A B=100-
Q5552	4880048M01	TSTR NPN DIG 47k/47k
Q5553	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5554	4880048M01	TSTR NPN DIG 47k/47k
Q5601	4805793Y01	TRANS MINI SOT NPN LOW NOISE

Reference	Motorola PN	Value
Q5602	4880048M01	TSTR NPN DIG 47k/47k
Q5604	4805723X02	TSTR DUAL PNP UMT1N ROHM
Q5605	4805723X02	TSTR DUAL PNP UMT1N ROHM
Q5621	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5631	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5653	4805921T07	XSTR DUAL ROHM IMX1
Q5671	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5681	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q5701	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5711	4809939C05	TSTR DUAL NPN/PNP UMC5N
Q5712	4805793Y01	TRANS MINI SOT NPN LOW NOISE
Q5801	4813827A07	TSTR NPN SML SIG MMBR941
Q5802	4802245J54	UMG5N DIGITAL TSTR
Q5804	4813824A17	TSTR PNP 40V .2A B=100-
R5001	0662057M98	10K 5%
R5004	0662057M47	75 5%
R5006	0662057M74	1000 5%
R5007	0662057M26	10 5%
R5009	0662057M01	0 5%
R5010	0662057M98	10K 5%
R5011	0662057M74	1000 5%
R5012	0662057M01	0 5%
R5013	0662057N15	47K 5%
R5014	0662057M70	680 5%
R5015	0662057M43	51 5%
R5017	0662057M74	1000 5%
R5018	0662057M42	47 5%
R5019	0662057M64	390 5%
R5020	0662057M64	390 5%
R5021	0662057M78	1500 5%
R5022	0662057M60	270 5%
R5023	0662057M90	4700 5%
R5024	0662057M86	3.3K 5%
R5026	0662057M26	10 5%

Reference	Motorola PN	Value
R5100	0662057A18	51 1/16W 5%
R5101	0662057A75	12k 1/16W 5%
R5102	0662057A83	27k 1/16W 5%
R5104	0662057A47	820 1/16W 5%
R5105	0662057A09	22 1/16W 5%
R5106	0662057A17	47 1/16W 5%
R5121	0662057A63	3k9 1/16W 5%
R5122	0662057A39	390 1/16W 5%
R5125	0662057A18	51 1/16W 5%
R5131	0662057A01	10 1/16W 5%
R5132	0662057A01	10 1/16W 5%
R5133	0662057A01	10 1/16W 5%
R5134	0662057A01	10 1/16W 5%
R5140	0662057A09	22 1/16W 5%
R5141	0662057B47	0 1/16W
R5142	0662057B47	0 1/16W
R5144	0662057A57	2k2 1/16W 5%
R5145	0662057A27	120 1/16W 5%
R5146	0662057A25	100 1/16W 5%
R5147	0662057A21	68 1/16W 5%
R5148	0662057A21	68 1/16W 5%
R5149	0662057A80	20k 1/16W 5%
R5150	0662057A01	10 1/16W 5%
R5151	0662057A01	10 1/16W 5%
R5152	0662057A01	10 1/16W 5%
R5153	0662057A01	10 1/16W 5%
R5154	0662057A01	10 1/16W 5%
R5155	0662057A01	10 1/16W 5%
R5157	0662057A89	47k 1/16W 5%
R5158	0662057A35	270 1/16W 5%
R5159	0662057B47	0 1/16W
R5160	0662057A49	1k 1/16W 5%
R5161	0662057A09	22 1/16W 5%
R5162	0662057A09	22 1/16W 5%
R5163	0662057A09	22 1/16W 5%
R5166	0662057A01	10 1/16W 5%
R5176	0662057A85	33k 1/16W 5%
R5177	0662057A41	470 1/16W 5%
R5178	0662057A01	10 1/16W 5%
R5179	0662057A35	270 1/16W 5%
R5180	0662057A61	3k3 1/16W 5%

Reference	Motorola PN	Value
R5181	0662057A91	56K 1/16W 5%
R5182	0662057B47	0 1/16W
R5183	0662057A25	100 1/16W 5%
R5184	0662057A51	1k2 1/16W 5%
R5185	0662057A09	22 1/16W 5%
R5186	0662057B05	200k 1/16W
R5187	0662057A35	270 1/16W 5%
R5189	0662057B47	0 1/16W
R5190	0662057A80	20k 1/16W 5%
R5191	0662057A85	33k 1/16W 5%
R5192	0662057A69	6k8 1/16W 5%
R5193	0662057A25	100 1/16W 5%
R5194	0662057A51	1k2 1/16W 5%
R5195	0662057A09	22 1/16W 5%
R5196	0662057B05	200k 1/16W
R5197	0662057A35	270 1/16W 5%
R5199	0662057B47	0 1/16W
R5204	0662057A60	3k 1/16W 5%
R5205	0662057A75	12k 1/16W 5%
R5206	0662057A44	CHIP RES 620 OHMS 5%
R5207	0662057A49	1k 1/16W 5%
R5208	0662057A40	430 1/16W 5%
R5209	0662057A37	330 1/16W 5%
R5210	0662057A13	33 1/16W 5%
R5218	0662057B47	0 1/16W
R5220	0662057B47	0 1/16W
R5222	0662057B47	0 1/16W
R5301	0662057A39	390 1/16W 5%
R5302	0662057M73	910 5%
R5303	0662057M78	1500 5%
R5304	0662057M62	330 5%
R5311	0662057M01	0 5%
R5312	0662057M50	100 5%
R5314	0662057N11	33K 5%
R5315	0662057M54	150 5%
R5316	0662057M54	150 5%
R5321	0662057A25	100 1/16W 5%
R5322	0662057A25	100 1/16W 5%
R5323	0662057A25	100 1/16W 5%
R5324	0662057A25	100 1/16W 5%
R5334	0662057M50	100 5%

Reference	Motorola PN	Value
R5335	0662057N23	100K 5%
R5336	0662057N03	15K 5%
R5338	0662057N11	33K 5%
R5351	0662057M74	1000 5%
R5352	0662057N15	47K 5%
R5353	0662057M50	100 5%
R5354	0662057M90	4700 5%
R5355	0662057M50	100 5%
R5358	0662057M01	0 5%
R5361	0662057N15	47K 5%
R5362	0662057M90	4700 5%
R5363	0662057M70	680 5%
R5364	0662057M01	0 5%
R5365	0662057A40	430 1/16W 5%
R5366	0662057A40	430 1/16W 5%
R5370	0662057N35	330K 5%
R5371	0662057M82	2200 5%
R5401	0662057M54	150 5%
R5402	0662057M02	1 5%
R5403	0662057M02	1 5%
R5404	0662057M02	1 5%
R5405	0662057M84	2700 5%
R5406	0662057A49	1k 1/16W 5%
R5413	0662057M38	33 5%
R5414	0662057M01	0 5%
R5415	0662057M34	22 5%
R5430	0662057M50	100 5%
R5431	0662057M84	2700 5%
R5451	0662057A29	150 1/16W 5%
R5452	0662057A29	150 1/16W 5%
R5453	0662057A30	160 1/16W 5%
R5454	0662057A27	120 1/16W 5%
R5455	0662057A21	68 1/16W 5%
R5491	0662057M98	10K 5%
R5501	0662057A49	1k 1/16W 5%
R5503	0662057N11	33K 5%
R5521	0662057N23	100K 5%
R5522	0662057N10	30K 5%
R5523	0662057M82	2200 5%
R5533	0662057C19	4R7 1/10W 5% 0508
R5541	0662057N23	100K 5%

Reference	Motorola PN	Value
R5542	0662057N23	100K 5%
R5543	0662057M82	2200 5%
R5551	0662057M98	10K 5%
R5552	0662057M84	2700 5%
R5553	0683962T51	120 1W 5%
R5554	0662057C71	680 1/10W 5% 0508
R5601	0662057M80	1.8K 5%
R5604	0662057M81	2000 5%
R5605	0662057M38	33 5%
R5607	0662057M38	33 5%
R5608	0662057M60	270 5%
R5609	0662057M58	220 5%
R5621	0662057N01	12K 5%
R5622	0662057M84	2700 5%
R5623	0662057M69	620 5%
R5624	0662057M54	150 5%
R5625	0662057M01	0 5%
R5628	0662057M01	0 5%
R5629	0662057M01	0 5%
R5631	0662057M54	150 5%
R5632	0662057N07	22K 5%
R5634	0662057M26	10 5%
R5636	0662057M34	22 5%
R5651	0662057N03	15K 5%
R5652	0662057M50	100 5%
R5653	0662057M01	0 5%
R5654	0662057M74	1000 5%
R5655	0662057M74	1000 5%
R5668	0662057N23	100K 5%
R5669	0662057M74	1000 5%
R5670	0662057M74	1000 5%
R5671	0662057M66	510 5%
R5672	0662057N06	20K 5%
R5681	0662057M66	510 5%
R5702	0662057M98	10K 5%
R5703	0662057M84	2700 5%
R5704	0662057M60	270 5%
R5705	0662057M47	75 5%
R5709	0662057M01	0 5%
R5711	0662057M72	820 5%
R5712	0662057M26	10 5%

Reference	Motorola PN	Value
R5713	0662057M76	1.2K 5%
R5714	0662057M50	100 5%
R5715	0662057M01	0 5%
R5722	0662057M78	1500 5%
R5723	0662057M98	10K 5%
R5725	0662057M80	1.8K 5%
R5726	0662057M58	220 5%
R5727	0662057M81	2000 5%
R5731	0662057M38	33 5%
R5732	0662057M01	0 5%
R5733	0662057M60	270 5%
R5734	0662057M38	33 5%
R5802	0662057A23	82 1/16W 5%
R5803	0662057M38	33 5%
R5804	0662057M30	15 5%
R5805	0662057M01	0 5%
R5806	0662057M82	2200 5%
R5808	0662057M41	43 5%
R5809	0662057M30	15 5%
R5811	0662057M76	1.2K 5%
R5812	0662057M58	220 5%
R5813	0662057M43	51 5%
R5814	0662057M30	15 5%
R5815	0662057M76	1.2K 5%
R5816	0662057M70	680 5%
R5817	0662057M43	51 5%
R5818	0662057M43	51 5%
R5819	0662057M43	51 5%
R5820	0662057M01	0 5%
R5837	0662057M70	680 5%
R5840	0662057M90	4700 5%
R5841	0662057M38	33 5%
R5842	0662057M38	33 5%
R5843	0662057M38	33 5%
R5844	0662057M38	33 5%
R5845	0662057M84	2700 5%
R5846	0662057M90	4700 5%
R5847	0662057N20	75K 5%
SH5601	2666500A01	SHIELD VCO
SH5602	2666500A01	SHIELD VCO
SH5701	2666500A01	SHIELD VCO

Reference	Motorola PN	Value
SH5702	2666500A01	SHIELD VCO
U5001	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5002	5102463J96	MMIC MIXER WITH IF BUFFER
U5003	5185368C01	IC 3V LOW NOISE AMP
U5101	5185963A83	IC ABACUS III HP
U5102	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5103	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5201	9102867C12	73.35MHZ CRYSTAL FILTER
U5321	5102463J58	LP2980AIM5X-3.3 REGULATOR
U5322	5105739X05	IC SOT 5V HI-PRECISION REGULAT
U5331	5185963A27	IC TESTED AT25016 48 PIN GFP
U5401	5185130C65	IC VHF/UHF/800 MHZ LDMOS DRIVER
U5501	5185963A15	TEMP SENSOR 1M5
U5701	5105750U54	VCO BUFFER PKG DIE
U5702	5185368C18	ESCORT IC IN 16 PIN QFN
U5704	2113743M24	100000 PF +80-20% Y5V
U5801	5880334L12	800/900MHZ CHIP MULTI-LAYER 90DE
U5802	5105457W85	CC ADDAG IC
U5803	5108428S43	LOW NOISE ODCT
VR5401	4813830A15	DIODE 5.6V 5% 225mW
W5601	4802245J57	COAXIAL CERAMIC INDUCTOR SMD
W5701	4802245J57	COAXIAL CERAMIC INDUCTOR SMD
Y5362	5102463J88	REF OSC, 16.8 MHZ, 0.8PPM, SMD

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers

Controller Parts on the Main Board

Reference	Motorola PN	Value
C0100	2113743E20	100nF 16V
C0101	2113743E20	100nF 16V
C0102	2113743E20	100nF 16V

Reference	Motorola PN	Value
C0103	2113743E20	100nF 16V
C0104	2113743E20	100nF 16V
C0105	2113743E20	100nF 16V
C0110	2113740F15	3.3pF 5% 50V
C0113	2113743E07	22nF 16V
C0115	2113743N39	36.0 PF 5%
C0116	2113743N39	36.0 PF 5%
C0118	2113740F40	36pF 5% 50V
C0121	2113740F67	470pF 5% 50V
C0122	2113740F49	82pF 5% 50V
C0123	2113743E20	100nF 16V
C0124	2113740F49	82pF 5% 50V
C0125	2113740F49	82pF 5% 50V
C0127	2113740F67	470pF 5% 50V
C0128	2113740F67	470pF 5% 50V
C0129	2113740F67	470pF 5% 50V
C0130	2113743L09	470 PF 10% X7R
C0131	2113740F67	470pF 5% 50V
C0132	2113740F67	470pF 5% 50V
C0133	2113740F67	470pF 5% 50V
C0134	2113740F67	470pF 5% 50V
C0135	2113740F67	470pF 5% 50V
C0136	2113743N30	15.0PF 5%
C0137	2113740F39	33pF 5% 50V
C0138	2113740F67	470pF 5% 50V
C0139	2113740F39	33pF 5% 50V
C0141	2113743E20	100nF 16V
C0142	2113740F67	470pF 5% 50V
C0146	2113743N39	36.0 PF 5%
C0147	2113743N39	36.0 PF 5%
C0150	2113740F67	470pF 5% 50V
C0151	2113740F67	470pF 5% 50V
C0152	2113740F67	470pF 5% 50V
C0154	2113740F67	470pF 5% 50V
C0155	2113741F33	2.2nF 50V
C0156	2311049A07	CAP TANT CP 1uF 10% 16V
C0157	2113740F67	470pF 5% 50V
C0158	2113740F67	470pF 5% 50V
C0159	2113740F67	470pF 5% 50V

Reference	Motorola PN	Value
C0200	2311049A57	CAP TANT CP 10uF 10% 16V
C0201	2311049A57	CAP TANT CP 10uF 10% 16V
C0202	2113743E20	100nF 16V
C0203	2113743E20	100nF 16V
C0204	2113743E20	100nF 16V
C0205	2113743E20	100nF 16V
C0213	2113743E20	100nF 16V
C0219	2113741F49	10nF 50V
C0220	2113743E20	100nF 16V
C0221	2311049A07	CAP TANT CP 1uF 10% 16V
C0222	2113743E20	100nF 16V
C0223	2113743E20	100nF 16V
C0224	2311049A57	CAP TANT CP 10uF 10% 16V
C0225	2113743E20	100nF 16V
C0226	2113743E20	100nF 16V
C0227	2113743E20	100nF 16V
C0228	2113740F57	180pF 5% 50V
C0229	2113740F49	82pF 5% 50V
C0230	2113741F37	3.3nF 50V
C0231	2311049A97	CAP TANT CHIP 33 UF 16
C0232	2113743E20	100nF 16V
C0233	2113741F25	1nF 50V
C0234	2113741F25	1nF 50V
C0235	2113741F25	1nF 50V
C0300	2113740F67	470pF 5% 50V
C0301	2113740F67	470pF 5% 50V
C0302	2311049A97	CAP TANT CHIP 33 UF 16
C0303	2113743E20	100nF 16V
C0304	2113740F67	470pF 5% 50V
C0305	2380090M24	LYT 10uF 50V 20%
C0306	2380090M24	LYT 10uF 50V 20%
C0307	2113741F49	10nF 50V
C0308	2311049A97	CAP TANT CHIP 33 UF 16
C0309	2311049A97	CAP TANT CHIP 33 UF 16
C0310	2311049C06	CAP TANT CP 22uF 20% 35V 7343

Reference	Motorola PN	Value
C0312	2113743E20	100nF 16V
C0313	2113743E20	100nF 16V
C0315	2311049A97	CAP TANT CHIP 33 UF 16
C0316	2311049A57	CAP TANT CP 10uF 10% 16V
C0317	2113740F67	470pF 5% 50V
C0319	2113743E20	100nF 16V
C0321	2113743E20	100nF 16V
C0322	2311049A99	CAP TANT CP 47uF 20% 10V
C0323	2311049A57	CAP TANT CP 10uF 10% 16V
C0324	2311049A09	CAP TANT CP 2.2uF 10% 20V
C0326	2113743E07	22nF 16V
C0328	2311049A99	CAP TANT CP 47uF 20% 10V
C0329	2311049A97	CAP TANT CHIP 33 UF 16
C0331	2311049A99	CAP TANT CP 47uF 20% 10V
C0333	2113743E20	100nF 16V
C0335	2113740F67	470pF 5% 50V
C0336	2113740F67	470pF 5% 50V
C0337	2113740F67	470pF 5% 50V
C0338	2113740F67	470pF 5% 50V
C0339	2113740F67	470pF 5% 50V
C0340	2113743E20	100nF 16V
C0401	2113743E20	100nF 16V
C0402	2113740F40	36pF 5% 50V
C0403	2113740F40	36pF 5% 50V
C0404	2113740F40	36pF 5% 50V
C0405	2113740F40	36pF 5% 50V
C0406	2113740F40	36pF 5% 50V
C0407	2113740F40	36pF 5% 50V
C0408	2113740F40	36pF 5% 50V
C0409	2311049A09	CAP TANT CP 2.2uF 10% 20V
C0410	2113740F40	36pF 5% 50V
C0411	2113740F40	36pF 5% 50V
C0412	2113740F40	36pF 5% 50V
C0413	2113740F40	36pF 5% 50V
C0414	2113740F40	36pF 5% 50V

Reference	Motorola PN	Value
C0415	2113740F40	36pF 5% 50V
C0416	2113740F40	36pF 5% 50V
C0417	2113740F40	36pF 5% 50V
C0418	2113740F40	36pF 5% 50V
C0419	2113740F40	36pF 5% 50V
C0502	2113743N46	68.0 PF 5%
C0503	2113743N46	68.0 PF 5%
C0504	2113743N46	68.0 PF 5%
C0505	2113743N46	68.0 PF 5%
C0506	2113743N46	68.0 PF 5%
C0507	2113743N46	68.0 PF 5%
C0508	2113743N46	68.0 PF 5%
C0509	2113743N46	68.0 PF 5%
C0510	2113743N46	68.0 PF 5%
C0511	2113743N46	68.0 PF 5%
C0512	2113743N46	68.0 PF 5%
C0513	2113743N46	68.0 PF 5%
C0515	2113743N46	68.0 PF 5%
C0517	2113743N46	68.0 PF 5%
C0519	2113743N46	68.0 PF 5%
C0520	2113743N46	68.0 PF 5%
C0521	2113743N46	68.0 PF 5%
C0522	2113743N46	68.0 PF 5%
C0523	2113743N46	68.0 PF 5%
C0524	2113743N46	68.0 PF 5%
C0525	2113743N46	68.0 PF 5%
C0526	2113743N46	68.0 PF 5%
C0527	2113743N46	68.0 PF 5%
C0528	2113743N46	68.0 PF 5%
C0529	2113743N46	68.0 PF 5%
C0530	2113743N46	68.0 PF 5%
C0531	2113743N46	68.0 PF 5%
C0532	2113743N46	68.0 PF 5%
C0533	2113743N46	68.0 PF 5%
C0534	2113743N46	68.0 PF 5%
C0535	2113743N46	68.0 PF 5%
C0536	2113743N46	68.0 PF 5%
C0537	2113743N46	68.0 PF 5%
C0538	2113743N46	68.0 PF 5%
C0540	2113743N46	68.0 PF 5%
C0550	2113743N39	36.0 PF 5%

Reference	Motorola PN	Value
C0551	2113740F40	36pF 5% 50V
C0552	2113740F40	36pF 5% 50V
C0553	2113740F40	36pF 5% 50V
C0554	2113743N39	36.0 PF 5%
C0555	2113740F40	36pF 5% 50V
C0556	2113740F40	36pF 5% 50V
C0557	2113740F40	36pF 5% 50V
C0558	2113740F40	36pF 5% 50V
C0559	2113740F40	36pF 5% 50V
C0560	2113740F40	36pF 5% 50V
C0561	2113740F40	36pF 5% 50V
D0100	4813833C02	DIODE DUAL SOT MMBD6100
D0102	4880154K03	DIODE DUAL SCHOT-TKY SOT23
D0161	4813833C02	DIODE DUAL SOT MMBD6100
D0300	4813833C02	DIODE DUAL SOT MMBD6100
D0301	4813833C02	DIODE DUAL SOT MMBD6100
D0303	4813833C02	DIODE DUAL SOT MMBD6100
D0304	4813833C02	DIODE DUAL SOT MMBD6100
E0100	GMZN4001B	MILAN HDI CNTRL MOD 1M
E0300	2484657R01	Ferrite Bead
F0302	6580542Z01	FUSE CHIP SMT TR/1608FF 3A
FL0200	5105109Z38	3 VOLT LINEAR PCM CODEC FILTE
J0301	0986165B01	DC PWR CONN
J0400	0986105B01	CONNECTOR SMD 20 PIN
J0450	0905505Y04	CONN ZIF HORIZON-TAL
J0500	0905505Y04	CONN ZIF HORIZON-TAL
J0550	0902636Y02	CONNECTOR FLEX 12 PIN
J0570	0905505Y03	CONN ZIF 18PIN
L0231	2484657R01	Ferrite Bead
L0232	2484657R01	Ferrite Bead
M0301	3980502Z01	CONTACT, BACKUP B+

Reference	Motorola PN	Value
M0302	3980501Z01	CONTACT, BACKUP B-
Q0100	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0150	4802245J54	UMG5N DIGITAL TSTR
Q0152	4802245J54	UMG5N DIGITAL TSTR
Q0156	4880048M01	TSTR NPN DIG 47k/47k
Q0157	4880048M01	TSTR NPN DIG 47k/47k
Q0158	4880048M01	TSTR NPN DIG 47k/47k
Q0159	4880052M01	TSTR NPN DRLNGTN MXTA
Q0160	4880048M01	TSTR NPN DIG 47k/47k
Q0161	4805723X03	TRANS DUAL NPN-PNP UMD3N ROHM
Q0200	4880048M01	TSTR NPN DIG 47k/47k
Q0201	4802245J54	UMG5N DIGITAL TSTR
Q0202	4880048M01	TSTR NPN DIG 47k/47k
Q0203	4880048M01	TSTR NPN DIG 47k/47k
Q0300	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0301	4805921T02	TSTR DUAL ROHM FMC2 RH
Q0302	4880214G02	TSTR SLCN NPN M4G02 SOT23
Q0303	4880048M01	TSTR NPN DIG 47k/47k
Q0305	4880214G02	TSTR SLCN NPN M4G02 SOT23
R0100	0662057A89	47k 1/16W 5%
R0103	0662057A01	10 1/16W 5%
R0104	0662057A01	10 1/16W 5%
R0105	0662057A01	10 1/16W 5%
R0106	0662057A89	47k 1/16W 5%
R0108	0662057A89	47k 1/16W 5%
R0109	0662057B47	0 1/16W
R0111	0662057A01	10 1/16W 5%
R0113	0662057A73	10k 1/16W 5%
R0115	0662057A94	75k 1/16W 5%

Reference	Motorola PN	Value
R0117	0662057A84	30k 1/16W 5%
R0118	0662057A77	15k 1/16W 5%
R0119	0662057A73	10k 1/16W 5%
R0120	0662057A65	4k7 1/16W 5%
R0125	0662057A65	4k7 1/16W 5%
R0128	0662057A49	1k 1/16W 5%
R0129	0662057A89	47k 1/16W 5%
R0130	0662057B47	0 1/16W
R0132	0662057A45	CHIP RES 680 OHMS 5%
R0133	0662057A89	47k 1/16W 5%
R0134	0662057A45	CHIP RES 680 OHMS 5%
R0136	0662057A89	47k 1/16W 5%
R0137	0662057A89	47k 1/16W 5%
R0138	0662057B47	0 1/16W
R0150	0662057A89	47k 1/16W 5%
R0151	0662057A57	2k2 1/16W 5%
R0153	0662057A89	47k 1/16W 5%
R0154	0662057A57	2k2 1/16W 5%
R0156	0662057A89	47k 1/16W 5%
R0159	0662057A89	47k 1/16W 5%
R0160	0662057A65	4k7 1/16W 5%
R0161	0662057A89	47k 1/16W 5%
R0162	0662057A89	47k 1/16W 5%
R0163	0662057A89	47k 1/16W 5%
R0164	0662057B47	0 1/16W
R0165	0662057A65	4k7 1/16W 5%
R0166	0662057A73	10k 1/16W 5%
R0167	0662057A89	47k 1/16W 5%
R0168	0662057A73	10k 1/16W 5%
R0170	0662057A73	10k 1/16W 5%
R0171	0662057A73	10k 1/16W 5%
R0172	0662057A79	18k 1/16W 5%
R0200	0662057A43	560 1/16W 5%
R0201	0662057A25	100 1/16W 5%
R0202	0662057A25	100 1/16W 5%
R0203	0662057A43	560 1/16W 5%
R0204	0662057B05	200k 1/16W
R0205	0662057B05	200k 1/16W
R0206	0662057A89	47k 1/16W 5%

Reference	Motorola PN	Value
R0207	0662057A89	47k 1/16W 5%
R0208	0662057A89	47k 1/16W 5%
R0218	0662057A73	10k 1/16W 5%
R0220	0662057A49	1k 1/16W 5%
R0221	0662057A25	100 1/16W 5%
R0222	0662057A73	10k 1/16W 5%
R0223	0662057A65	4k7 1/16W 5%
R0224	0662057A77	15k 1/16W 5%
R0225	0662057A49	1k 1/16W 5%
R0228	0662057A73	10k 1/16W 5%
R0237	0662057A77	15k 1/16W 5%
R0238	0662057A83	27k 1/16W 5%
R0239	0662057A75	12k 1/16W 5%
R0240	0662057A97	100k 1/16W
R0241	0662057A77	15k 1/16W 5%
R0242	0662057B08	270k 1/16W 5%
R0243	0662057A83	27k 1/16W 5%
R0244	0662057A73	10k 1/16W 5%
R0245	0662057A61	3k3 1/16W 5%
R0300	0662057A49	1k 1/16W 5%
R0301	0662057B02	150k 1/16W
R0302	0662057A73	10k 1/16W 5%
R0303	0662057A89	47k 1/16W 5%
R0304	0662057A65	4k7 1/16W 5%
R0305	0660076E70	FILM 7500 1 1
R0306	0660076E51	FILM 1200 1 1
R0307	0660076E70	FILM 7500 1 1
R0308	0660076E51	FILM 1200 1 1
R0309	0662057A73	10k 1/16W 5%
R0310	0662057A89	47k 1/16W 5%
R0311	0662057A53	1k5 1/16W 5%
R0314	0662057A49	1k 1/16W 5%
R0318	0662057A87	39k 1/16W 5%
R0319	0662057A83	27k 1/16W 5%
R0321	0662057B47	0 1/16W
R0322	0662057B47	0 1/16W
R0400	0662057A89	47k 1/16W 5%
R0402	0662057A65	4k7 1/16W 5%
R0403	0662057A73	10k 1/16W 5%
R0404	0662057A65	4k7 1/16W 5%
R0405	0662057A51	1k2 1/16W 5%

Reference	Motorola PN	Value
R0406	0662057A73	10k 1/16W 5%
R0407	0662057A33	220 1/16W 5%
R0408	0662057A33	220 1/16W 5%
R0409	0662057A43	560 1/16W 5%
R0410	0662057A97	100k 1/16W
R0411	0662057A33	220 1/16W 5%
R0412	0662057A33	220 1/16W 5%
R0413	0662057A73	10k 1/16W 5%
R0415	0662057A25	100 1/16W 5%
R0505	0662057A09	22 1/16W 5%
R0527	0662057A65	4k7 1/16W 5%
R0555	0662057A41	470 1/16W 5%
R0557	0662057A01	10 1/16W 5%
R0559	0662057A01	10 1/16W 5%
R0562	0662057B47	0 1/16W
R0571	0662057A89	47k 1/16W 5%
U0100	5164602A01	IC DS1306EN SERIAL RTC
U0102	5113820A02	IC DUAL SING SPLY LO PWR
U0103	5113820A02	IC DUAL SING SPLY LO PWR
U0150	5185765B26	IC POWER CON-TROL PASS
U0201	5184704M60	IC-CMOS 04M60 ANA-LOS
U0202	5105750U28	SNGL ANALOG SWITCH SMD
U0203	5185963A52	IC DIG POT LIN X9315
U0204	5185963A52	IC DIG POT LIN X9315
U0205	5109699X01	AUDIO PA TDA1519C
U0206	5183222M49	IC QUAD OPAMP __3403_
U0300	5183308X01	ADJ VLTG REG LM2941 TO263
U0301	5183308X01	ADJ VLTG REG LM2941 TO263
U0302	5183308X01	ADJ VLTG REG LM2941 TO263
U0303	5113816A07	REG 5V POS 500MA MC78M05
U0304	5105469E65	IC VLTG REGLTR LP2951C
U0305	5113816M39	VLTG REG LP2951ACD-3.0R2

Reference	Motorola PN	Value
U0306	5105469E65	IC VLTG REGLTR LP2951C
U0307	5113816A62	VLTG REG MC33275 3.0V
U0308	5113815A54	UNDERVLTG SENS CKT MC33465N-2
VR0101	4813830A14	DIODE 5.1V 5% 225mW
VR0163	4813830A15	DIODE 5.6V 5% 225mW
VR0300	4813832C77	TRANS SUP. 24V HIGH PWR
VR0301	4880140L15	DIODE SOT ZENER 10V TA
VR0401	4805656W09	DIODE ZENER QUAD MMQA20VT1
VR0402	4805656W09	DIODE ZENER QUAD MMQA20VT1
VR0403	4805656W09	DIODE ZENER QUAD MMQA20VT1
VR0404	4813830A15	DIODE 5.6V 5% 225mW
VR0405	4813830A15	DIODE 5.6V 5% 225mW
VR0406	4813830A40	SOC23 AUTO SDN
VR0407	4813830A40	SOC23 AUTO SDN
VR0408	4813830A15	DIODE 5.6V 5% 225mW
VR0409	4813830A15	DIODE 5.6V 5% 225mW
VR0410	4813830A15	DIODE 5.6V 5% 225mW
Y0101	4809995L05	XTAL QUARTZ 32.768KHZ

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers

Parts on the HDI Controller Board

Reference Symbol	Motorola PN	Value
C0100	2113743L41	CAP CHIP 10000 PF 10% X7R
C0101	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0102	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0103	2113743L41	CAP CHIP 10000 PF 10% X7R
C0104	2113743L41	CAP CHIP 10000 PF 10% X7R
C0105	2113743L33	CAP CHIP 4700 PF 10% X7R
C0106	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C0107	2113740F57	CAP CHIP REEL CL1 +/-30 180
C0108	2113928E01	CAP CER CHIP 1.0 UF 10 % 10V
C0109	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0111	2113928E01	CAP CER CHIP 1.0 UF 10 % 10V
C0112	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C0113	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0114	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0115	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0116	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0117	2113743L41	CAP CHIP 10000 PF 10% X7R
C0118	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0119	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0120	2113743L41	CAP CHIP 10000 PF 10% X7R
C0121	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0122	2113743L41	CAP CHIP 10000 PF 10% X7R
C0123	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0124	2113743M24	CAP CHIP 100000 PF +80-20% Y5V

Reference Symbol	Motorola PN	Value
C0125	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0126	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0127	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C0129	2113740F57	CAP CHIP REEL CL1 +/-30 180
E0100	2480067M02	CHK RF CHIP BEAD INDUCTOR
E0101	2480067M02	CHK RF CHIP BEAD INDUCTOR
E0102	2480067M02	CHK RF CHIP BEAD INDUCTOR
R0101	NOTPLACED	GCAM DUMMY PART NUMBER
R0102	0662057M01	RES. CHIP 0 5% 20X40
R0103	0662057N07	RES. CHIP 22K 5% 20X40
R0104	0662057M42	RES. CHIP 47 5% 20X40
R0108	NOTPLACED	GCAM DUMMY PART NUMBER
R0121	0662057N07	RES. CHIP 22K 5% 20X40
R0122	0662057M76	RES. CHIP 1200 5% 20X40
U0100	5185368C99	IC REDCAP
U0101	5109509A43	IC SRAM 512X16 70NS 7X9MM
U0102	5185130C97	IC 32MBIT FLASH 28F320C3

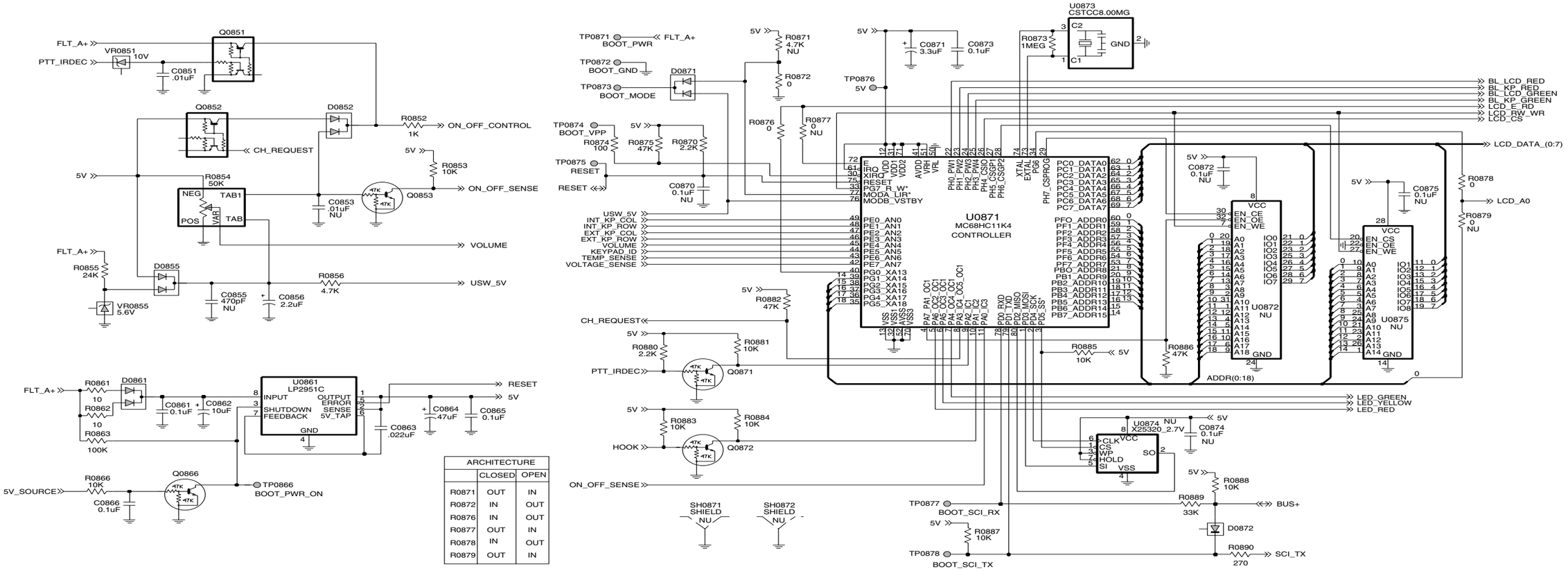
Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

CHAPTER 8.3

CONTROL HEADS: SCHEMATICS, PCBs and PARTS LISTS

Standard Control Head
Expansion Head
Remote Mount Head
Motorcycle Control Head

PCB / STANDARD_CONTROL_HEAD / BOTTOM & TOP SIDE

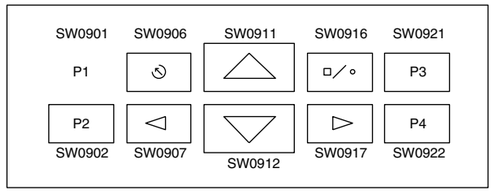


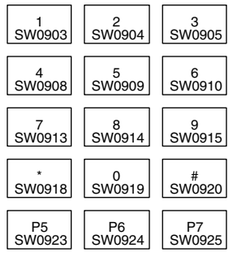
ARCHITECTURE		
	CLOSED	OPEN
R0871	OUT	IN
R0872	IN	OUT
R0876	IN	OUT
R0877	OUT	IN
R0878	IN	OUT
R0879	OUT	IN

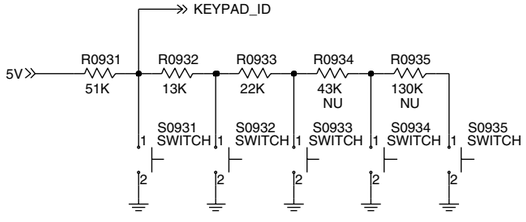
ZWG0130370-A

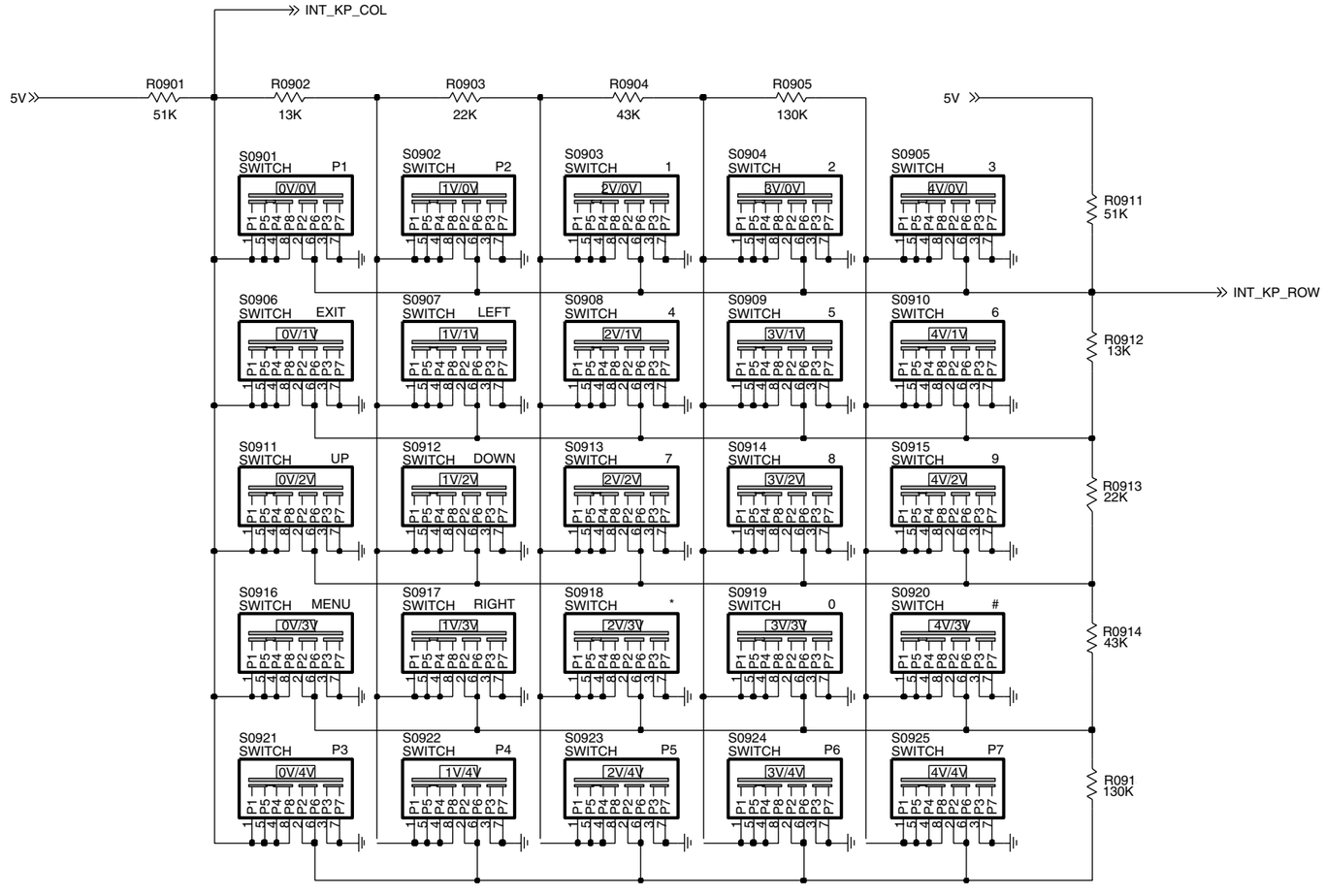
STANDARD_CONTROL_HEAD (Sheet 1)

KEYPAD D

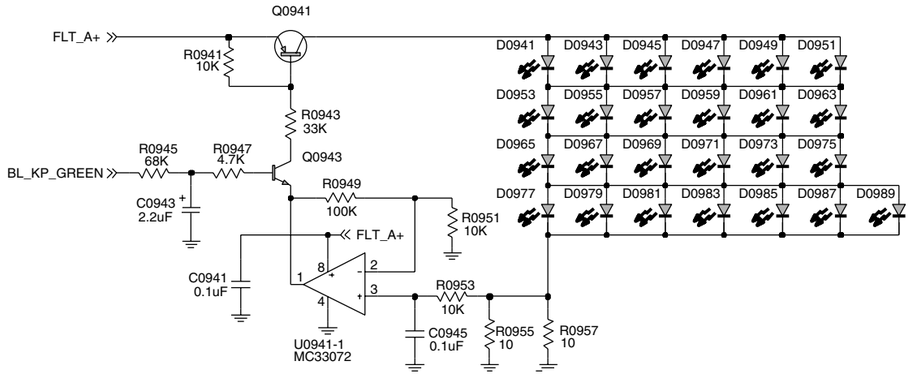


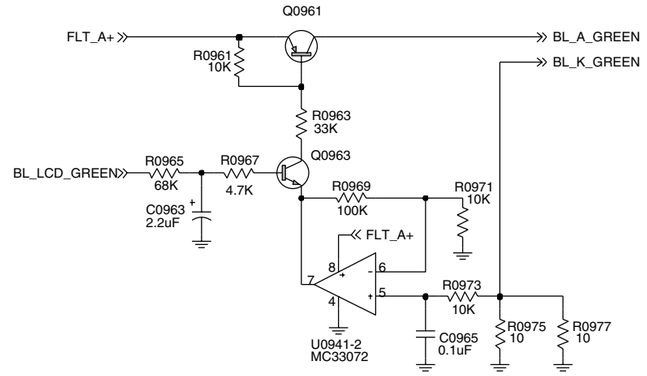


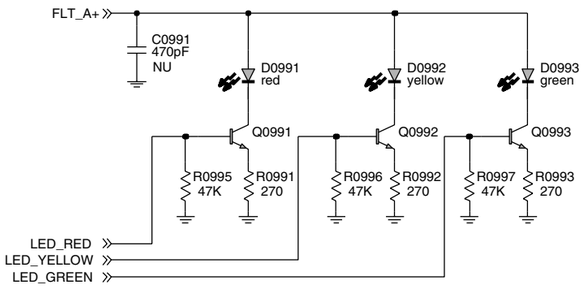


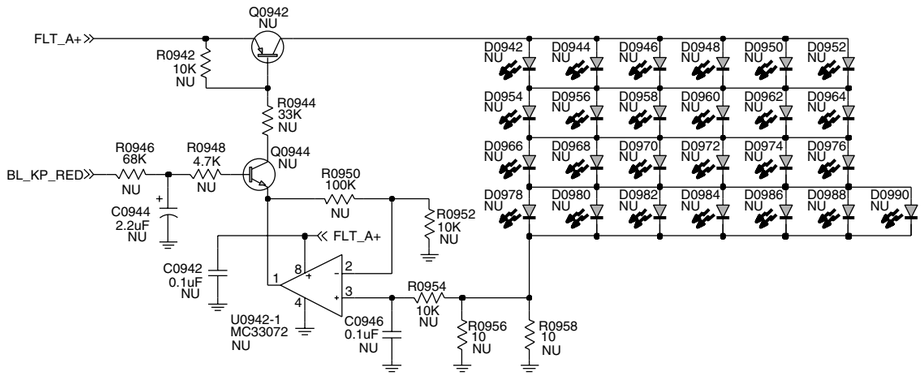


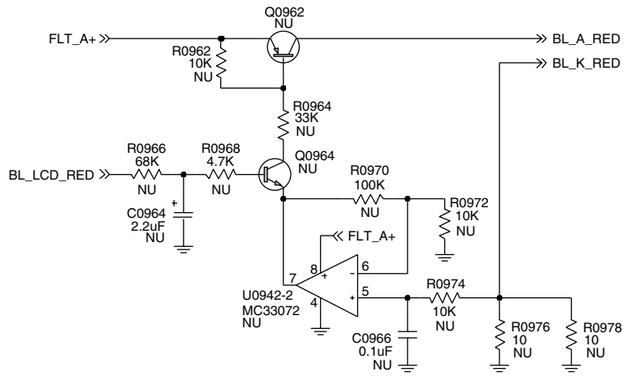
STANDARD_CONTROL_HEAD (Sheet 2)



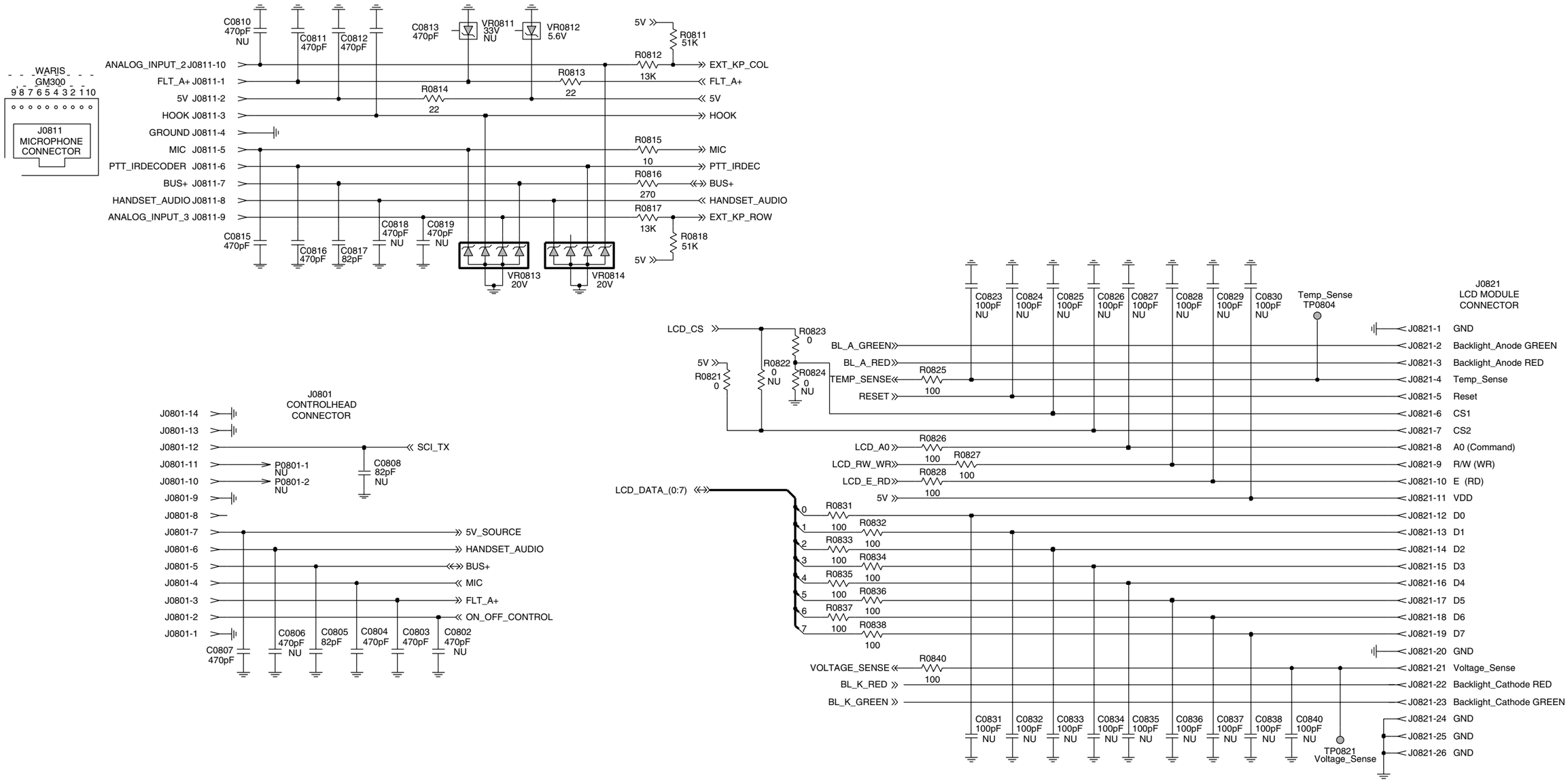




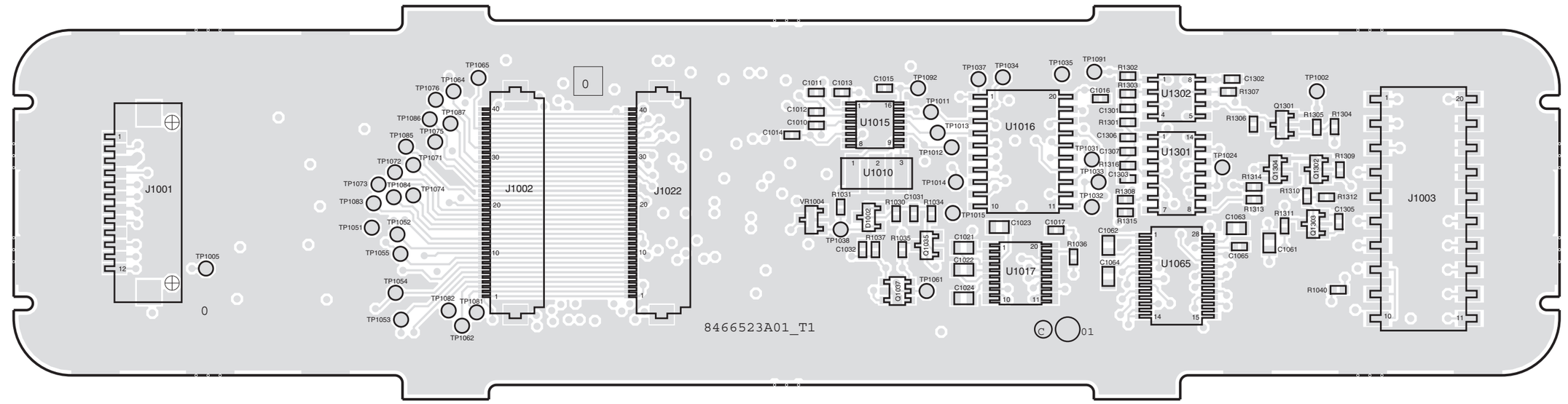


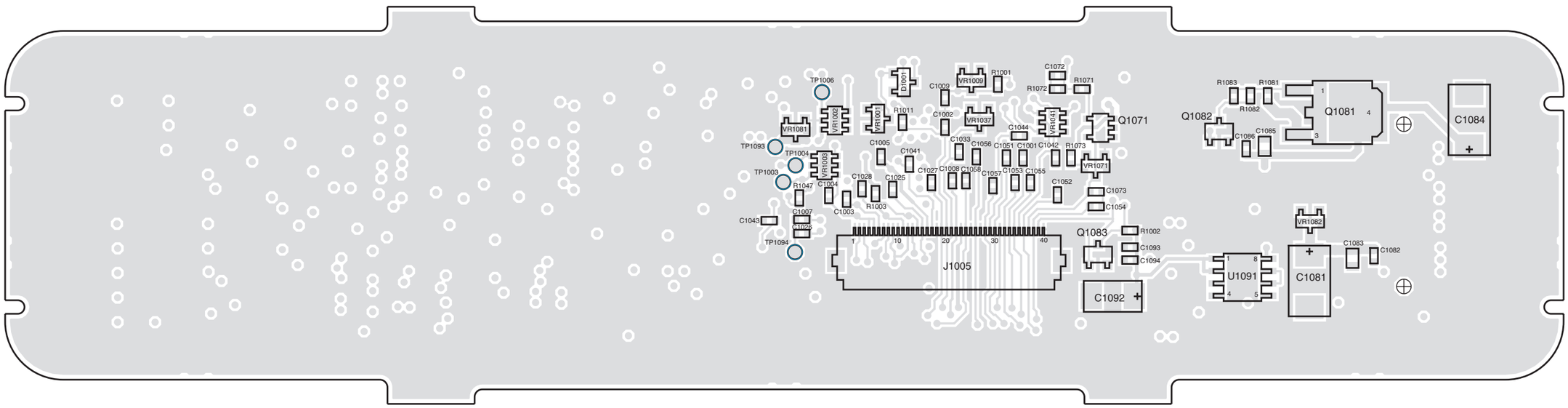


STANDARD_CONTROL_HEAD (Sheet 3)

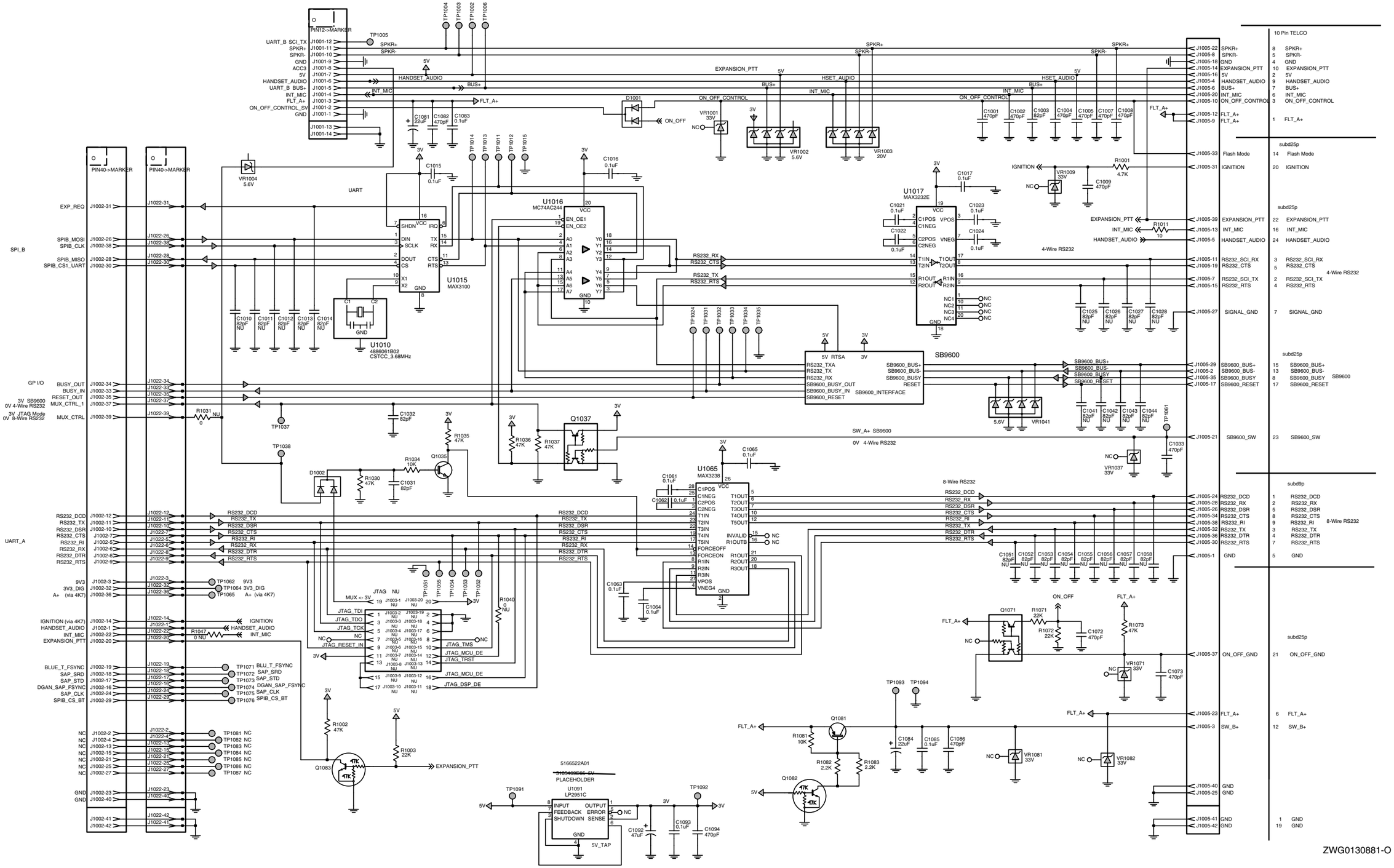


STANDARD_CONTROL_HEAD (Sheet 4)





EXPANSION_HEAD / Expansion Board / PCB BOTTOM & TOP SIDE



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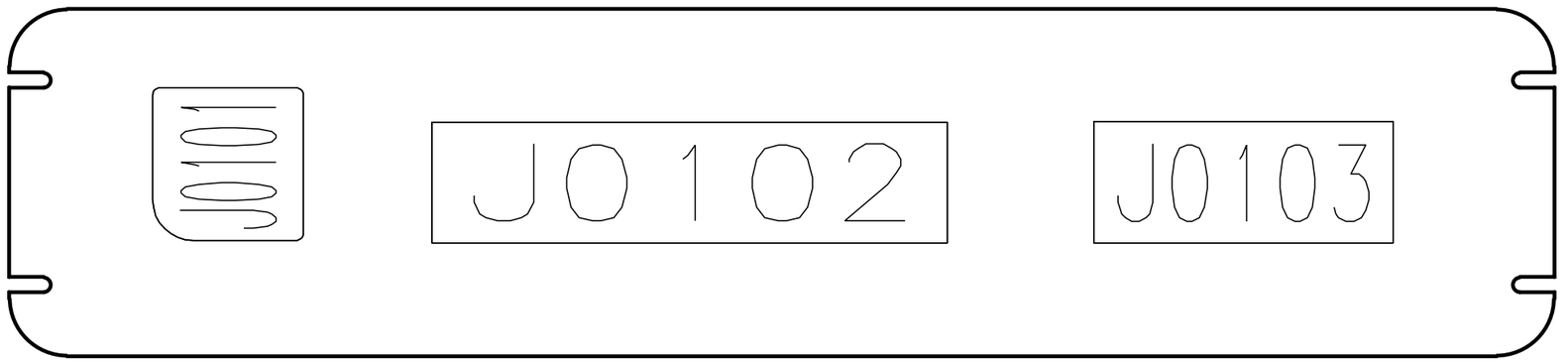
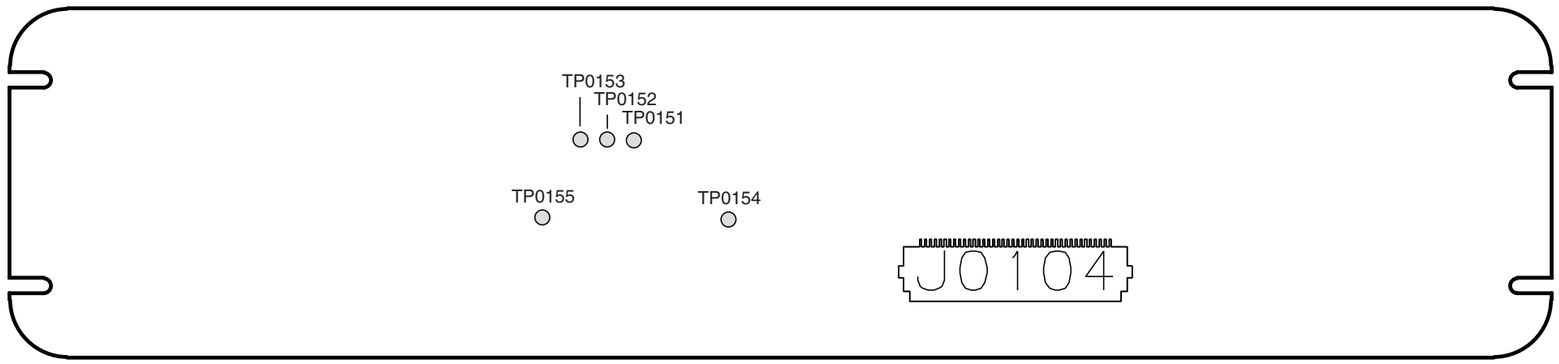
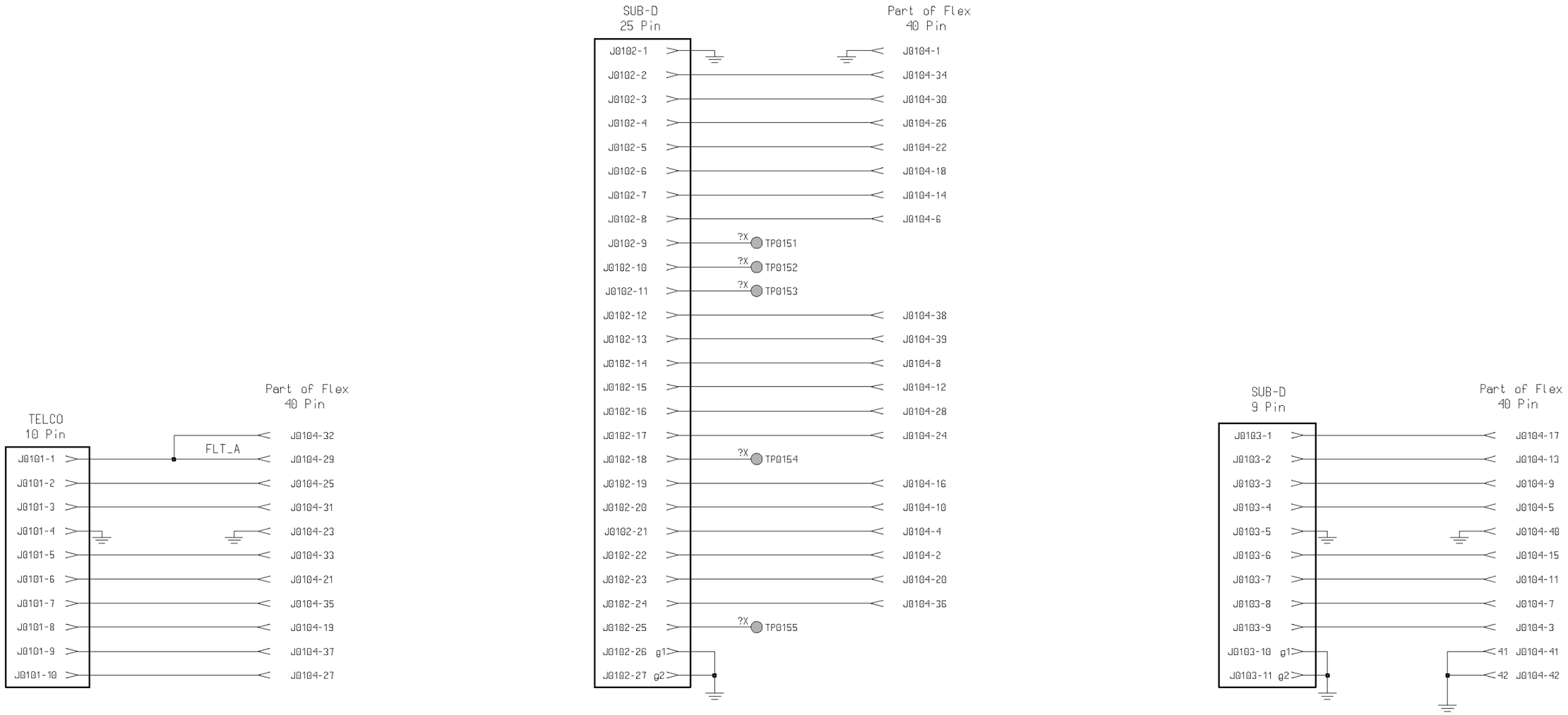
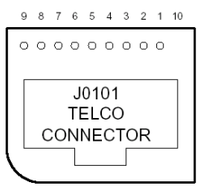
EXPANSION_HEAD / Expansion Board / Schematic Diagram





PCB / EXPANSION_HEAD / Connector Board / BOTTOM & TOP SIDE

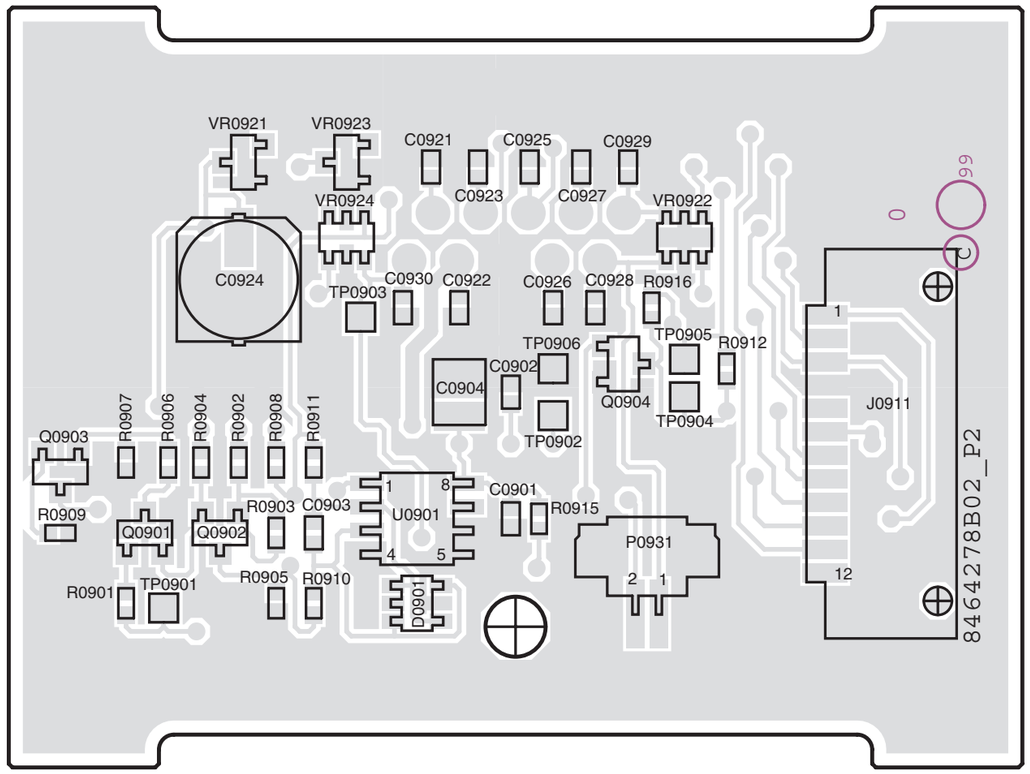


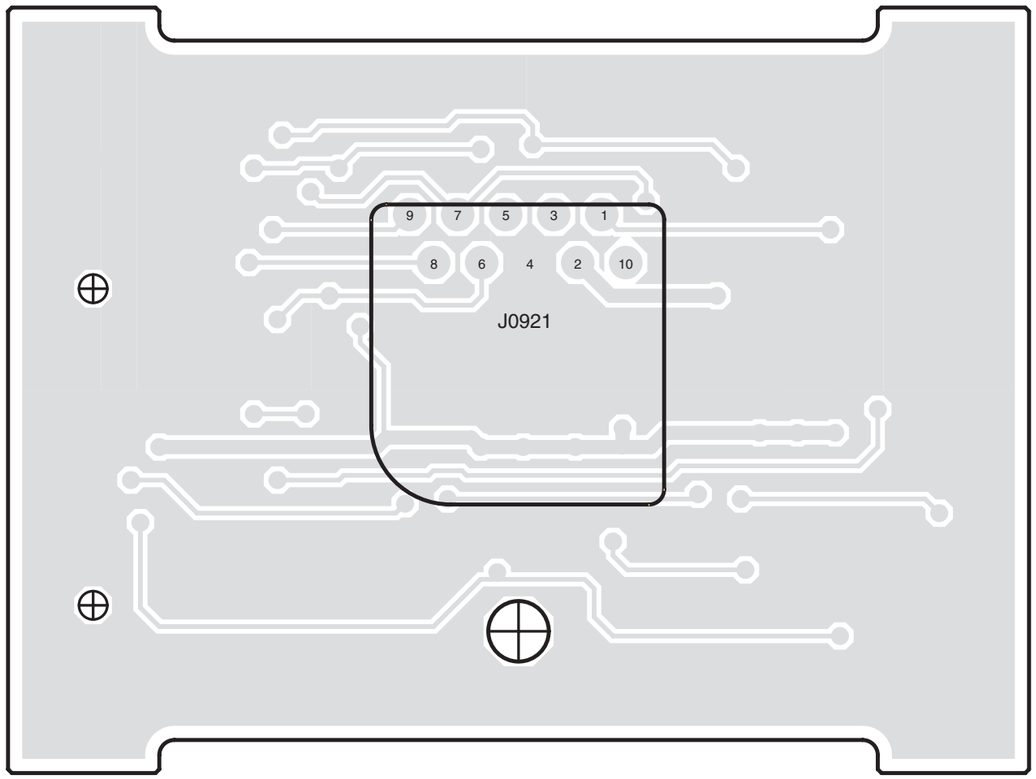


J0102
SUB-D 25 PIN
CONNECTOR

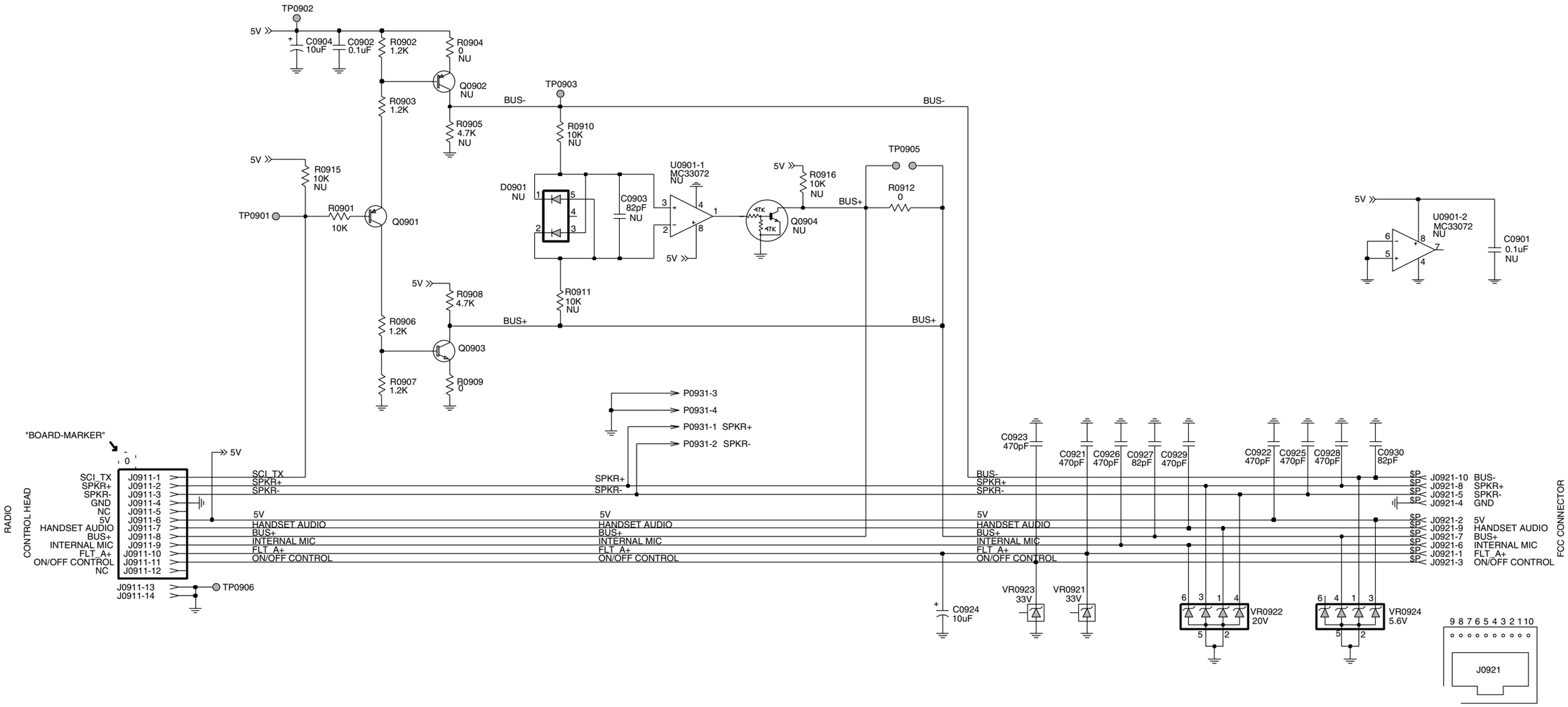
J0103
SUB-D 9 PIN
CONNECTOR

EXPANSION_HEAD / Connector Board / Schematic Diagram





PCB / REMOTE_MOUNT_HEAD / BOTTOM & TOP SIDE



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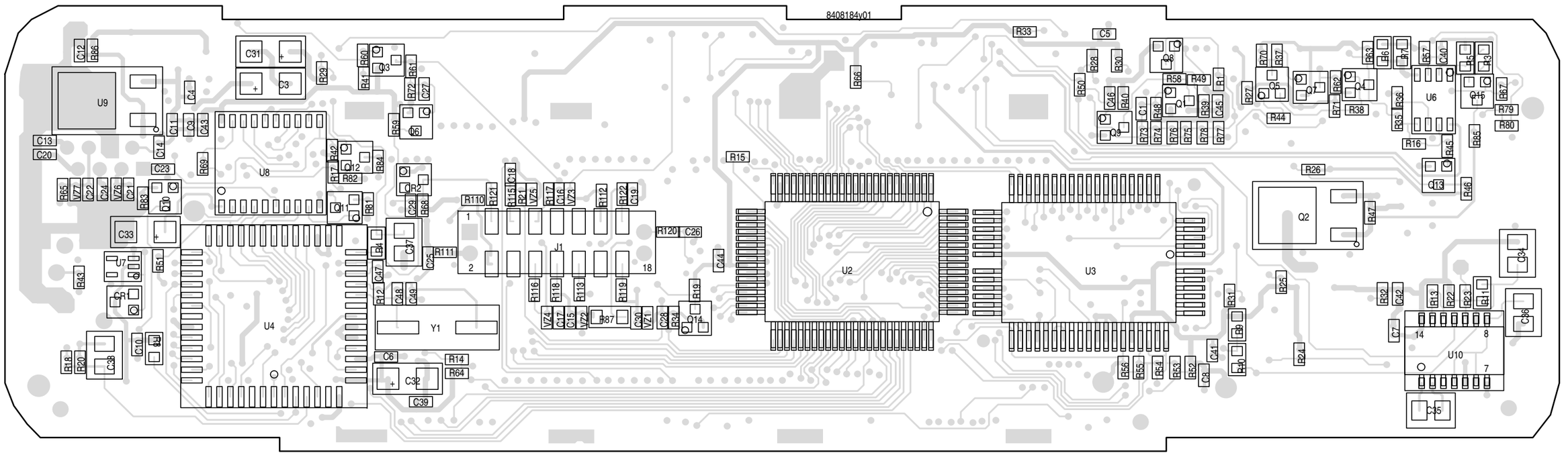
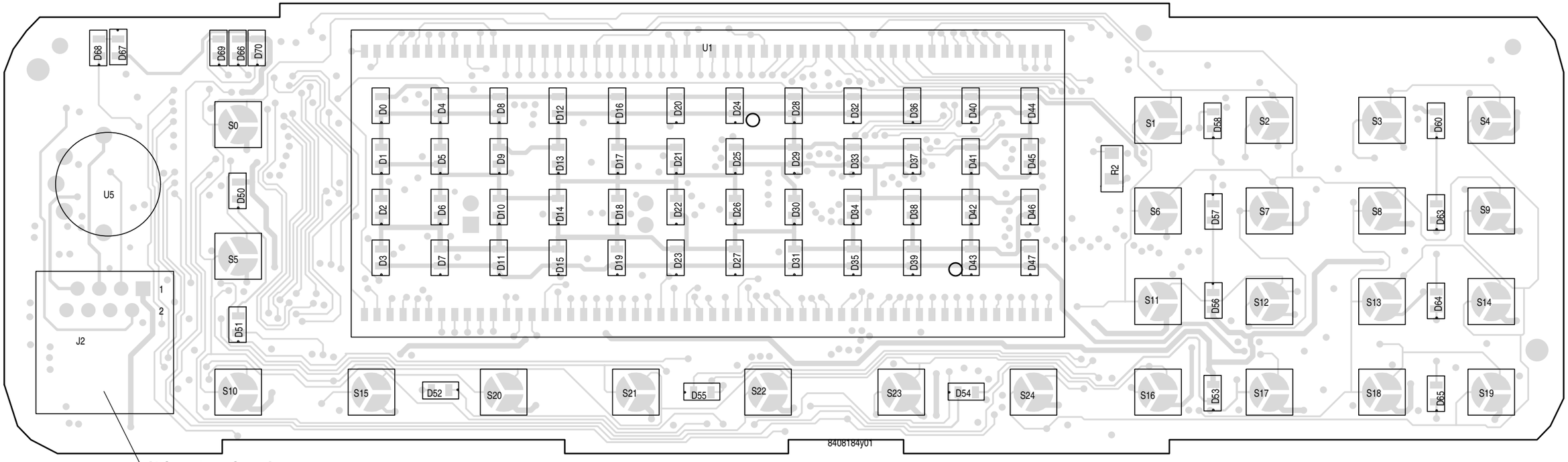
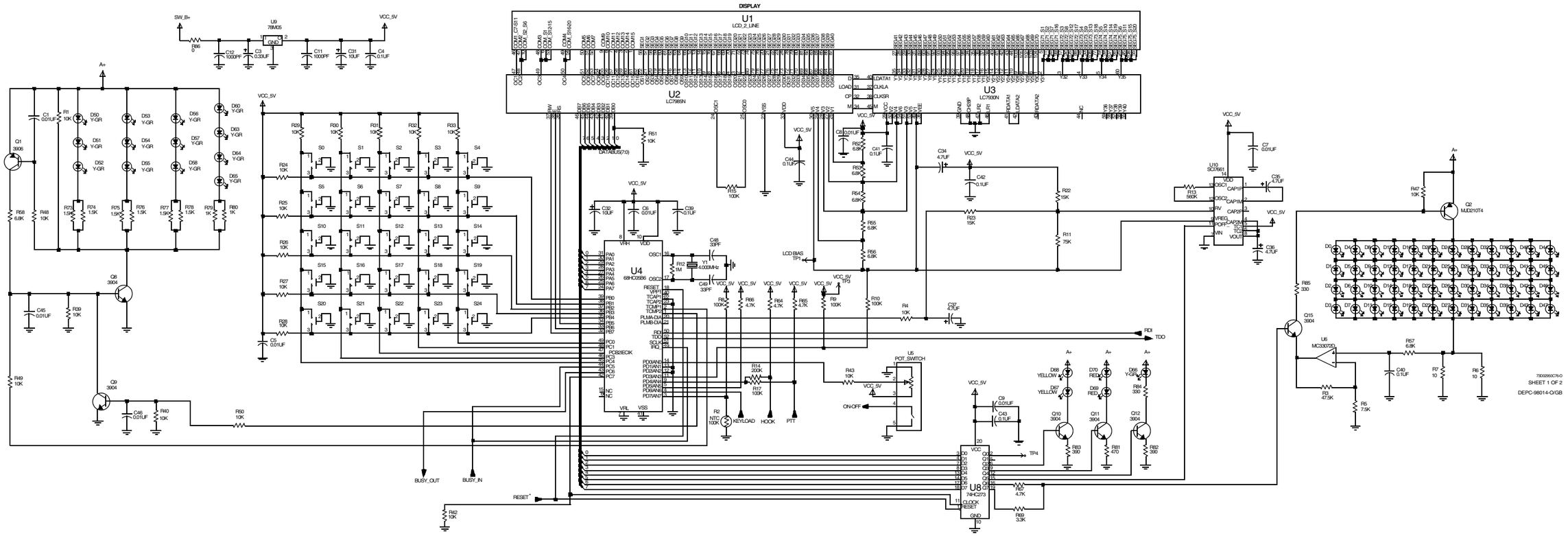
REMOTE_MOUNT_HEAD Schematic Diagram



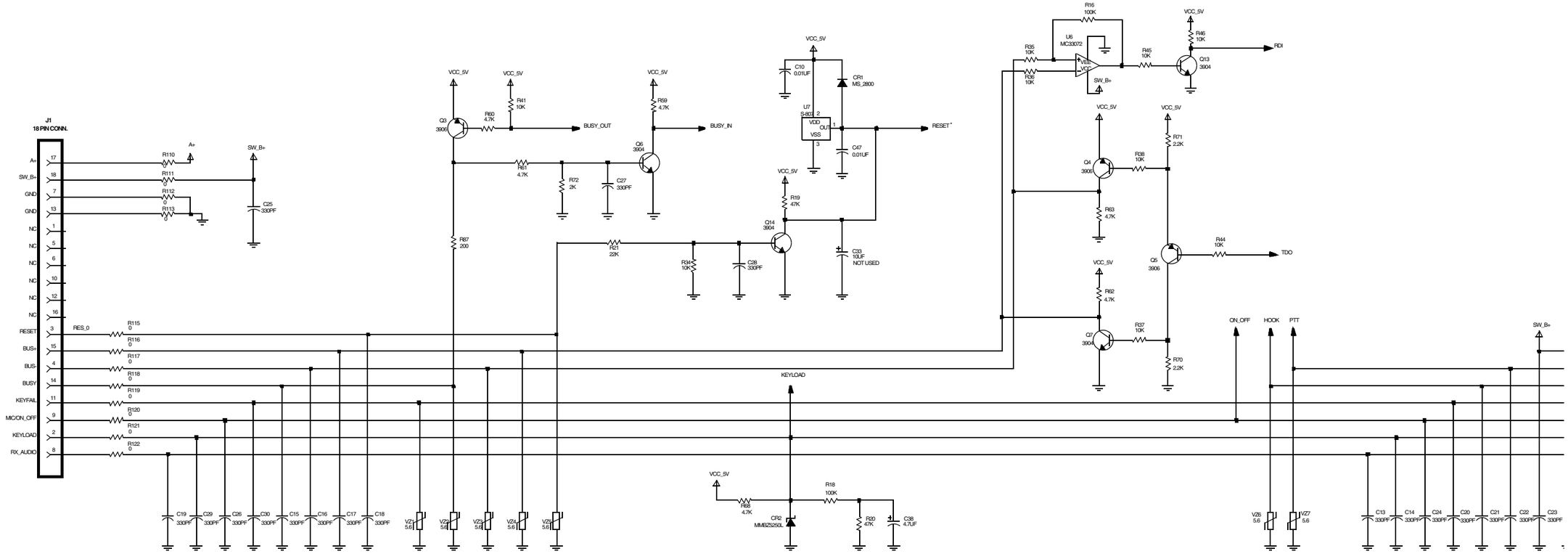


J2 is not equipped

PCB / MOTORCYCLE_CONTROL_HEAD / BOTTOM & TOP SIDE



MOTORCYCLE_CONTROL_HEAD (Sheet 1)



MOTORCYCLE_CONTROL_HEAD (Sheet 2)

Parts List

Standard Control Head

Circuit Ref	Motorola Part No	Description
C0803	2113741F17	470pF 50V
C0804	2113741F17	470pF 50V
C0805	2113740F49	82pF 5% 50V
C0807	2113741F17	470pF 50V
C0811	2113741F17	470pF 50V
C0812	2113741F17	470pF 50V
C0813	2113741F17	470pF 50V
C0815	2113741F17	470pF 50V
C0816	2113741F17	470pF 50V
C0817	2113740F49	82pF 5% 50V
C0851	2113741F49	10nF 50V
C0856	2311049A40	TANT CP 2.2uF 10% 10V
C0861	2113743E20	100nF 16V
C0862	2311049A45	TANT CP 10uF 10% 35V
C0863	2113743E07	22nF 16V
C0864	2311049A99	TANT CP 47uF 20% 10V
C0865	2113743E20	100nF 16V
C0866	2113743E20	100nF 16V
C0870	2113741F49	10nF 50V
C0871	2311049A42	TANT CP 3.3uF 10% 6V
C0873	2113743E20	100nF 16V
C0941	2113743E20	100nF 16V
C0942	2113743E20	100nF 16V
C0943	2311049A40	TANT CP 2.2uF 10% 10V
C0944	2311049A40	TANT CP 2.2uF 10% 10V
C0945	2113743E20	100nF 16V
C0946	2113743E20	100nF 16V
C0963	2311049A40	TANT CP 2.2uF 10% 10V
C0964	2311049A40	TANT CP 2.2uF 10% 10V
C0965	2113743E20	100nF 16V
C0966	2113743E20	100nF 16V
D0852	4813833C02	DUAL SOT MMBD6100
D0855	4813833C02	DUAL SOT MMBD6100
D0861	4813833C02	DUAL SOT MMBD6100
D0871	4813833C02	DUAL SOT MMBD6100
D0872	4880236E05	DIODECHIP SCHOTTKY
D0941	4886171B04	LED GREEN
D0942	4886171B01	LED RED
D0943	4886171B04	LED GREEN
D0944	4886171B01	LED RED
D0945	4886171B04	LED GREEN
D0946	4886171B01	LED RED
D0947	4886171B04	LED GREEN
D0948	4886171B01	LED RED
D0949	4886171B04	LED GREEN
D0950	4886171B01	LED RED
D0951	4886171B04	LED GREEN
D0952	4886171B01	LED RED
D0953	4886171B04	LED GREEN
D0954	4886171B01	LED RED
D0955	4886171B04	LED GREEN
D0956	4886171B01	LED RED
D0957	4886171B04	LED GREEN
D0958	4886171B01	LED RED
D0959	4886171B04	LED GREEN
D0960	4886171B01	LED RED
D0961	4886171B04	LED GREEN
D0962	4886171B01	LED RED
D0963	4886171B04	LED GREEN
D0964	4886171B01	LED RED
D0965	4886171B04	LED GREEN
D0966	4886171B01	LED RED
D0967	4886171B04	LED GREEN
D0968	4886171B01	LED RED
D0969	4886171B04	LED GREEN
D0970	4886171B01	LED RED
D0971	4886171B04	LED GREEN
D0972	4886171B01	LED RED
D0973	4886171B04	LED GREEN
D0974	4886171B01	LED RED
D0975	4886171B04	LED GREEN
D0976	4886171B01	LED RED
D0977	4886171B04	LED GREEN
D0978	4886171B01	LED RED
D0979	4886171B04	LED GREEN
D0980	4886171B01	LED RED
D0981	4886171B04	LED GREEN
D0982	4886171B01	LED RED
D0983	4886171B04	LED GREEN
D0984	4886171B01	LED RED
D0985	4886171B04	LED GREEN
D0986	4886171B01	LED RED
D0987	4886171B04	LED GREEN
D0988	4886171B01	LED RED
D0989	4886171B04	LED GREEN
D0990	4886171B01	LED RED
D0991	4886171B01	LED RED
D0992	4886171B03	LED YELLOW
D0993	4886171B04	LED GREEN
J0801	0902636Y02	CONN FLEX 12 PIN
J0811	2864287B01	CONN TELCO 10 PIN
J0821	0986197B01	CONN ZIF HOR 24PIN
P0801	2809926G01	CONN1.25MM 2PIN
Q0851	4805921T02	DUAL ROHM FMC2 RH
Q0852	4805921T02	DUAL ROHM FMC2 RH
Q0853	4880048M01	NPN DIG 47k/47k
Q0866	4880048M01	NPN DIG 47k/47k
Q0871	4880048M01	NPN DIG 47k/47k
Q0872	4880048M01	NPN DIG 47k/47k
Q0941	4813822A08	PNP 25V 5A MJD210T4
Q0942	4813822A08	PNP 25V 5A MJD210T4
Q0943	4813824A10	NPN 40V .2A B=50-150
Q0944	4813824A10	NPN 40V .2A B=50-150
Q0961	4813822A08	PNP 25V 5A MJD210T4
Q0962	4813822A08	PNP 25V 5A MJD210T4
Q0963	4813824A10	NPN 40V .2A B=50-150
Q0964	4813824A10	NPN 40V .2A B=50-150
Q0991	4813824A10	NPN 40V .2A B=50-150
Q0992	4813824A10	NPN 40V .2A B=50-150
Q0993	4813824A10	NPN 40V .2A B=50-150
R0811	0662057A90	51k 1/16W 5%
R0812	0662057A76	13k 1/16W 5%
R0813	0662057A09	22 1/16W 5%
R0814	0662057A09	22 1/16W 5%
R0815	0662057A01	10 1/16W 5%
R0816	0662057A35	270 1/16W 5%
R0817	0662057A76	13k 1/16W 5%
R0818	0662057A90	51k 1/16W 5%
R0821	0662057B47	0 1/16W
R0823	0662057B47	0 1/16W
R0825	0662057A25	100 1/16W 5%
R0826	0662057A25	100 1/16W 5%
R0827	0662057A25	100 1/16W 5%
R0828	0662057A25	100 1/16W 5%
R0831	0662057A25	100 1/16W 5%
R0832	0662057A25	100 1/16W 5%
R0833	0662057A25	100 1/16W 5%
R0834	0662057A25	100 1/16W 5%
R0835	0662057A25	100 1/16W 5%
R0836	0662057A25	100 1/16W 5%
R0837	0662057A25	100 1/16W 5%
R0838	0662057A25	100 1/16W 5%
R0840	0662057A25	100 1/16W 5%
R0852	0662057A49	1k 1/16W 5%

Circuit Ref	Motorola Part No	Description
R0853	0662057A73	10k 1/16W 5%
R0854	1805911V02	POT VOL
R0855	0662057A82	24K 1/16W 5%
R0856	0662057A65	4k7 1/16W 5%
R0861	0662057A01	10 1/16W 5%
R0862	0662057A01	10 1/16W 5%
R0863	0662057A97	100k 1/16W
R0866	0662057A73	10k 1/16W 5%
R0870	0662057A73	10k 1/16W 5%
R0872	0662057B47	0 1/16W
R0873	0662057B22	1M 1/16W 5%
R0874	0662057A25	100 1/16W 5%
R0875	0662057A89	47k 1/16W 5%
R0876	0662057B47	0 1/16W
R0878	0662057B47	0 1/16W
R0880	0662057A57	2k2 1/16W 5%
R0881	0662057A73	10k 1/16W 5%
R0882	0662057A89	47k 1/16W 5%
R0883	0662057A73	10k 1/16W 5%
R0884	0662057A73	10k 1/16W 5%
R0885	0662057A73	10k 1/16W 5%
R0886	0662057A89	47k 1/16W 5%
R0887	0662057A73	10k 1/16W 5%
R0888	0662057A73	10k 1/16W 5%
R0889	0662057A85	33k 1/16W 5%
R0890	0662057A35	270 1/16W 5%
R0901	0662057A90	51k 1/16W 5%
R0902	0662057A76	13k 1/16W 5%
R0903	0662057A81	22k 1/16W 5%
R0904	0662057A88	43k 1/16W 5%
R0905	0662057B01	130K 1/16W 5%
R0911	0662057A90	51k 1/16W 5%
R0912	0662057A76	13k 1/16W 5%
R0913	0662057A81	22k 1/16W 5%

Circuit Ref	Motorola Part No	Description
R0914	0662057A88	43k 1/16W 5%
R0915	0662057B01	130K 1/16W 5%
R0931	0662057A90	51k 1/16W 5%
R0932	0662057A76	13k 1/16W 5%
R0933	0662057A81	22k 1/16W 5%
R0941	0662057A73	10k 1/16W 5%
R0942	0662057A73	10k 1/16W 5%
R0943	0662057A61	3k3 1/16W 5%
R0944	0662057A85	33k 1/16W 5%
R0945	0662057A93	68k 1/16W 5%
R0946	0662057A93	68k 1/16W 5%
R0947	0662057A65	4k7 1/16W 5%
R0948	0662057A65	4k7 1/16W 5%
R0949	0662057A97	100k 1/16W
R0950	0662057A97	100k 1/16W
R0951	0662057A73	10k 1/16W 5%
R0952	0662057A73	10k 1/16W 5%
R0953	0662057A73	10k 1/16W 5%
R0954	0662057A73	10k 1/16W 5%
R0955	0660076A01	10 5 1/8
R0956	0660076A01	10 5 1/8
R0957	0660076A01	10 5 1/8
R0958	0660076A01	10 5 1/8
R0961	0662057A73	10k 1/16W 5%
R0962	0662057A73	10k 1/16W 5%
R0963	0662057A61	3k3 1/16W 5%
R0964	0662057A85	33k 1/16W 5%
R0965	0662057A93	68k 1/16W 5%
R0966	0662057A93	68k 1/16W 5%
R0967	0662057A65	4k7 1/16W 5%
R0968	0662057A65	4k7 1/16W 5%
R0969	0662057A97	100k 1/16W
R0970	0662057A97	100k 1/16W
R0971	0662057A73	10k 1/16W 5%

Circuit Ref	Motorola Part No	Description
R0972	0662057A73	10k 1/16W 5%
R0973	0662057A73	10k 1/16W 5%
R0974	0662057A73	10k 1/16W 5%
R0975	0660076A01	10 5 1/8
R0976	0660076A01	10 5 1/8
R0977	0660076A01	10 5 1/8
R0978	0660076A01	10 5 1/8
R0991	0660076A35	270 5 1/8
R0992	0660076A35	270 5 1/8
R0993	0660076A35	270 5 1/8
R0995	0662057A89	47k 1/16W 5%
R0996	0662057A89	47k 1/16W 5%
R0997	0662057A89	47k 1/16W 5%
U0861	5105469E65	IC VLTG REGLTR LP2951C
*U0871	5113802A32	68HC11 W/SCI SPI A/D
U0873	4886061B01	CER RESONATOR 8MHZ
U0941	5113818A03	IC HIGH PERFORMANCE SI
U0942	5113818A03	IC HIGH PERFORMANCE SI
VR0812	4813830A15	DIODE 5.6V 5% 225mW
VR0813	4805656W09	ZENER QUAD MMQA20VT1
VR0814	4805656W09	ZENER QUAD MMQA20VT1
VR0851	4813830A23	DIODE 10V 5% 20mA 350mW
VR0855	4813830A15	DIODE 5.6V 5% 225mW

* Motorola Depot Servicing only

Reference designators with an asterisk indicate components which are not fieldreplaceable because they need to be calibrated with specialized factory equipment after installation. Radios in which these parts have been replaced in the field will be off frequency at temperature extremes.

Expansion Head / Expansion Board

Reference Symbol	Motorola PN	Value
C1001	2113740F67	470pF 5% 50V
C1002	2113740F67	470pF 5% 50V
C1003	2113740F49	82pF 5% 50V
C1004	2113740F67	470pF 5% 50V
C1005	2113740F67	470pF 5% 50V
C1006	2113740F67	470pF 5% 50V
C1007	2113740F67	470pF 5% 50V
C1008	2113740F67	470pF 5% 50V
C1009	2113740F67	470pF 5% 50V
C1010	2113740F49	82pF 5% 50V
C1011	2113740F49	82pF 5% 50V
C1012	2113740F49	82pF 5% 50V
C1013	2113740F49	82pF 5% 50V
C1014	2113740F49	82pF 5% 50V
C1015	2113743E20	100nF 16V
C1016	2113743E20	100nF 16V
C1017	2113743E20	100nF 16V
C1021	2113741M69	0.1uF 50V
C1022	2113741M69	0.1uF 50V
C1023	2113741M69	0.1uF 50V
C1024	2113741M69	0.1uF 50V
C1025	2113740F49	82pF 5% 50V
C1026	2113740F49	82pF 5% 50V
C1027	2113740F49	82pF 5% 50V
C1028	2113740F49	82pF 5% 50V
C1031	2113740F49	82pF 5% 50V
C1032	2113740F49	82pF 5% 50V
C1033	2113740F67	470pF 5% 50V
C1041	2113740F49	82pF 5% 50V
C1042	2113740F49	82pF 5% 50V
C1043	2113740F49	82pF 5% 50V
C1044	2113740F49	82pF 5% 50V
C1051	2113740F49	82pF 5% 50V
C1052	2113740F49	82pF 5% 50V
C1053	2113740F49	82pF 5% 50V
C1054	2113740F49	82pF 5% 50V
C1055	2113740F49	82pF 5% 50V

Reference Symbol	Motorola PN	Value
C1056	2113740F49	82pF 5% 50V
C1057	2113740F49	82pF 5% 50V
C1058	2113740F49	82pF 5% 50V
C1061	2113741M69	0.1uF 50V
C1062	2113741M69	0.1uF 50V
C1063	2113741M69	0.1uF 50V
C1064	2113741M69	0.1uF 50V
C1065	2113743E20	100nF 16V
C1072	2113740F67	470pF 5% 50V
C1073	2113740F67	470pF 5% 50V
C1081	2311049C06	TANT CP 22uF 20% 35V
C1082	2113740F67	470pF 5% 50V
C1083	2113741M69	0.1uF 50V
C1084	2311049C06	TANT CP 22uF 20% 35V
C1085	2113741M69	0.1uF 50V
C1086	2113740F67	470pF 5% 50V
C1092	2311049A99	TANT CP 47uF 20% 10V
C1093	2113743E20	100nF 16V
C1094	2113740F67	470pF 5% 50V
C1301	2113741F25	1nF 50V
C1302	2113743E20	100nF 16V
C1303	2113743E20	100nF 16V
C1304	2113743E20	100nF 16V
C1305	2113741F37	3.3nF 50V
C1306	2113743E20	100nF 16V
C1307	2113743E20	100nF 16V
D1001	4813833C02	DUAL SOT MMBD6100
J1001	0902636Y02	CONN FLEX 12 PIN
J1002	0905505Y04	CONN ZIF HORIZONTAL
J1005	0905505Y04	CONN ZIF HORIZONTAL
J1022	0905505Y04	CONN ZIF HORIZONTAL
Q1035	4813824A10	NPN 40V .2A B=50-150
Q1037	4805921T02	DUAL ROHM FMC2 RH
Q1071	4805921T02	DUAL ROHM FMC2 RH

Reference Symbol	Motorola PN	Value
Q1081	4813822A09	PNP 40V 3A MJD32T4
Q1082	4880048M01	NPN DIG 47k/47k
Q1301	4813824A17	PNP 40V .2A B=100-
Q1302	4813824A17	PNP 40V .2A B=100-
Q1303	4813824A10	NPN 40V .2A B=50-150
Q1304	4813824A17	PNP 40V .2A B=100-
R1011	0662057A01	10 1/16W 5%
R1030	0662057A89	47k 1/16W 5%
R1031	0662057A43	560 1/16W 5%
R1032	0662057A43	560 1/16W 5%
R1034	0662057A73	10k 1/16W 5%
R1035	0662057A89	47k 1/16W 5%
R1036	0662057A89	47k 1/16W 5%
R1037	0662057A89	47k 1/16W 5%
R1040	0662057B47	0 1/16W
R1041	0662057A18	51 1/16W 5%
R1042	0662057A18	51 1/16W 5%
R1043	0662057A18	51 1/16W 5%
R1044	0662057A18	51 1/16W 5%
R1050	0662057A18	51 1/16W 5%
R1051	0662057A18	51 1/16W 5%
R1052	0662057A18	51 1/16W 5%
R1053	0662057A18	51 1/16W 5%
R1054	0662057A18	51 1/16W 5%
R1055	0662057A18	51 1/16W 5%
R1056	0662057A18	51 1/16W 5%
R1057	0662057A18	51 1/16W 5%
R1071	0662057A85	33k 1/16W 5%
R1072	0662057A81	22k 1/16W 5%
R1073	0662057A89	47k 1/16W 5%
R1081	0662057A73	10k 1/16W 5%
R1082	0662057A57	2k2 1/16W 5%
R1083	0662057A57	2k2 1/16W 5%
R1301	0662057A53	1k5 1/16W 5%
R1302	0662057A65	4k7 1/16W 5%
R1303	0662057A56	2k 1/16W 5%
R1304	0662057A73	10k 1/16W 5%
R1305	0662057A57	2k2 1/16W 5%
R1306	0662057A65	4k7 1/16W 5%

Reference Symbol	Motorola PN	Value
R1307	0662057A73	10k 1/16W 5%
R1308	0662057A73	10k 1/16W 5%
R1309	0662057A57	2k2 1/16W 5%
R1310	0662057A65	4k7 1/16W 5%
R1311	0662057A73	10k 1/16W 5%
R1312	0662057A57	2k2 1/16W 5%
R1313	0662057A73	10k 1/16W 5%
R1314	0662057A57	2k2 1/16W 5%
R1315	0662057A69	6k8 1/16W 5%
U1010	4886061B02	3.68MHZ CERAMIC RESONNATOR
U1015	5186210B01	SPI/MICROWIRE COMPATABLE UART
U1016	5113808A38	LINE DRVR OCT 3T NON INV
U1017	5186211B02	VREG MAX 3232E
U1065	5109781E76	RS-232 XCVR/SHTDN MAX3238
U1091	5105469E65	VLTG REGLTR LP2951C
U1301	5113808A07	AND QUAD 2 INP MC74AC08D
U1302	5113820A02	DUAL SING SPLY LO PWR
VR1001	4813830A40	SOC23 AUTO SDN
VR1002	4805656W08	ZENER QUAD 5.6V
VR1003	4805656W09	ZENER QUAD MMQA20VT1
VR1009	4813830A40	SOC23 AUTO SDN
VR1037	4813830A40	SOC23 AUTO SDN
VR1041	4805656W08	ZENER QUAD 5.6V
VR1071	4813830A40	SOC23 AUTO SDN
VR1081	4813830A40	SOC23 AUTO SDN
VR1082	4813830A40	SOC23 AUTO SDN

Expansion Head / Connector Board

Reference Symbol	Motorola PN	Value
J0101	2864287B01	CONN_J
J0102	0964329B01	CONN_J
J0103	0964328B01	CONN_J
J0104	0905505Y04	TELCO10PIN

Remote Mount Head

Reference Symbol	Motorola PN	Value
C0903	2113743e20	0.1uF 10% 50V
C0902	2311049a57	Tant B 10uF 16V 10%
C0920	2113741f17	470pF 10% 50V
C0922	2113741f17	470pF 10% 50V
C0924	2113741f17	470pF 10% 50V
C0921	2380090m24	Alum SM 10uF 50V
C0925	2113741f17	470pF 10% 50V
C0926	2113741f17	470pF 10% 50V
C0931	2113740f49	82pF 10% 50V
C0930	2113741f17	470pF 10% 50V
C0923	2113740f49	82pF 10% 50V
Q0901	4813824a17	Trans PNP
Q0903	4813824a10	Trans PNP
R0901	0662057a73	10K 5%
R0906	0662057a51	1K2 5%
R0907	0662057a51	1K2 5%
R0908	0662057a65	4K7 5%
R0902	0662057a73	10K 5%
VR0921	4813830a40	Diode ZENER MMBZ5257B
VR0922	4805656w09	Diode SM Zener 20V
VR0923	4813830a40	Diode ZENER MMBZ5257B
VR0924	4805656w08	Diode Zener 5V6
J0911	0902636y02	Conn ZIF R/A 12 pos
J0921	2864287B01	10 PIN TELCO

Motorcycle Control Head

Reference Symbol	Motorola PN	Value
C1	2113741F49	0.01UF
C3	2113741D32	0.33UF
C4	2113743K15	0.1UF
C5-10	2113741F49	0.01UF
C11-12	2113741F25	1000PF
C13-30	2113741F13	330PF
C31-33	2311049J26	ELECTROLYTIC, 10UF
C34-38	2311049J12	ELECTROLYTIC, 4.7UF
C39-44	2113743K15	0.1UF
C45-47	2113741F49	0.01UF
C48-49	2113740F39	33PF
CR1	4882290T01	MS_2800
CR2	4813830A33	MMBZ5250L
D0-66	4805729G75	M-LED, YELLOW & GREEN
D67,68	4805729G73	M-LED, YELLOW
D69,70	4805729G74	M-LED, RED
J1	2805922V01	EDGE
J2	2805924V01	EDGE (see Note 3)
Q1	4813824A17	PNP 3906L
Q2	4813822A08	MJD210T4
Q3-5	4813824A17	PNP 3906L
Q6-15	4813824A10	NPN 3904L
R1	0662057A73	10K
R2	0680149M02	RT-1 100K
R3	0662057R92	47.5K
R4	0662057R60	10.0K
R5	0662057R55	7.50K
R6-7	0662057R02	10
R8-10	0662057G13	100K
R11	0662057G07	75K
R12	0662057B22	1M
R13	0662057B16	560K
R14	0662057B05	200K
R15-18	0662057A97	100K
R19-20	0662057A89	47K
R21	0662057A81	22K
R22-23	0662057A77	15K
R24-51	0662057A73	10K
R52-58	0662057A69	6.8K
R59-68	0662057A65	4.7K
R69	0662057A61	3.3K
R70-71	0662057A57	2.2K
R72	0662057A56	2K
R73-78	0662057A53	1.5K
R79-80	0662057A49	1K
R81	0662057A41	470
R82-83	0662057A39	390
R84-85	0662057A37	330
R86	0662057B47	0
R87	0611077A57	200
R110-113	0662057B47	0
R115-122	0662057B47	0
S0-24	7505694W01	FUNCTIONAL
TP1,3-4	39PRODGY01	TEST POINTS, LCD BIAS
U1	7202076U01	LCD_2_LINE
U2	5102101U01	LC7985N
U3	5102102U01	LC7930N
U4	5102100U03	68HC05B6
U5	1805911V01	POTENTIOMETER SWITCH
U6	5113818A03	MC33072D
U7	5105625U63	S-807
U8	5113805A60	74HC273
U9	5113816A07	VREG1-M_78M05
U10	5105461G54	SCI7661
VZ1-7	4804645P09	VARISTOR, 5.6
Y1	4802582S12	SMD 4.000MHz

Note: For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

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CHAPTER 9
TROUBLESHOOTING

Section Introduction

This Chapter contains the following sections:

General

Troubleshooting faults in the radio require proper understanding of the different circuitry contained in the radio. Since the radio contains a highly integrated system, the software and hardware functions can not be separated easily. Thus, it is also necessary to understand the functioning of different ICs and the role of the software in the operation of the radio. This service manual includes schematic diagrams, circuit board layouts, block diagrams, and troubleshooting procedures, which help a technician to troubleshoot a malfunctioning circuit and detect a defective component.

NOTE: The CPS has no capability to tune the radio. Tuning the radio can only be performed at the factory or at the appropriate Motorola Repair Centre.
Components replacement can affect the radio tuning and must only be performed by the appropriate Motorola Repair Centre.

The radio is tuned and tested at the factory. The results of the tuning procedures are stored in a special EEPROM. This information includes tuning and other system parameters. The area of the memory in the radio where the tuning information is stored is called the “codeplug”. A radio codeplug can be read using the CPS programme.

Test Procedures

This section explains the procedures required to troubleshoot a MTM700 radio. Whenever possible the radio should be tested and tuned using the automatic test system PATS before troubleshooting. The PATS result file can provide useful hints to determine the failing circuitry section. Alternatively, the Main Function Test Procedure can be performed to determine where to start troubleshooting. After disassembling the board from the chassis you should check the board visually for bad soldering or damaged components.

Troubleshooting Setup

Some of the troubleshooting procedures require an audio signal input or measurment of the audio at the speaker output. The Test Set RLN4460 provides the correct microphone input and speaker output circuitry. Figure 1 shows the recomended setup for troubleshooting. Figure 2 shows the required connections between the radio's accessory connector, the Test Set and the Interface Box. The Interface Box connects the radio to the RS232 interface of a PC and is required to control the radio during troubleshooting

.

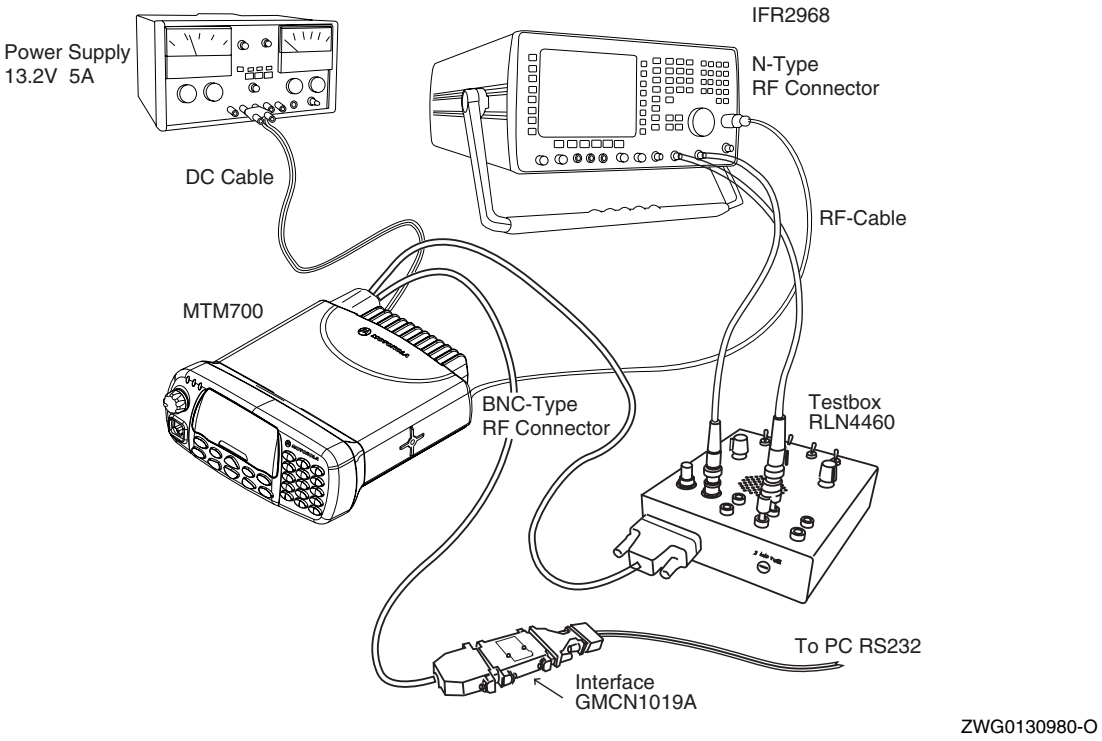

Figure 1 Troubleshooting Setup

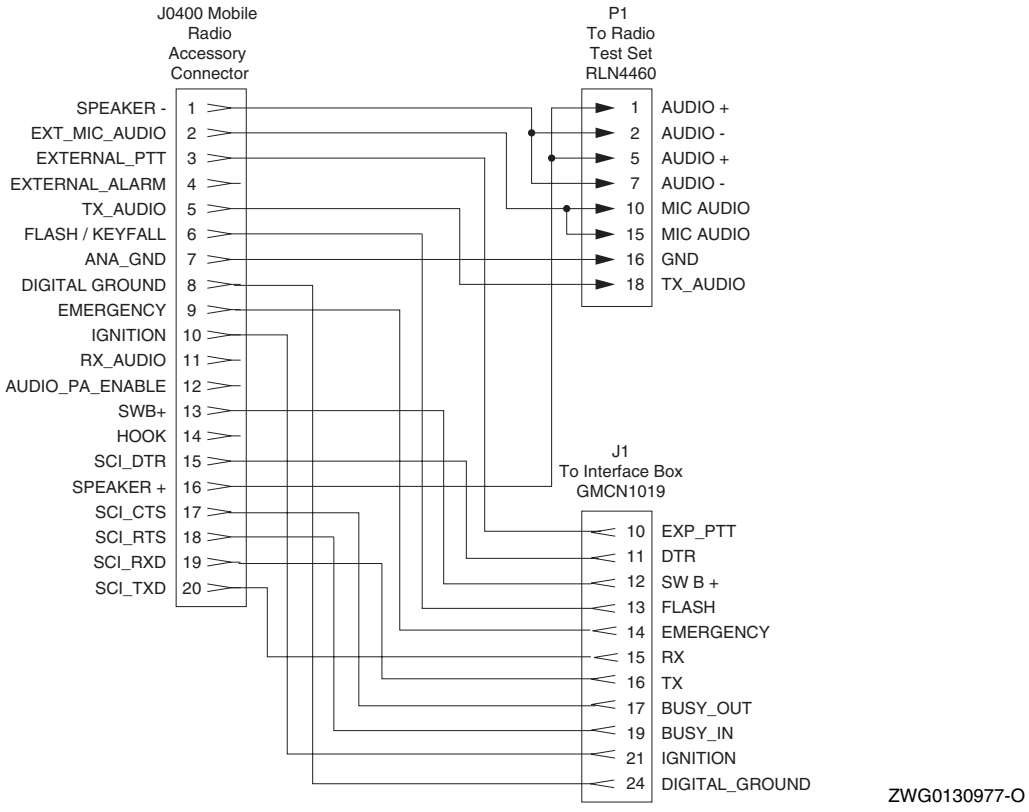

Figure 2 Required Connections (Accessory Connector / Test Set / Interface Box)

For RF levels, which should be measured with a 50 Ohm RF probe, you can use the following circuit.

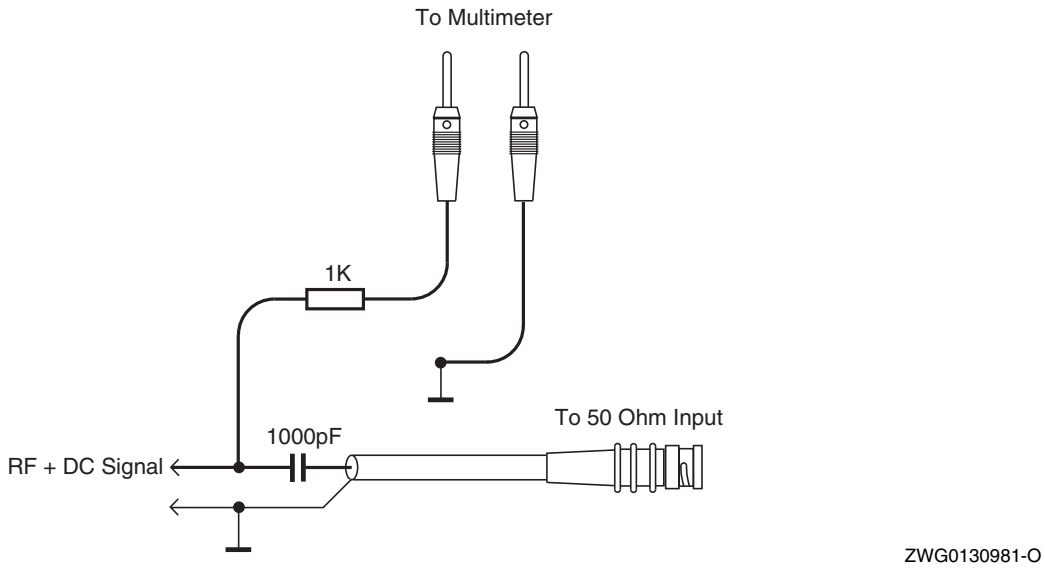

Figure 3 Example for 50 Ohm RF Probe

Troubleshooting Flowcharts

Use the following flowcharts to troubleshoot the radio.

These flowcharts contain procedures which use the TETRA COM SW application to set the radio into the appropriate test modes for troubleshooting radios having digital, receiver, transmitter, or frequency generation failures.

The radio performs most of the used TETRA COM commands only in test mode. If not in test mode, it ignores these commands.

To enter test mode you must enter the command "TEST_ENTER" in TETRA COM.

After about 10 seconds the TETRA COM screen must show the message "Radio HW is READY" to indicate that the radio has entered test mode.

Once in test mode, you don't have to use this command again until the test mode is terminated or the radio performed a reset.

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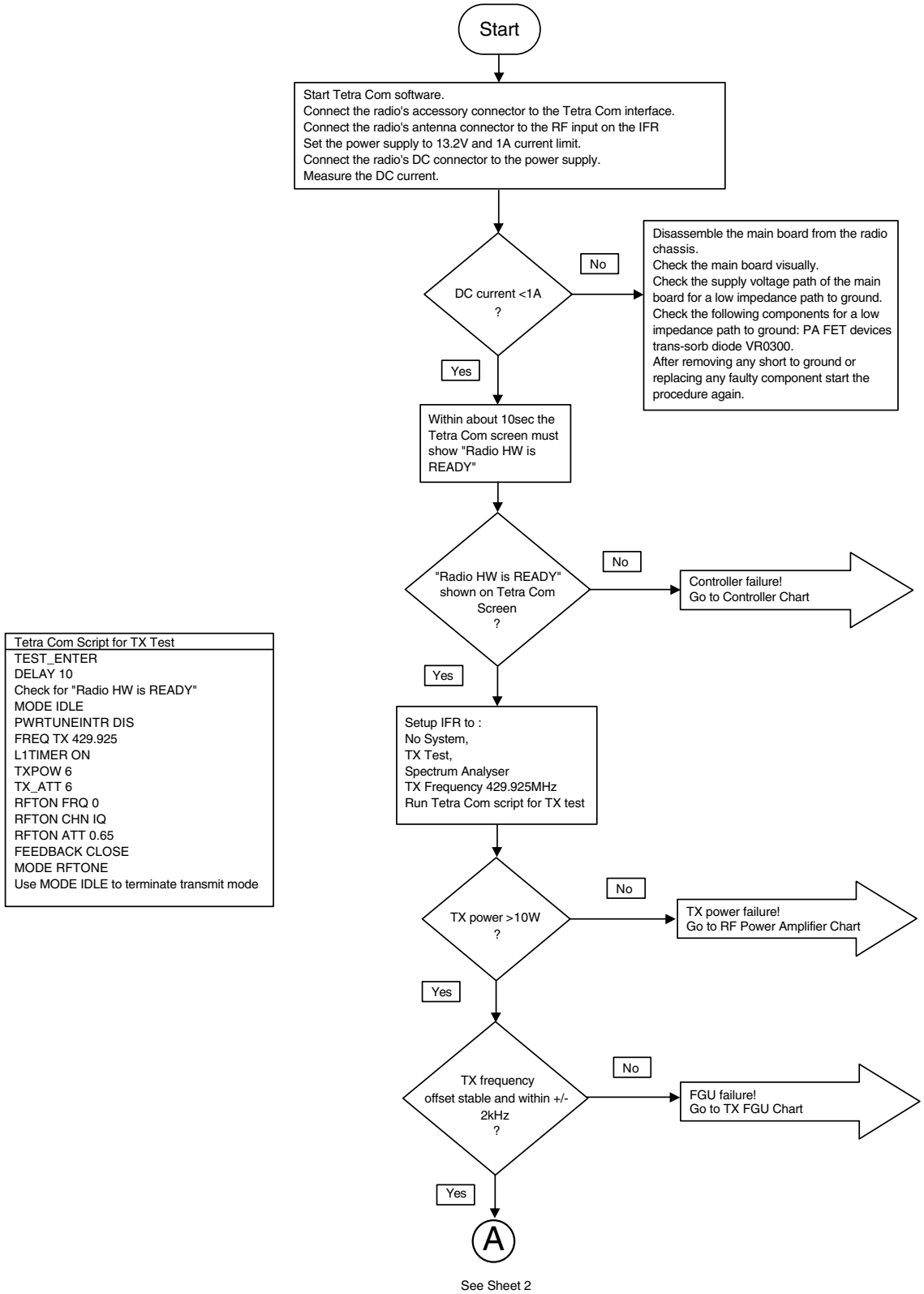
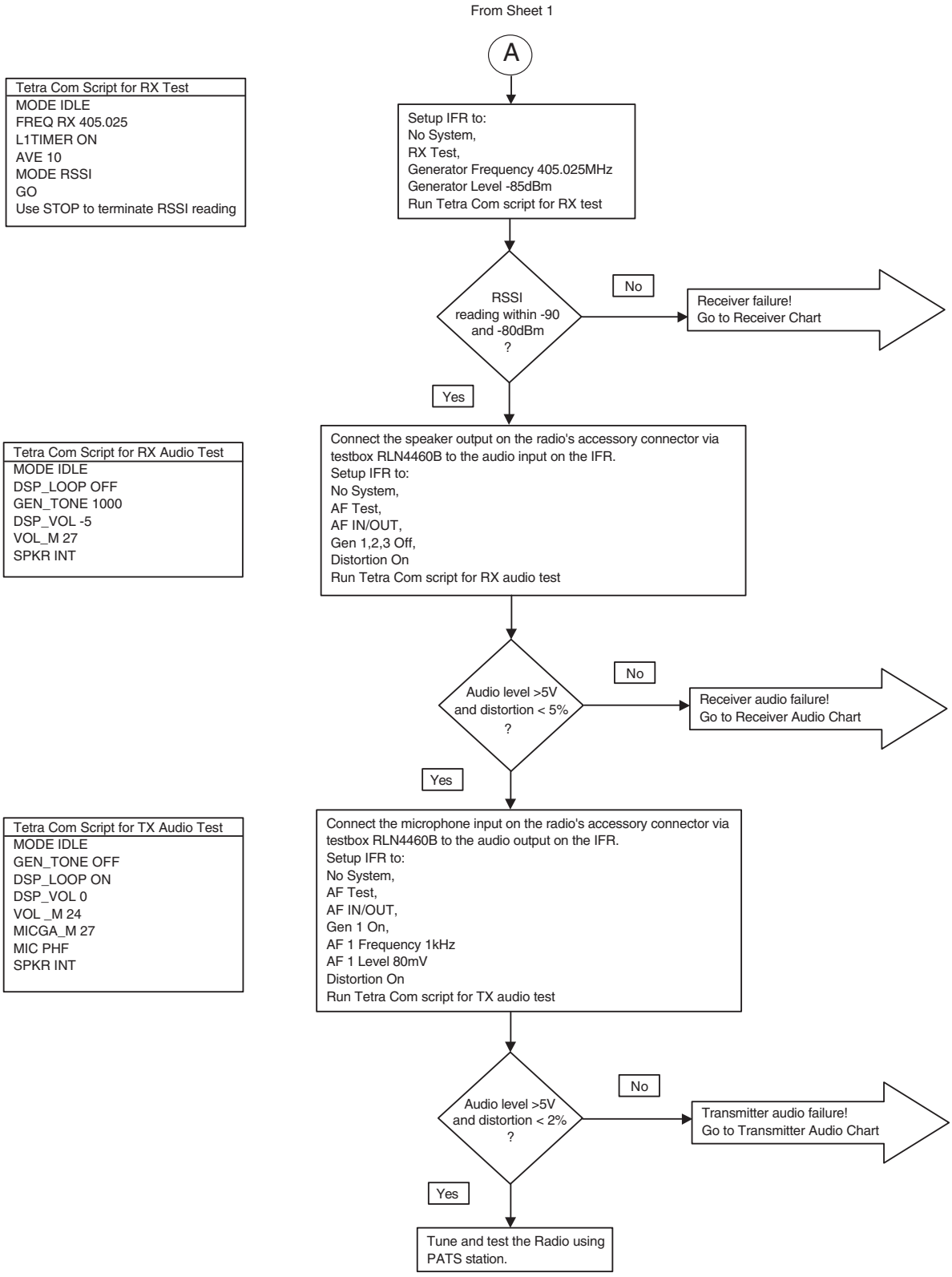
TROUBLESHOOTING CHARTS (400MHz)

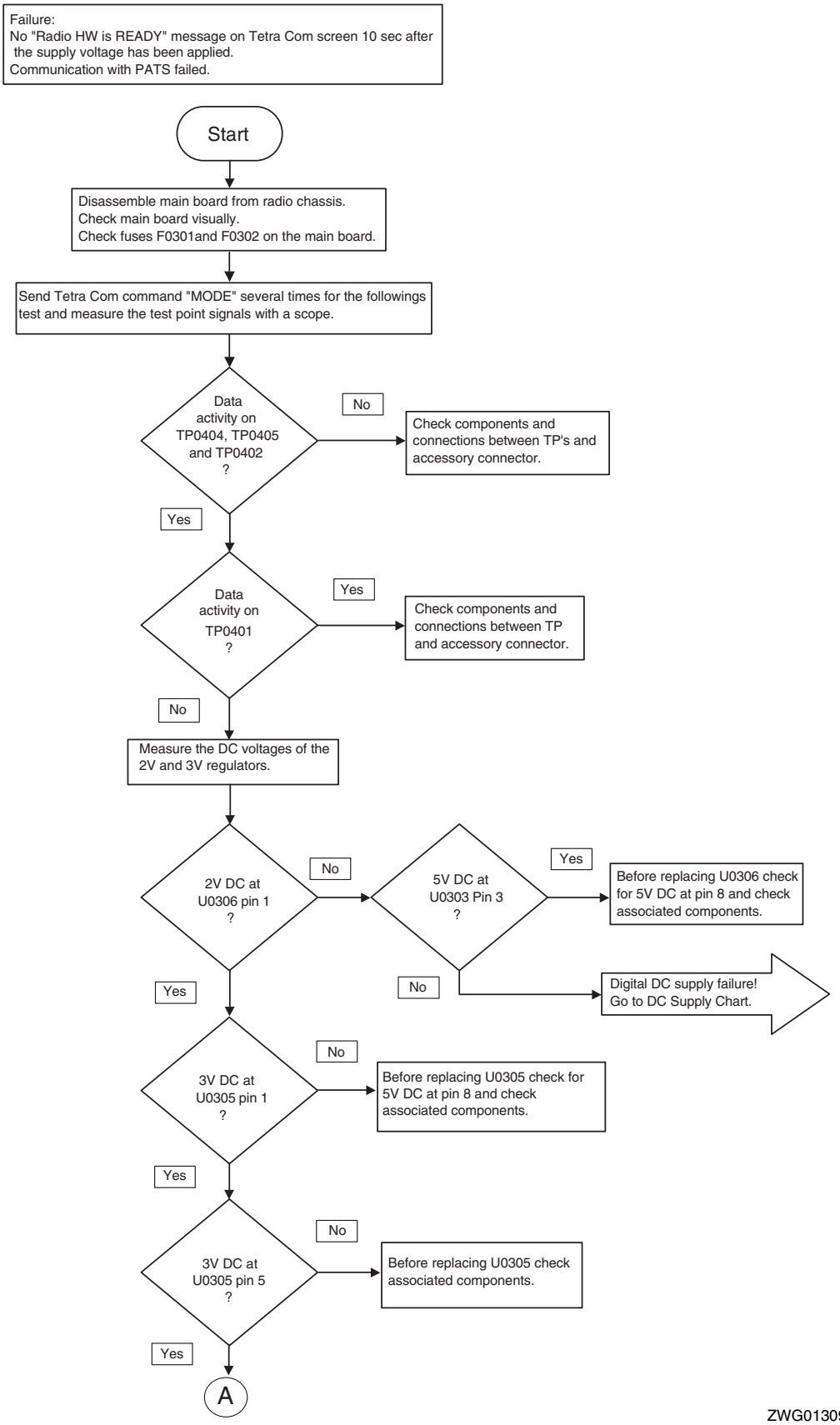
Main Function Test Chart (Sheet 1) >> Startup Procedure <<



Main Function Test Chart (Sheet 2)



Controller Troubleshooting (Sheet 1)



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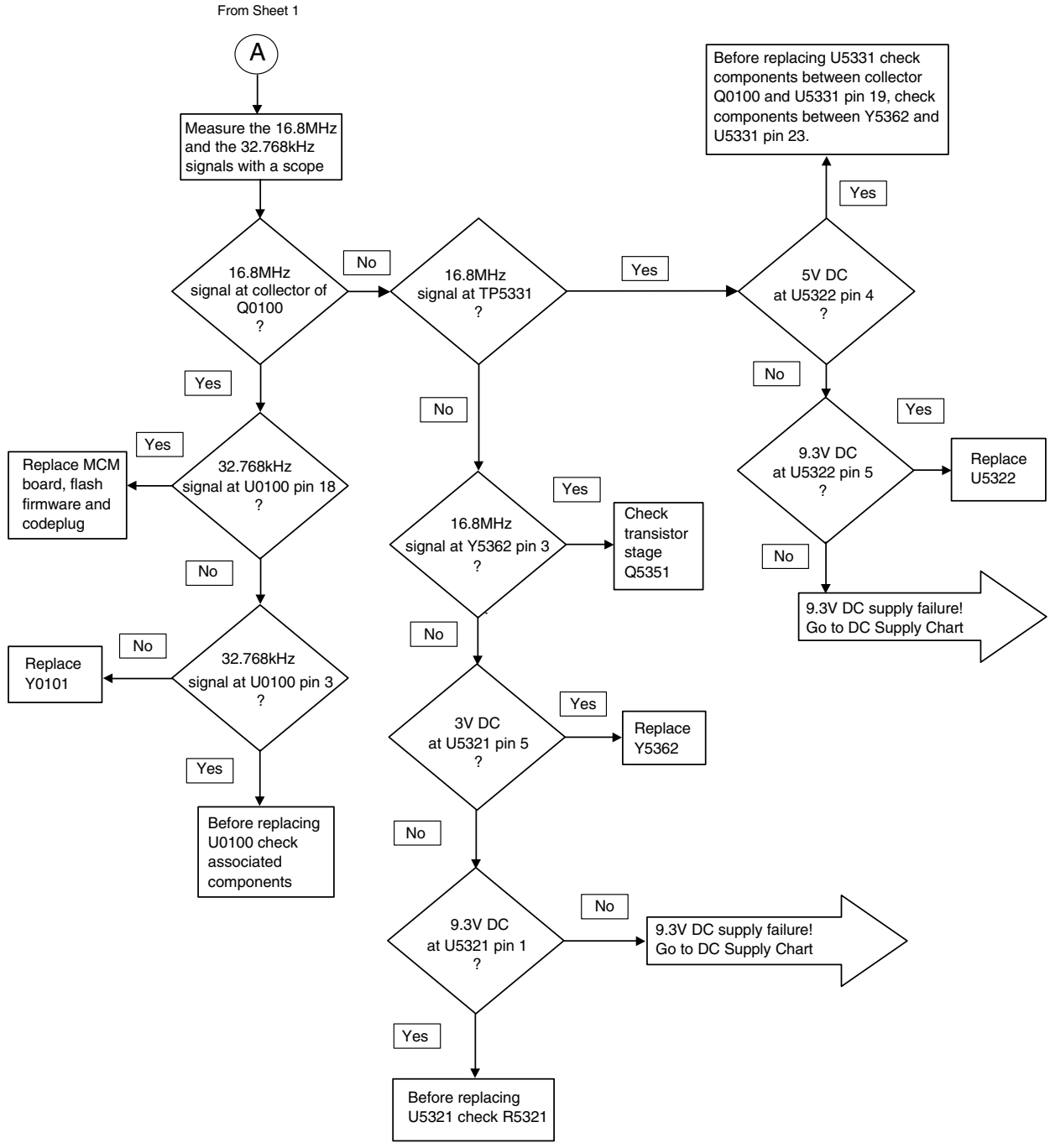
Controller Troubleshooting (Sheet 2)



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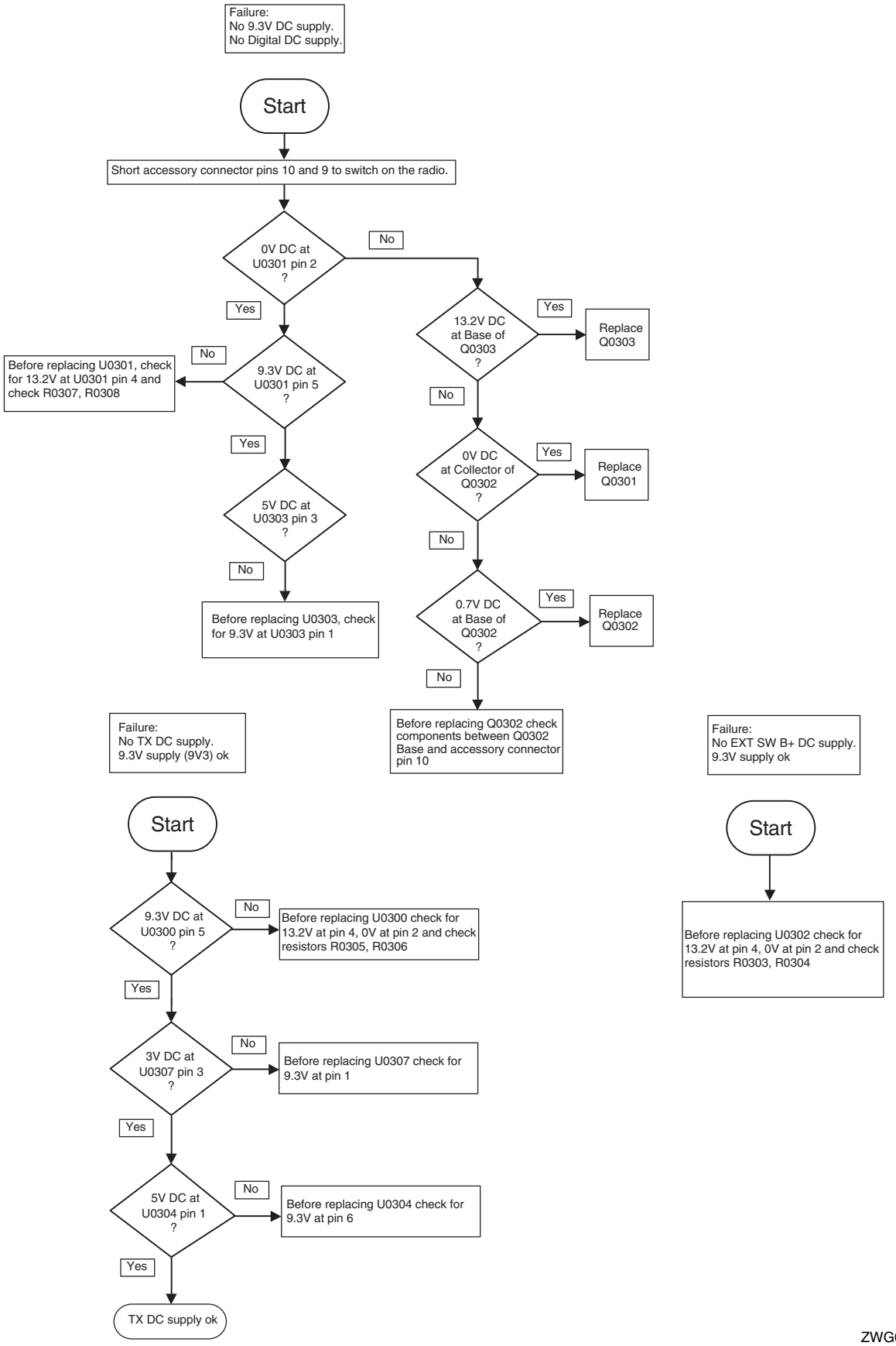
DC Supply Troubleshooting



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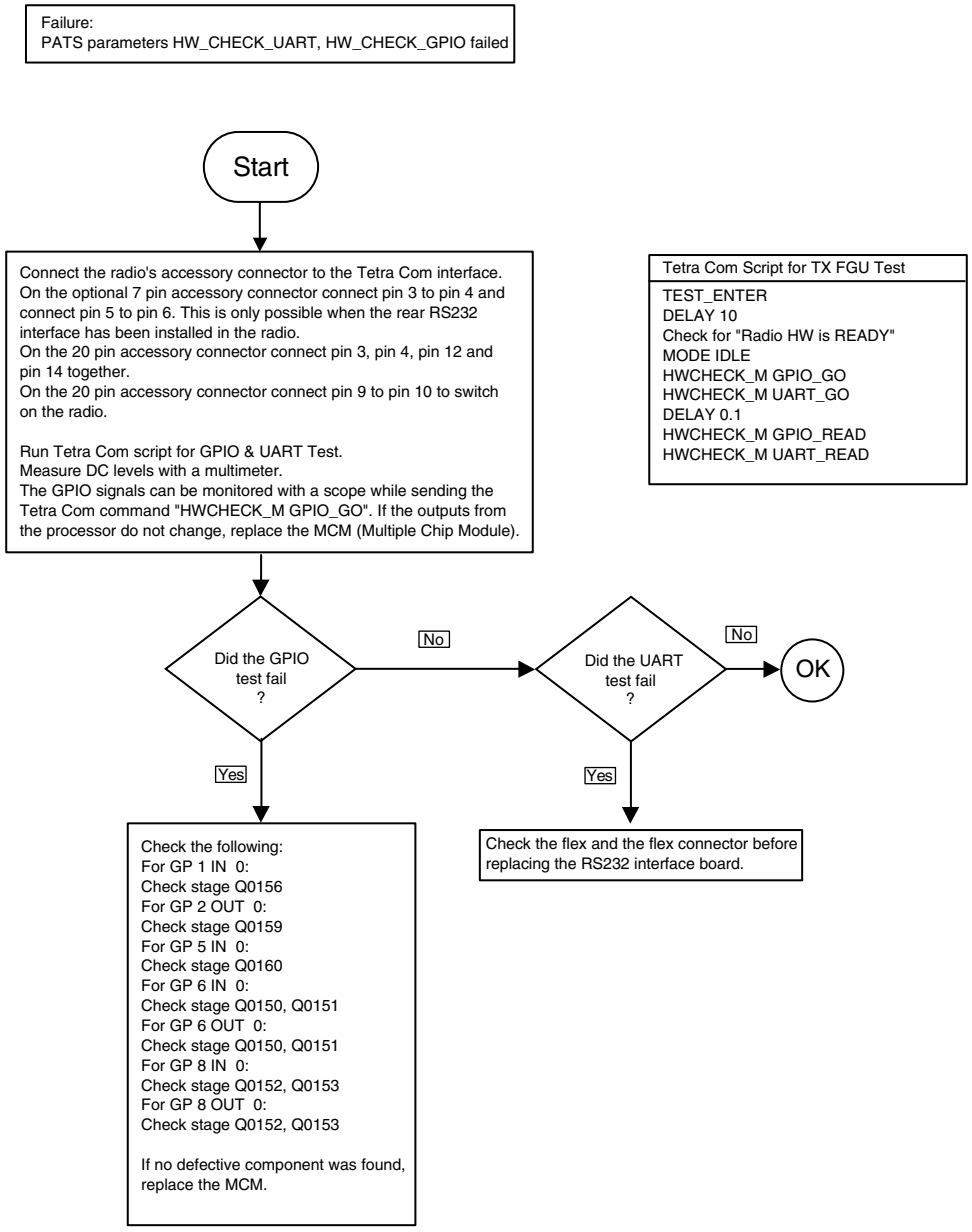
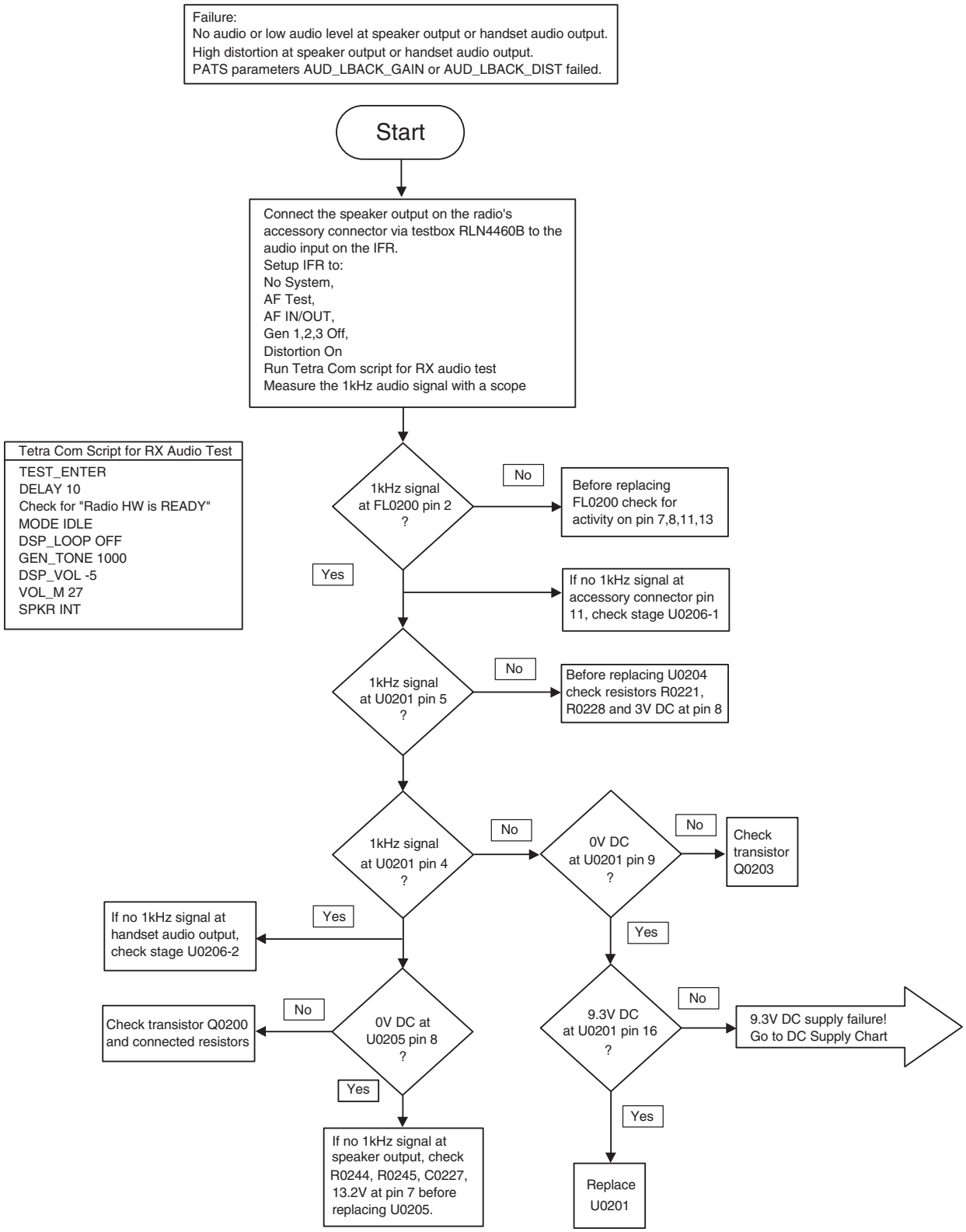
GPIO & RS232 Troubleshooting



Receiver Audio Troubleshooting



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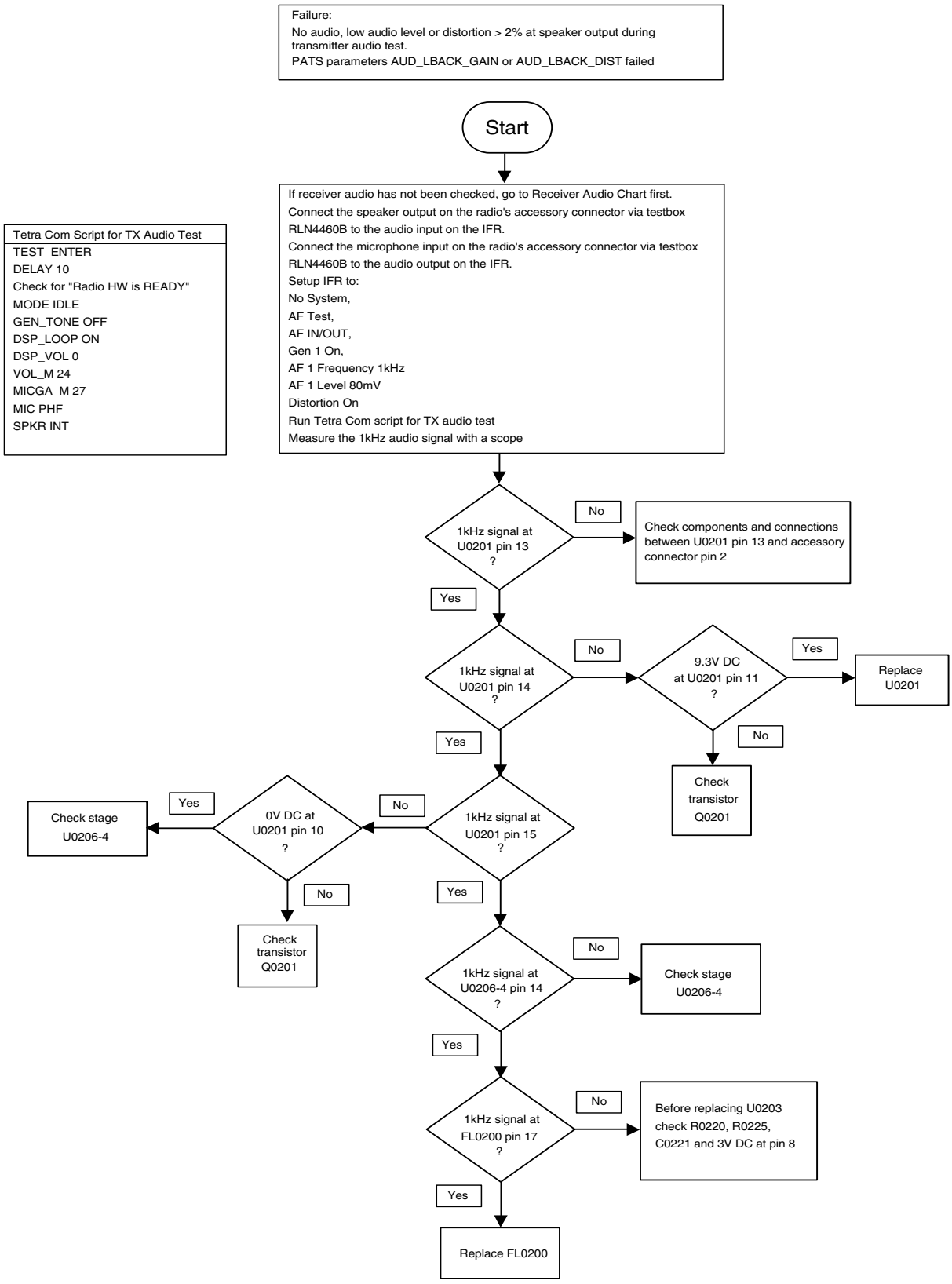
Transmitter Audio Troubleshooting



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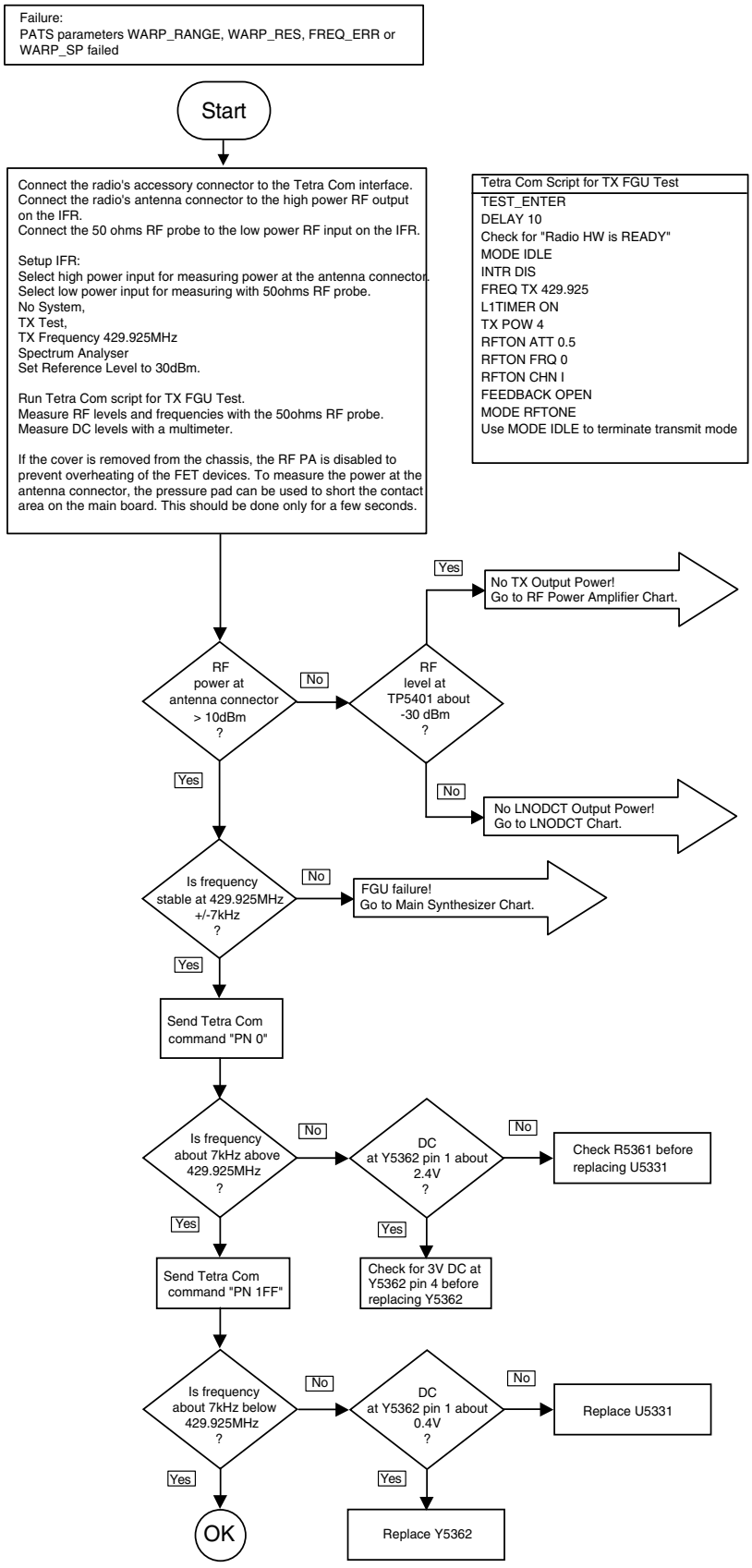
Warping Failure Troubleshooting



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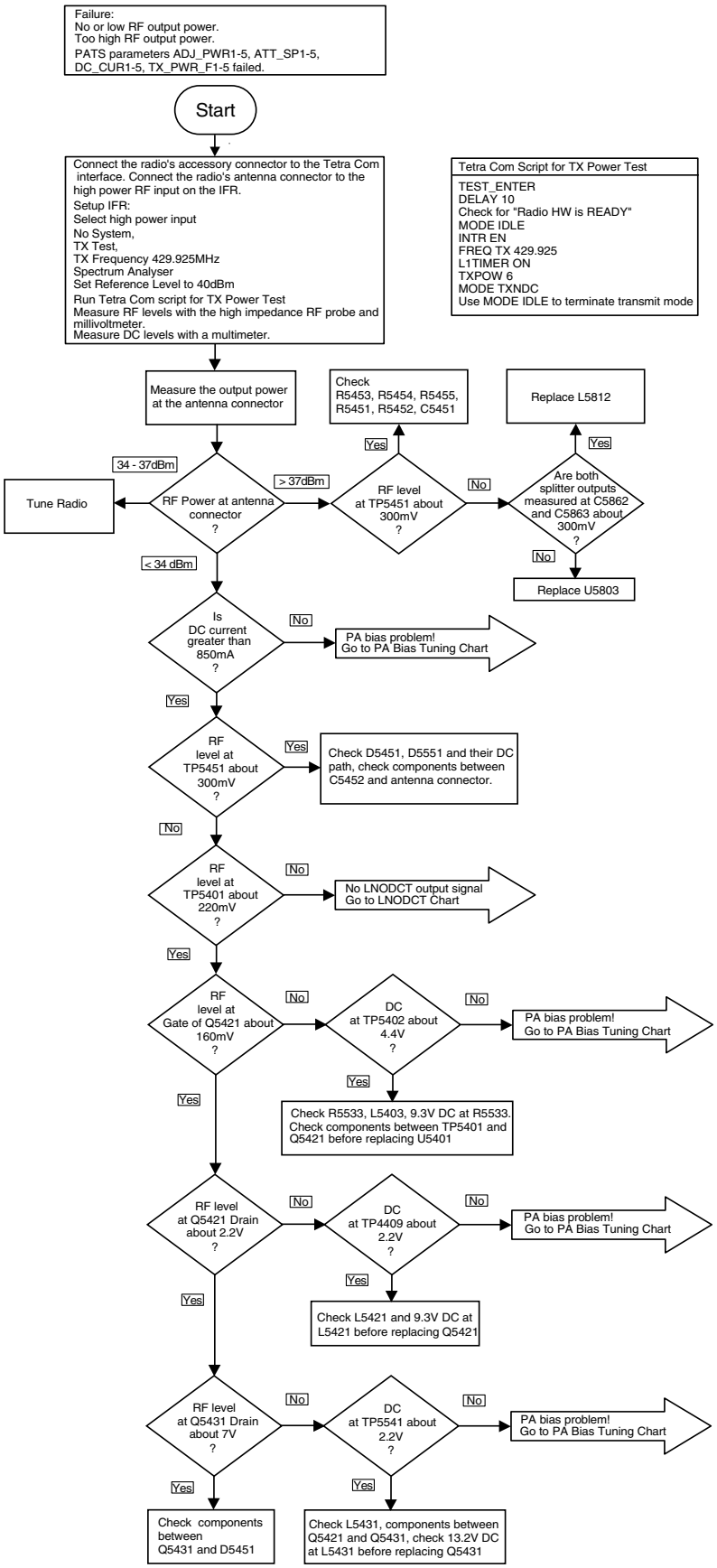
RF Power Amplifier Troubleshooting



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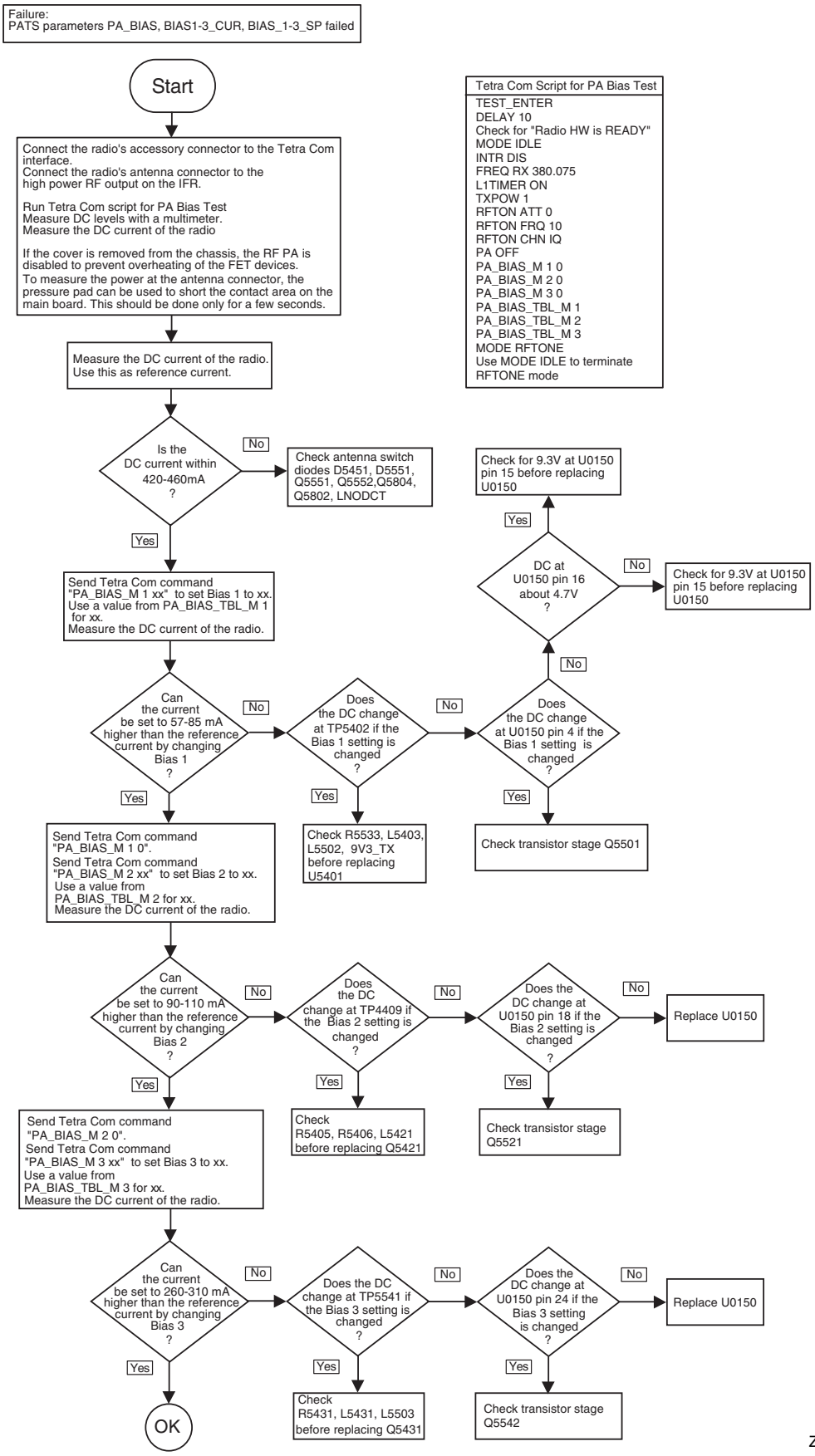
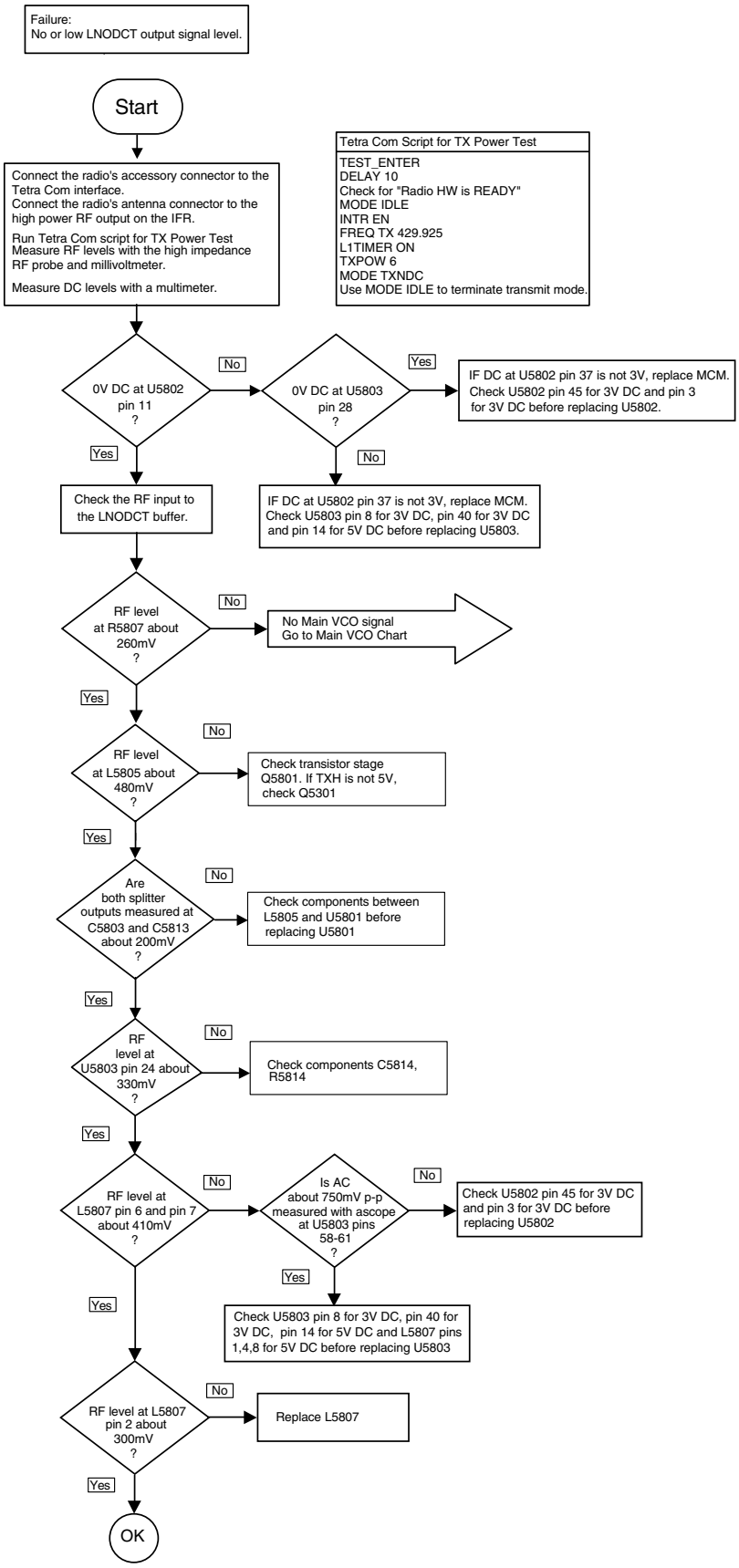
PA Bias Failure Troubleshooting

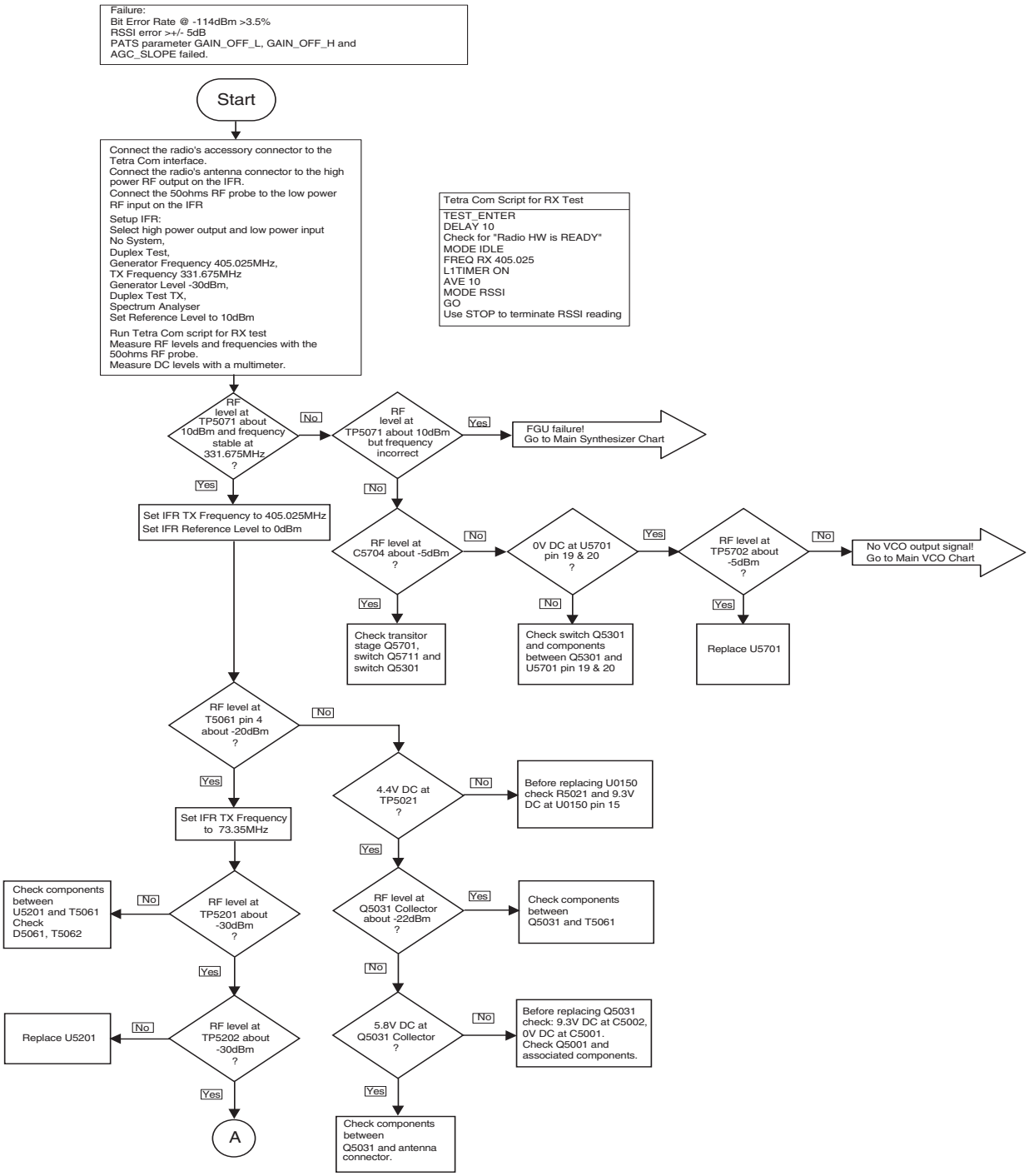


LNODCT Troubleshooting



ZWG0130978-O

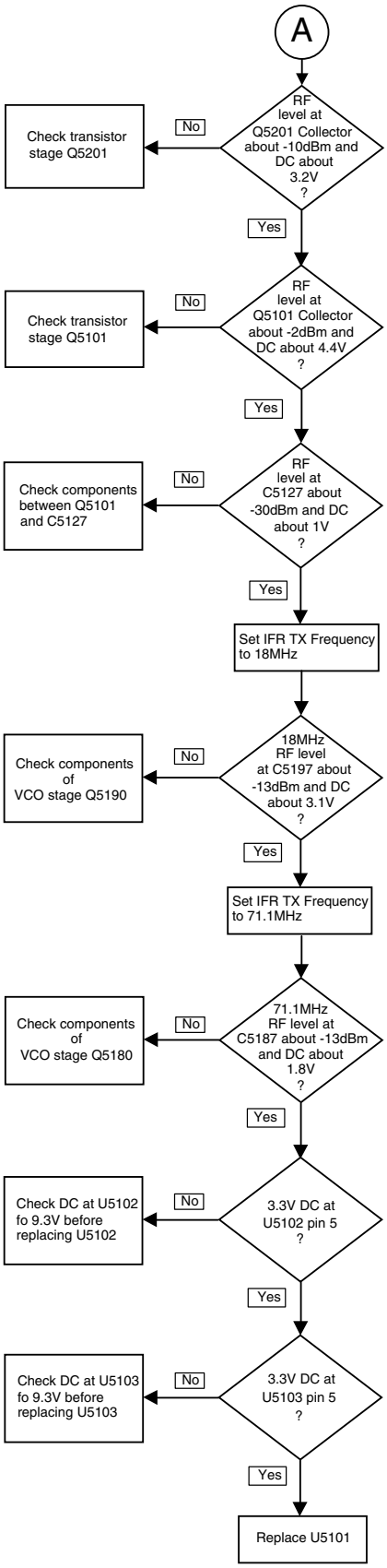
Receiver Troubleshooting (Sheet 1)



ZWG0130968-O

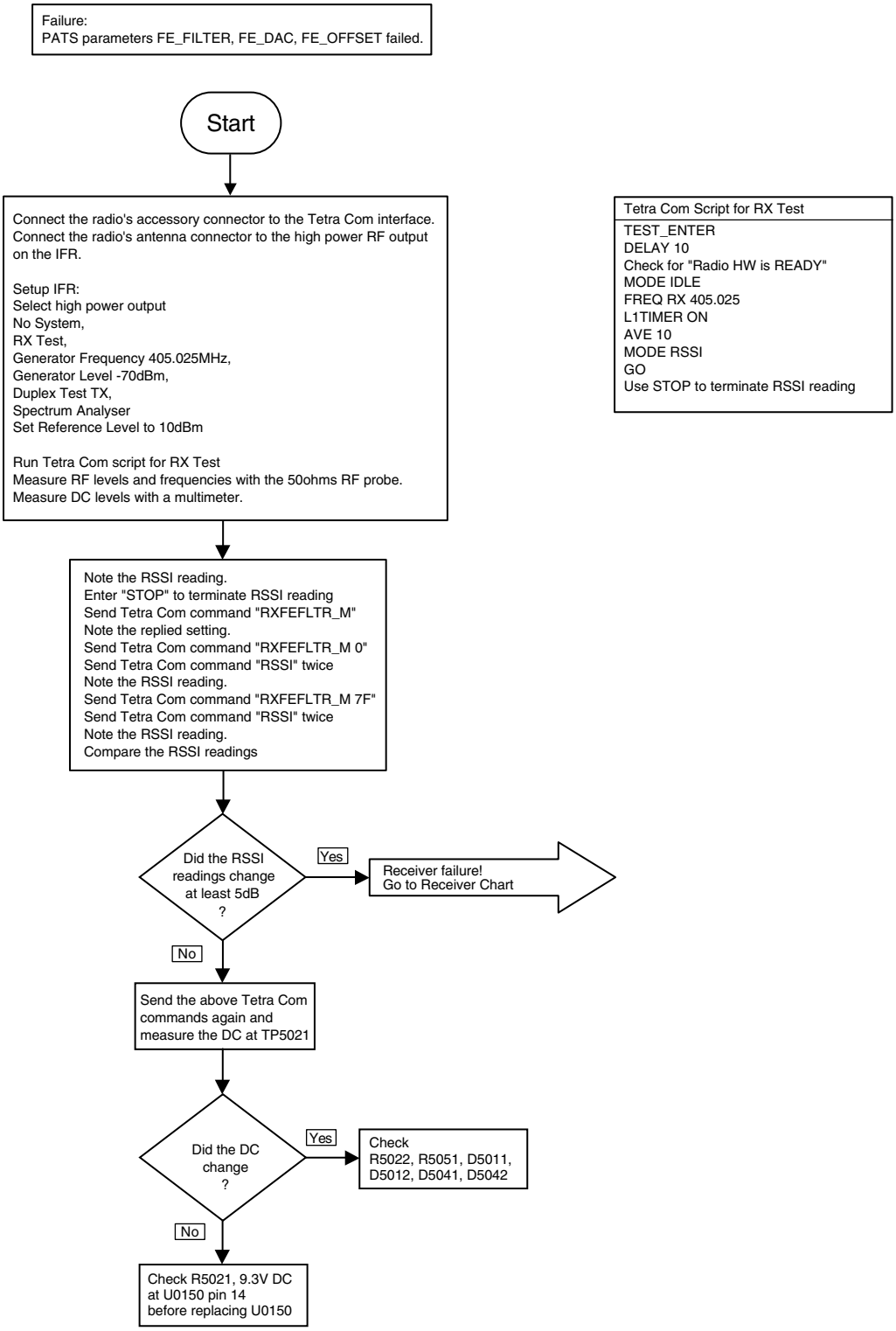
Receiver Chart 1
UHF

Receiver Troubleshooting (Sheet 2)

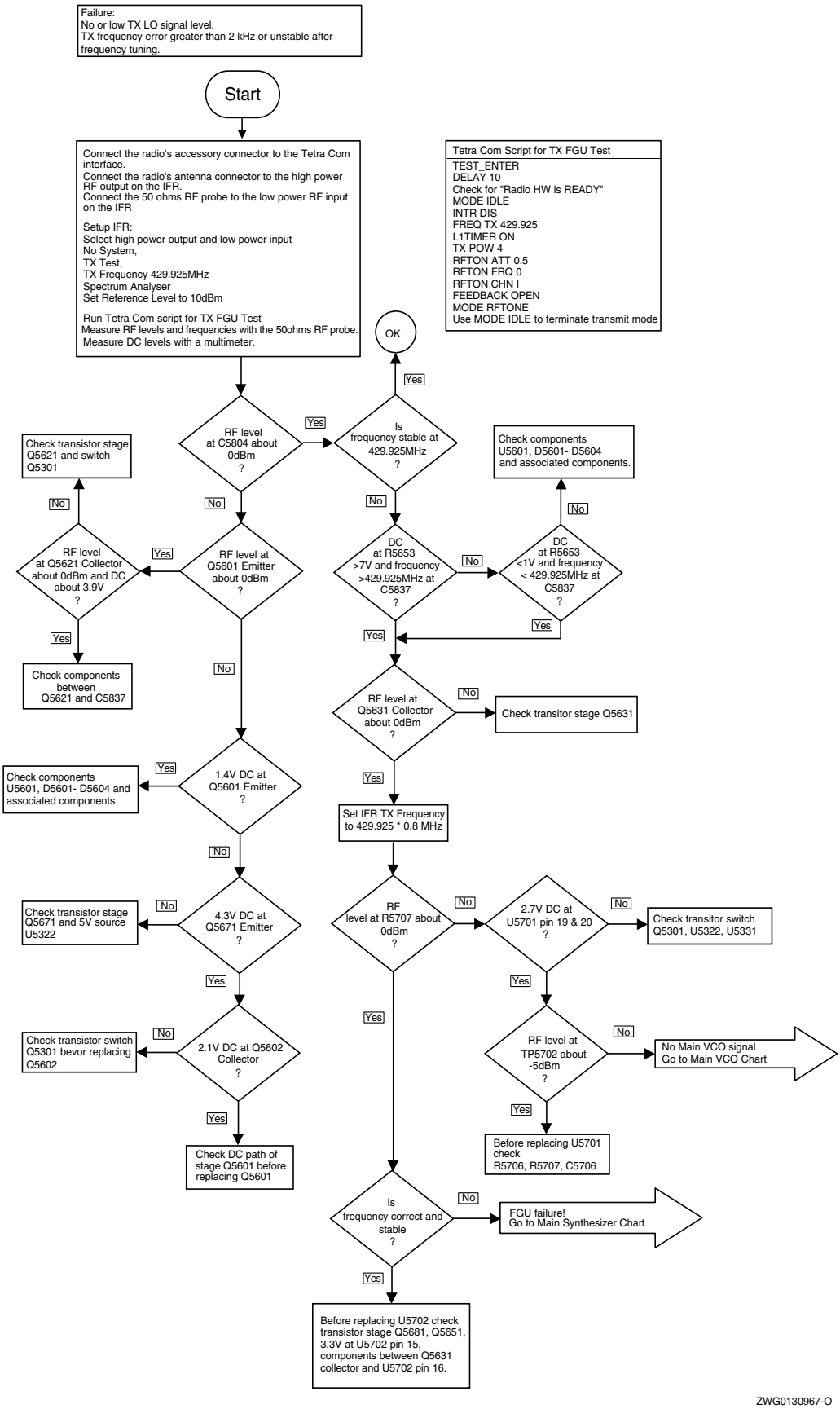


ZWG0130969-O

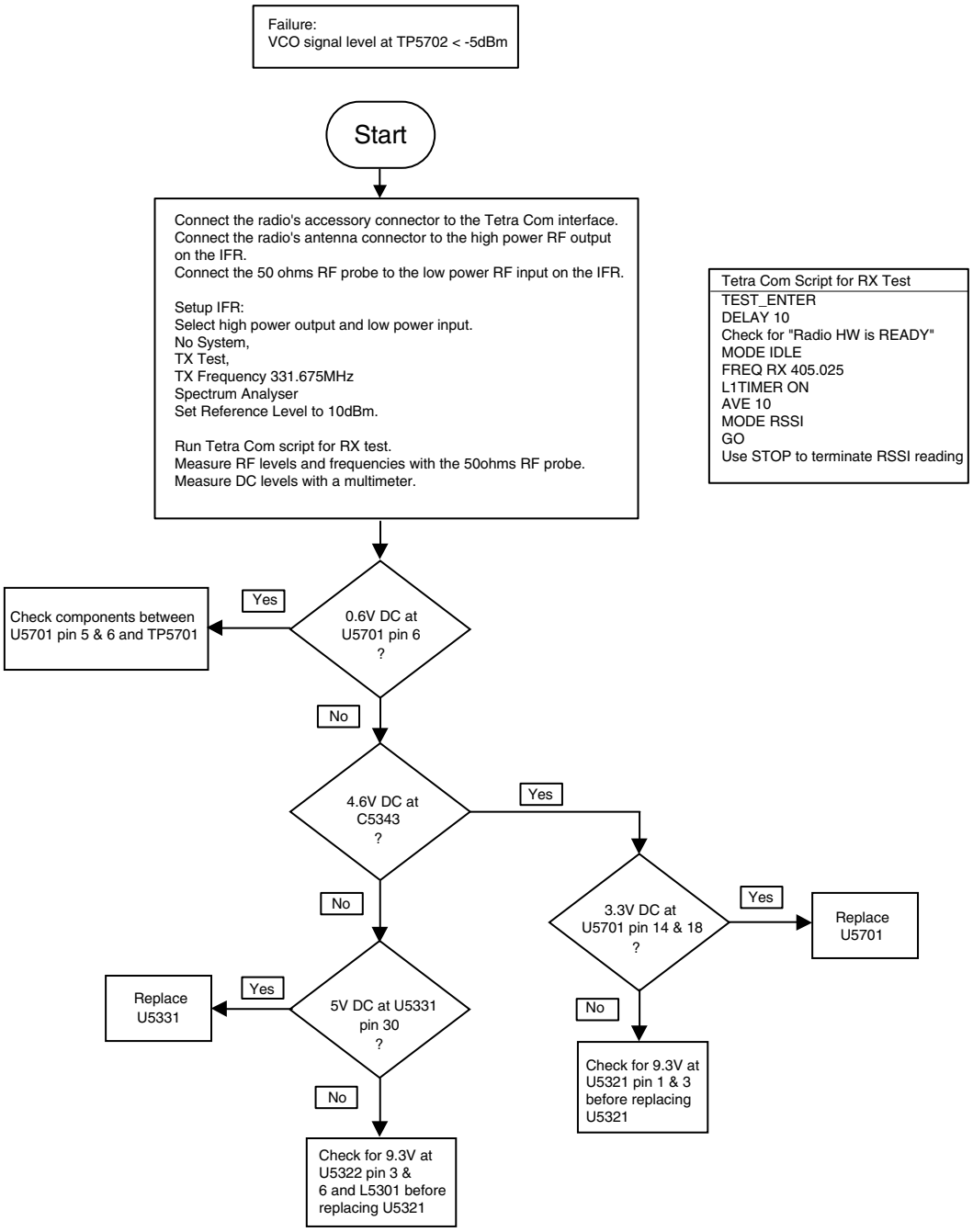
Front-End Tuning Troubleshooting



Tx Frequency Generation Troubleshooting

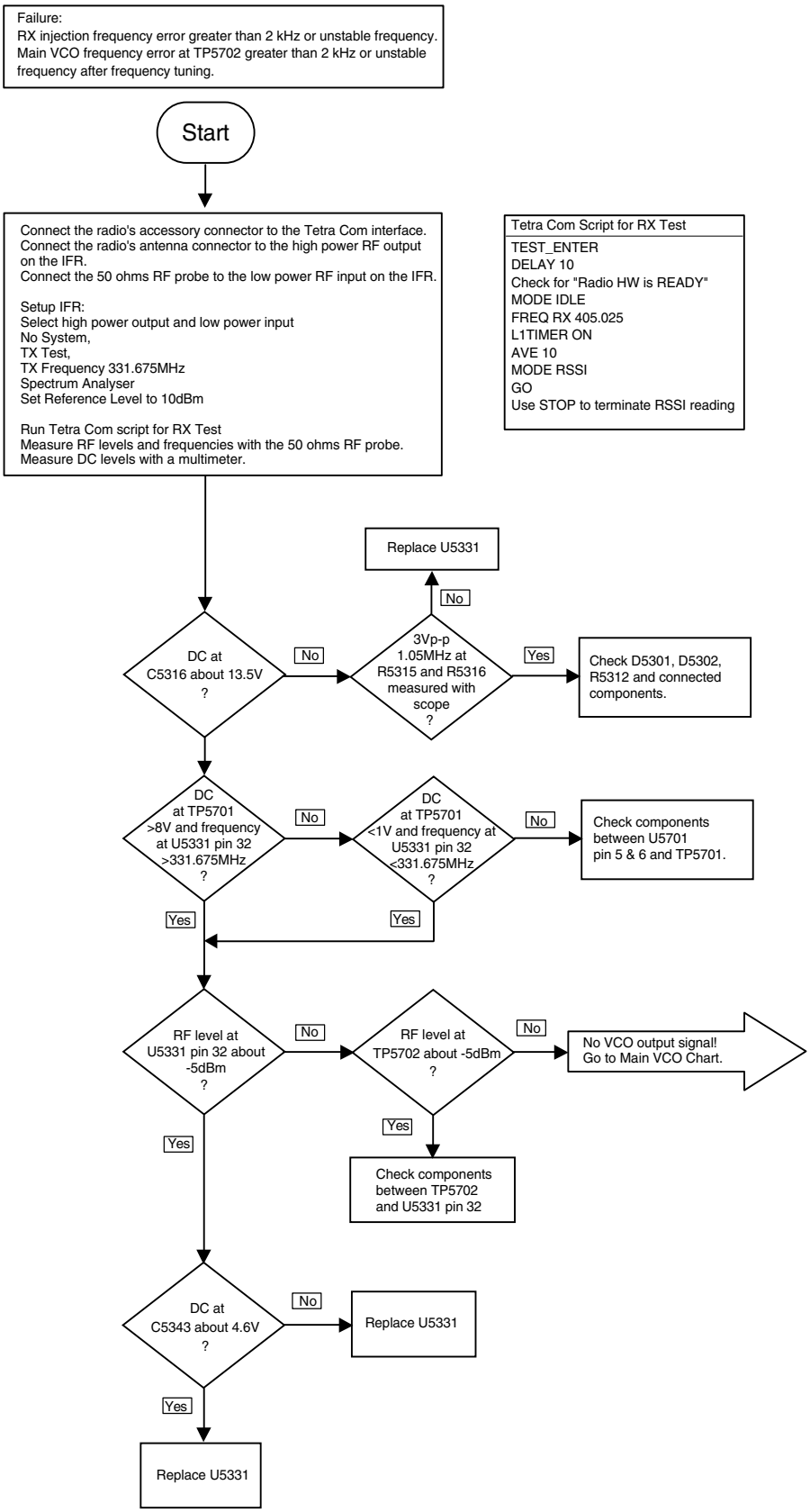


Main VCO Troubleshooting



ZWG0130966-O

Main Synthesizer Troubleshooting



ZWG0130970-O

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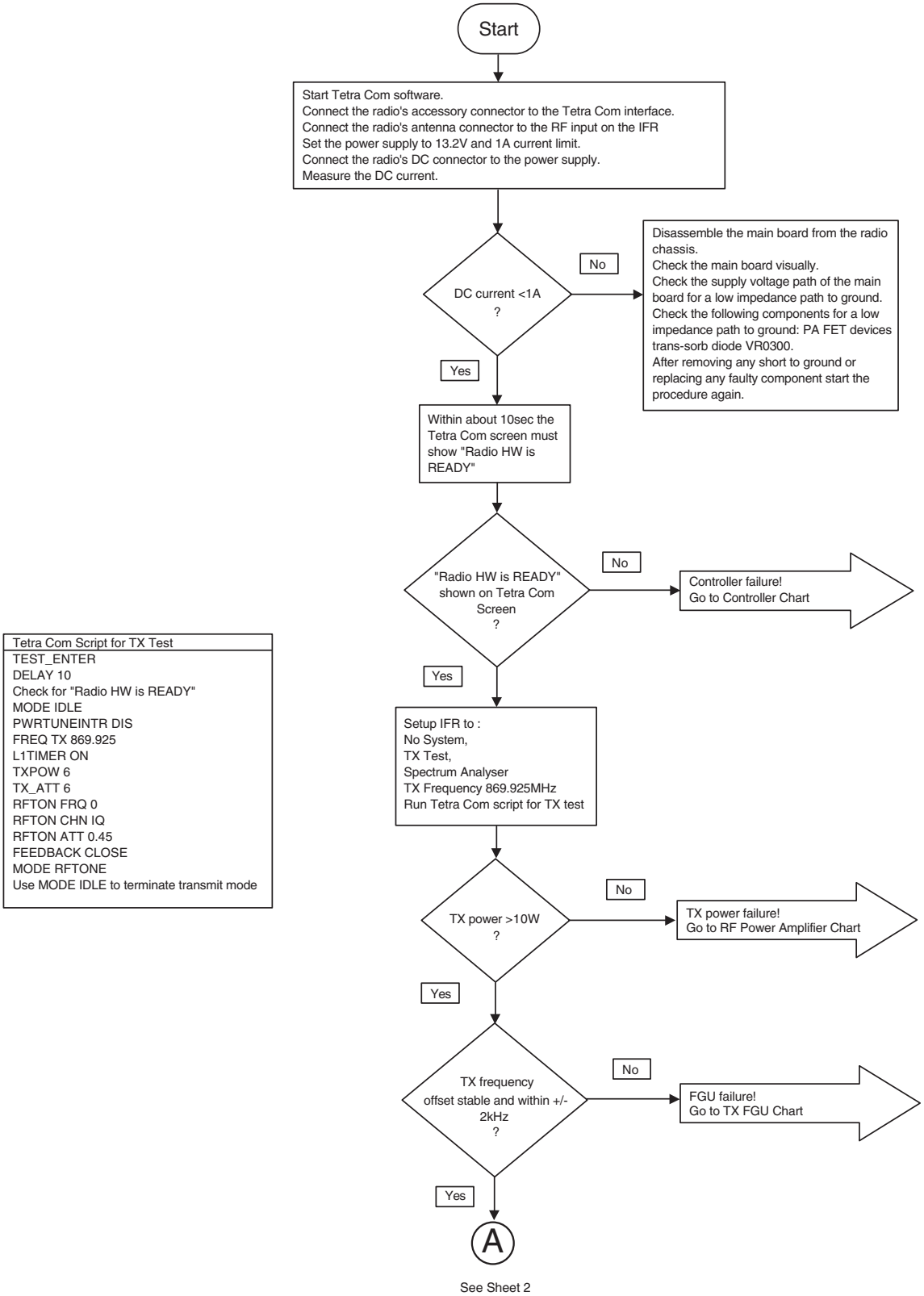
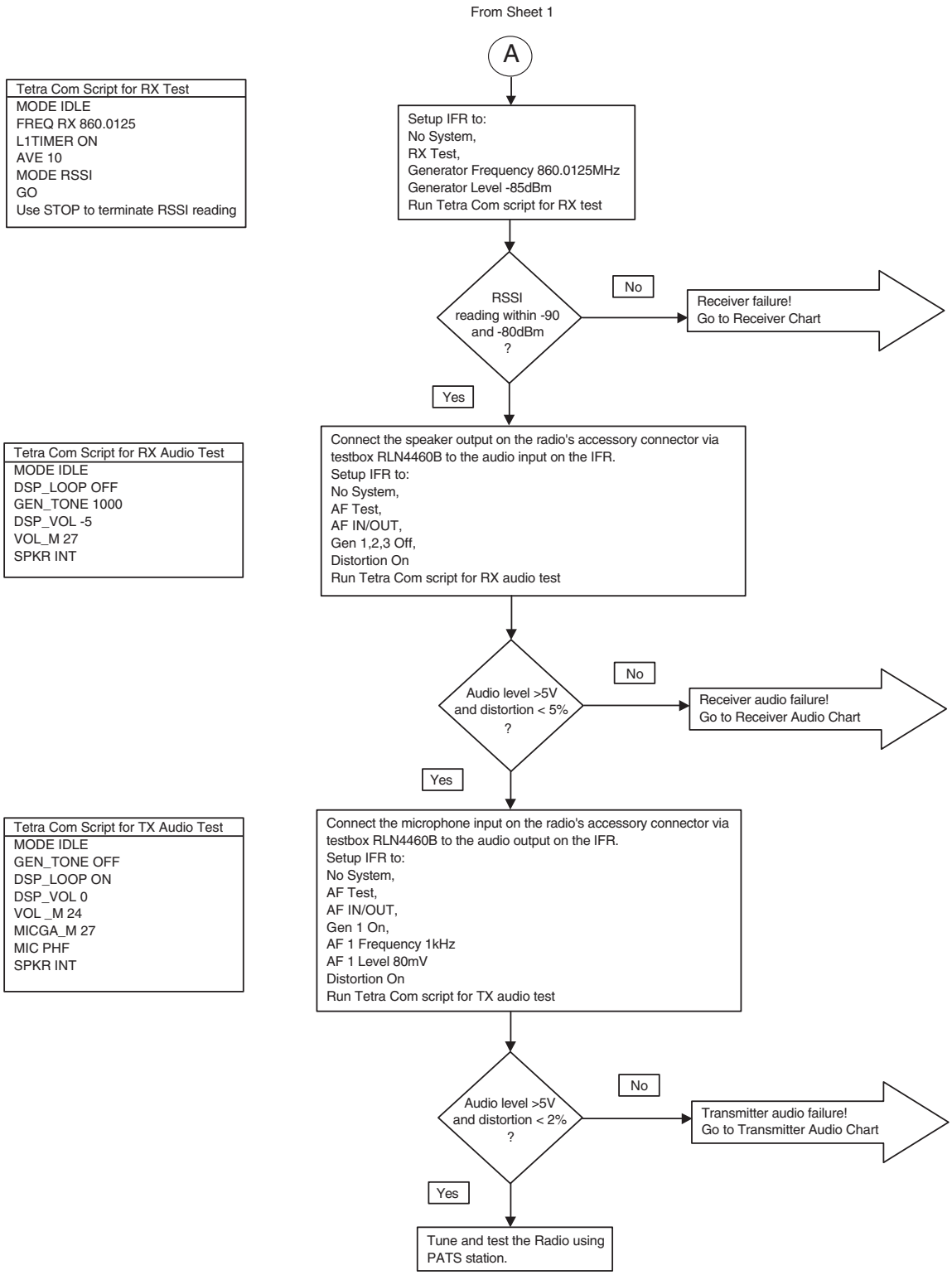
CHAPTER 9.2

TROUBLESHOOTING CHARTS (800MHz)

Main Function Test Chart (Sheet 1) >> Startup Procedure <<

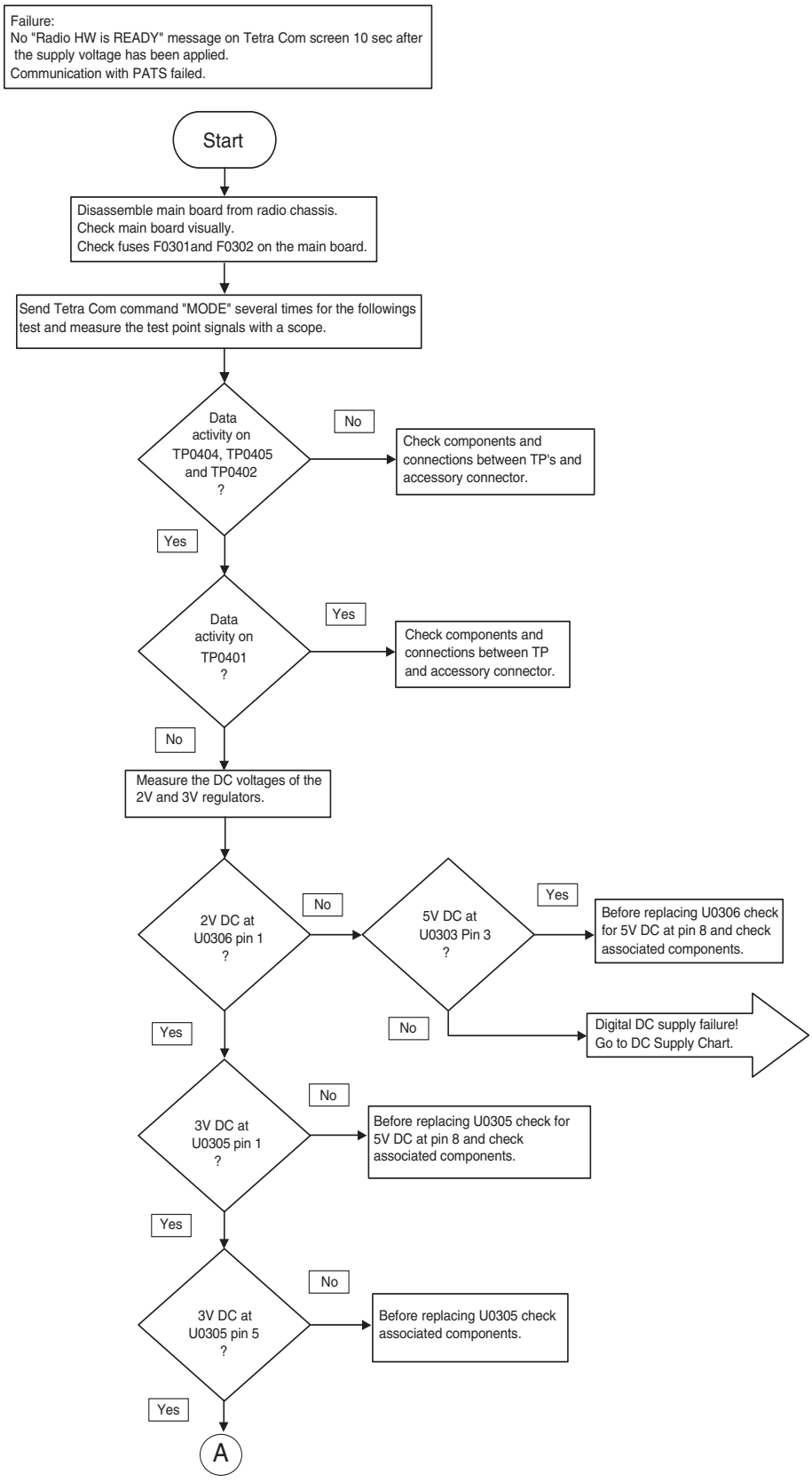


Main Function Test Chart (Sheet 2)



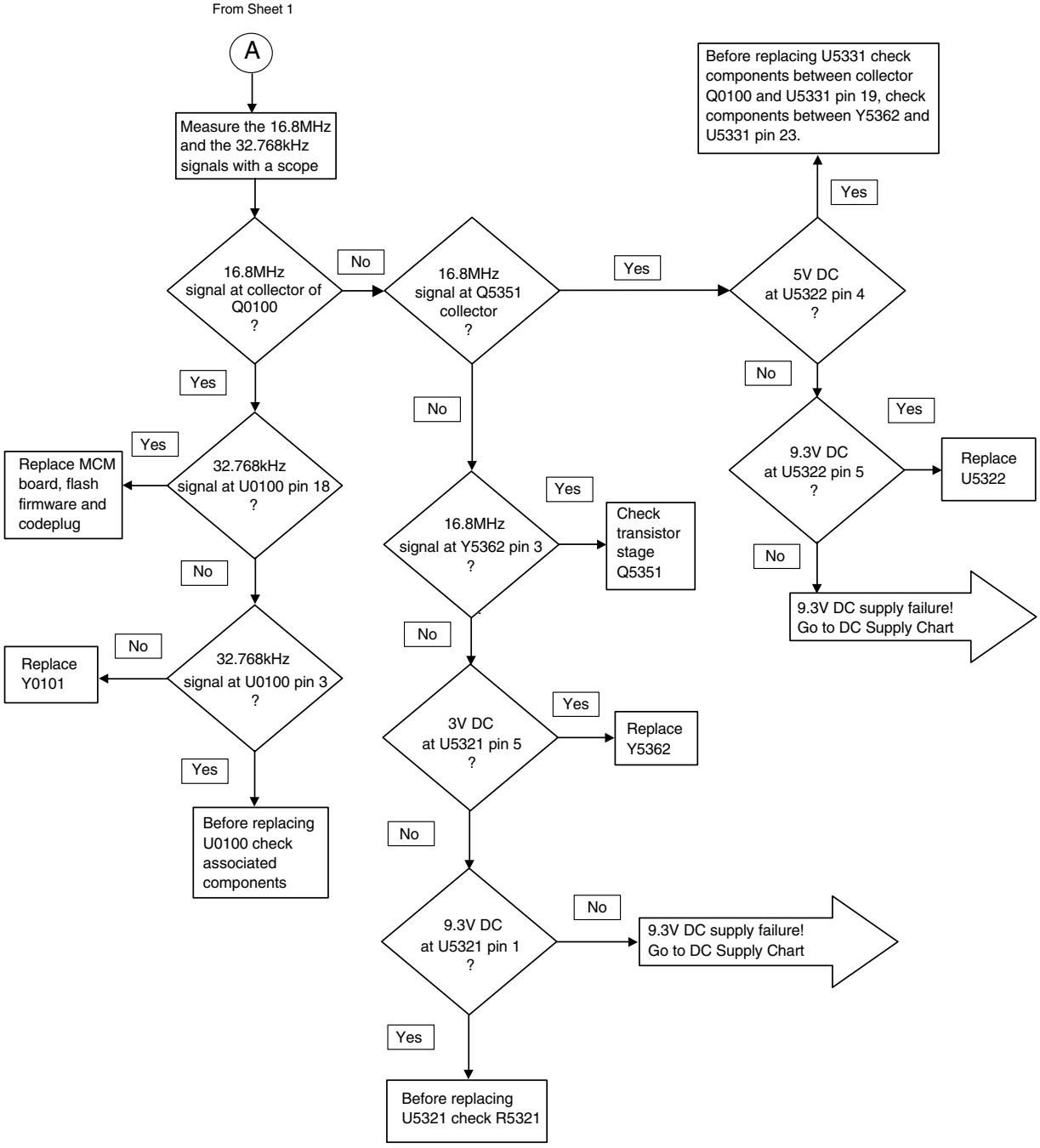
ZWG0130963-O

Controller Troubleshooting (Sheet 1)

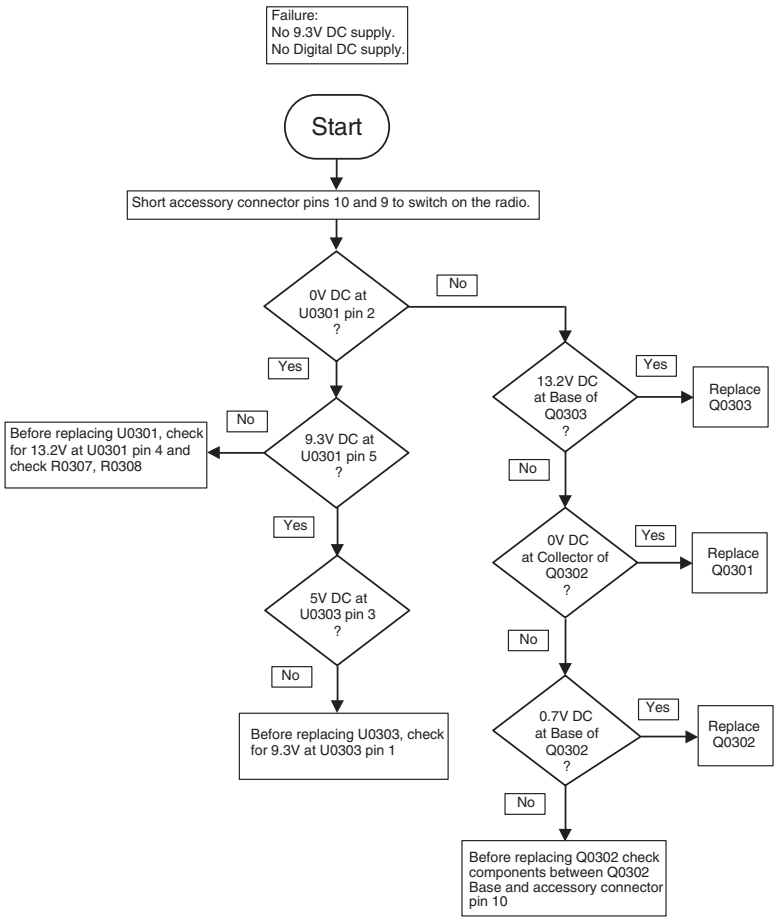


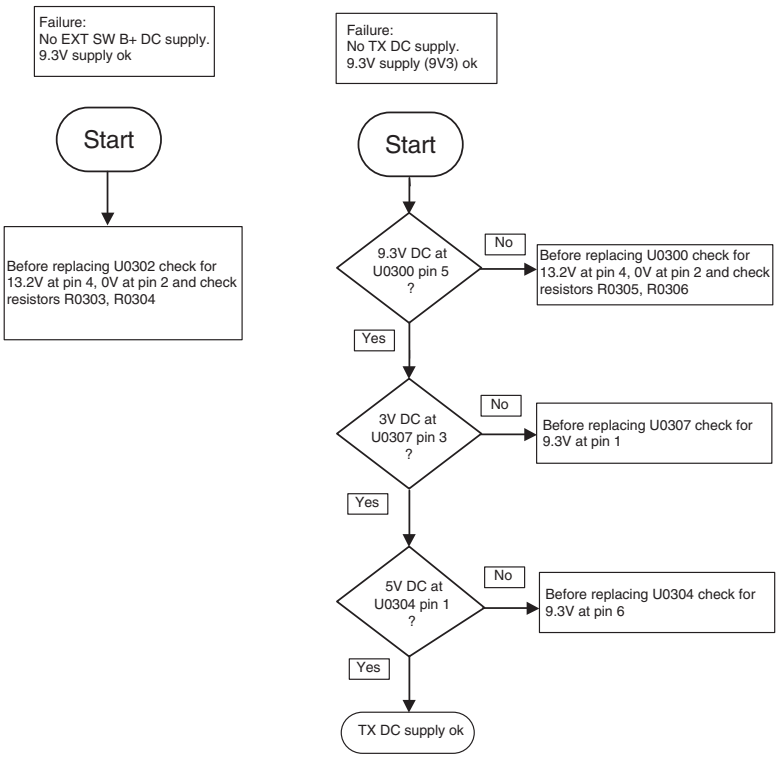
See Sheet 2

Controller Troubleshooting (Sheet 2)



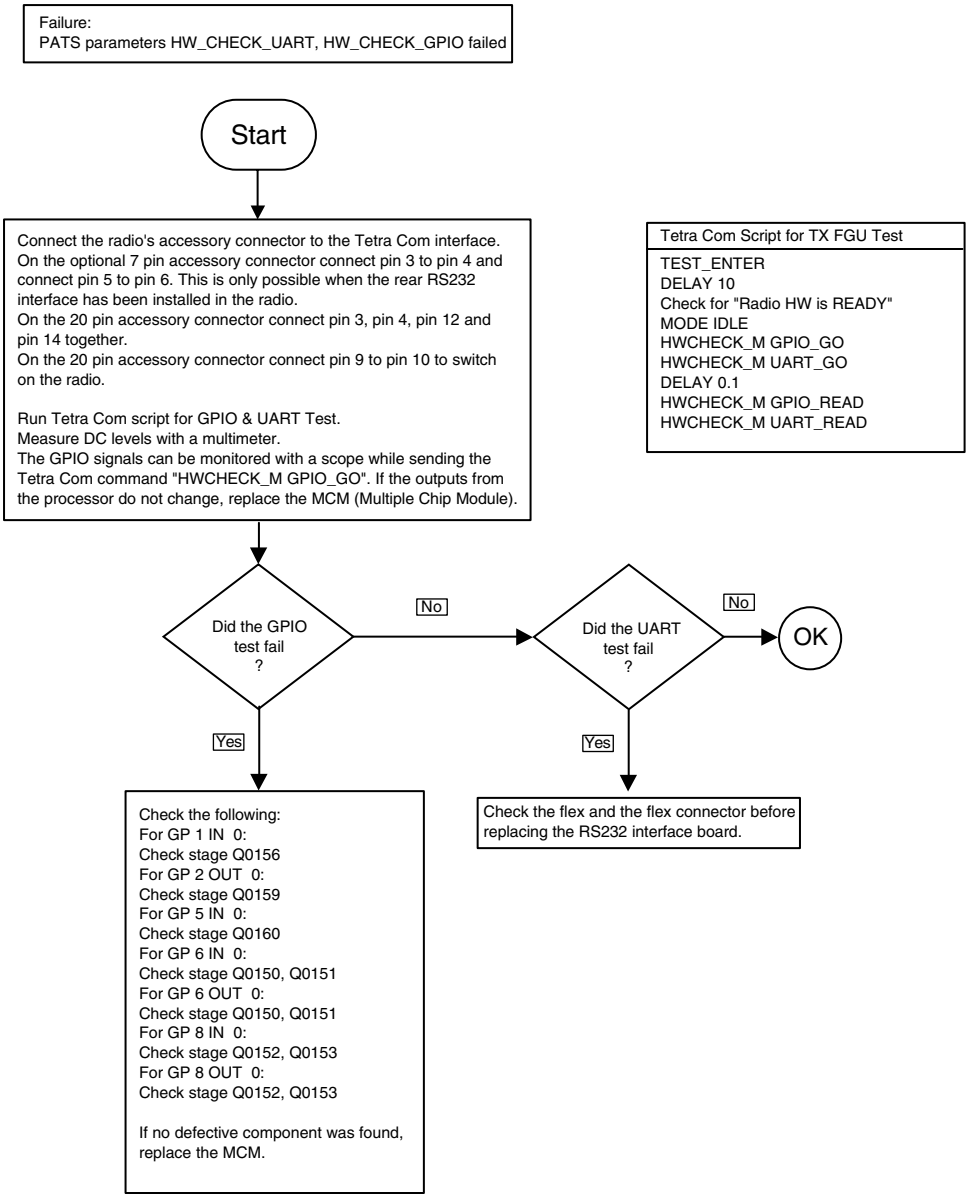
DC Supply Troubleshooting



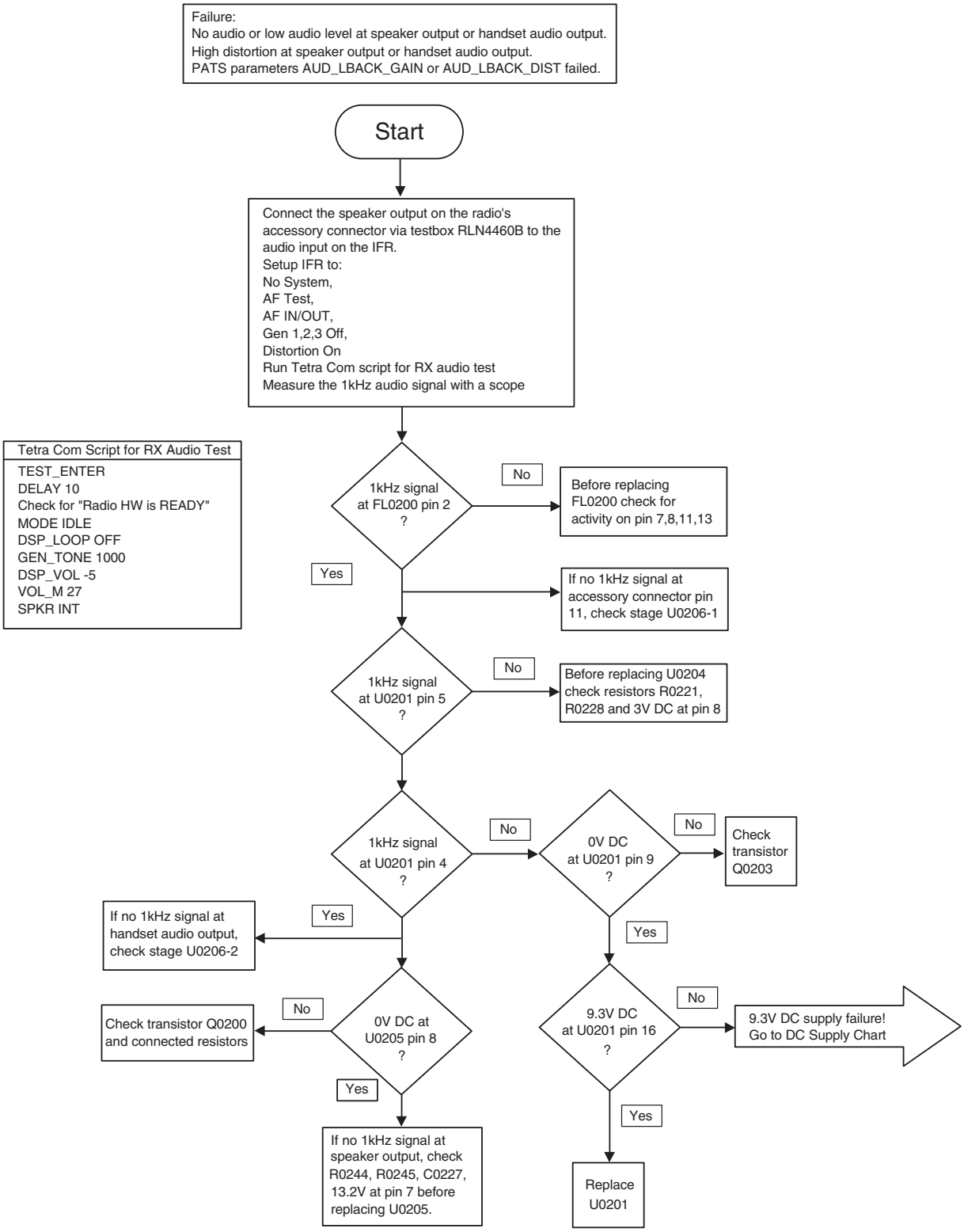


ZWG0130976-O

GPIO & RS232 Troubleshooting

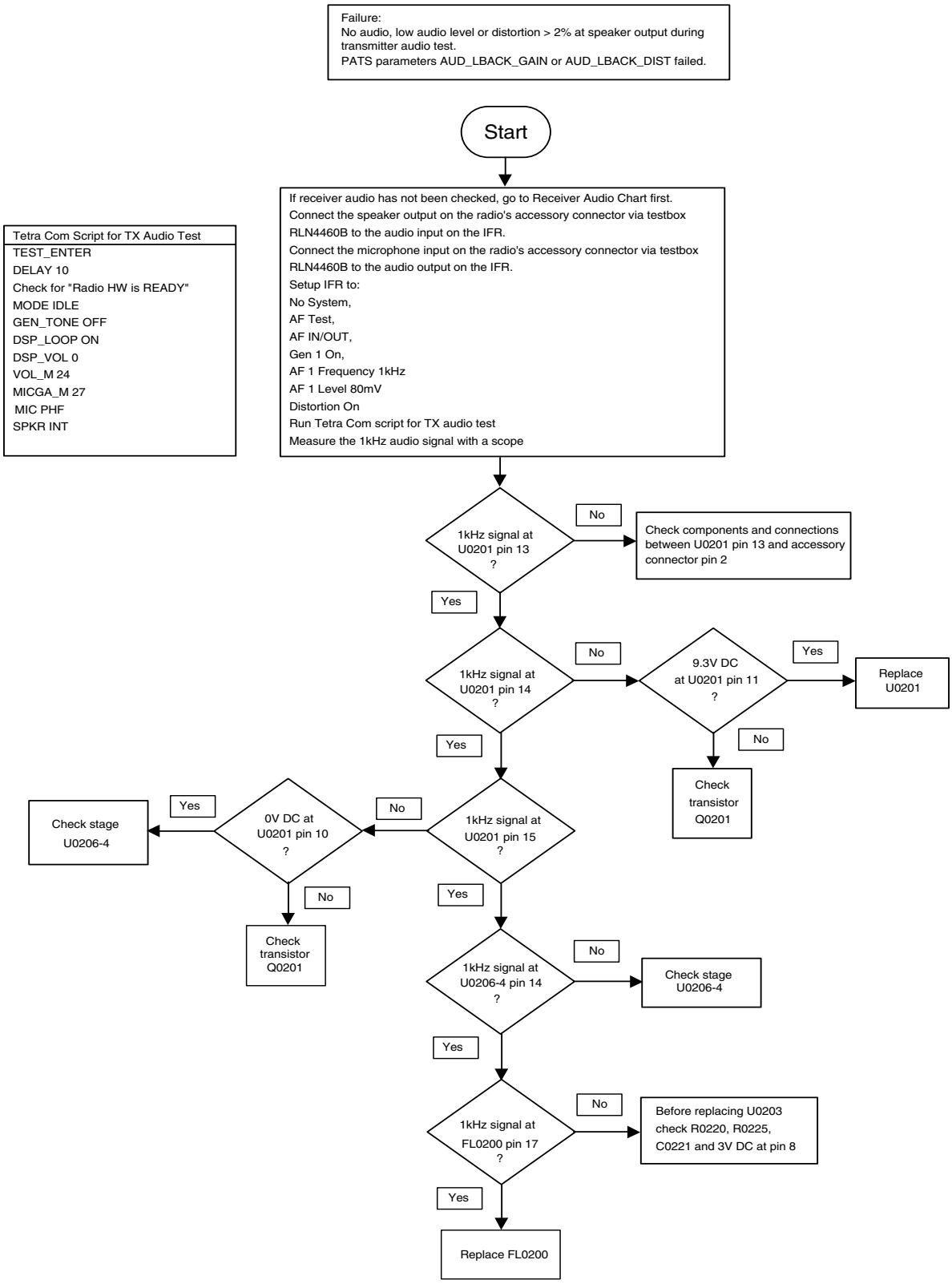


Receiver Audio Troubleshooting



ZWG0130958-O

Transmitter Audio Troubleshooting



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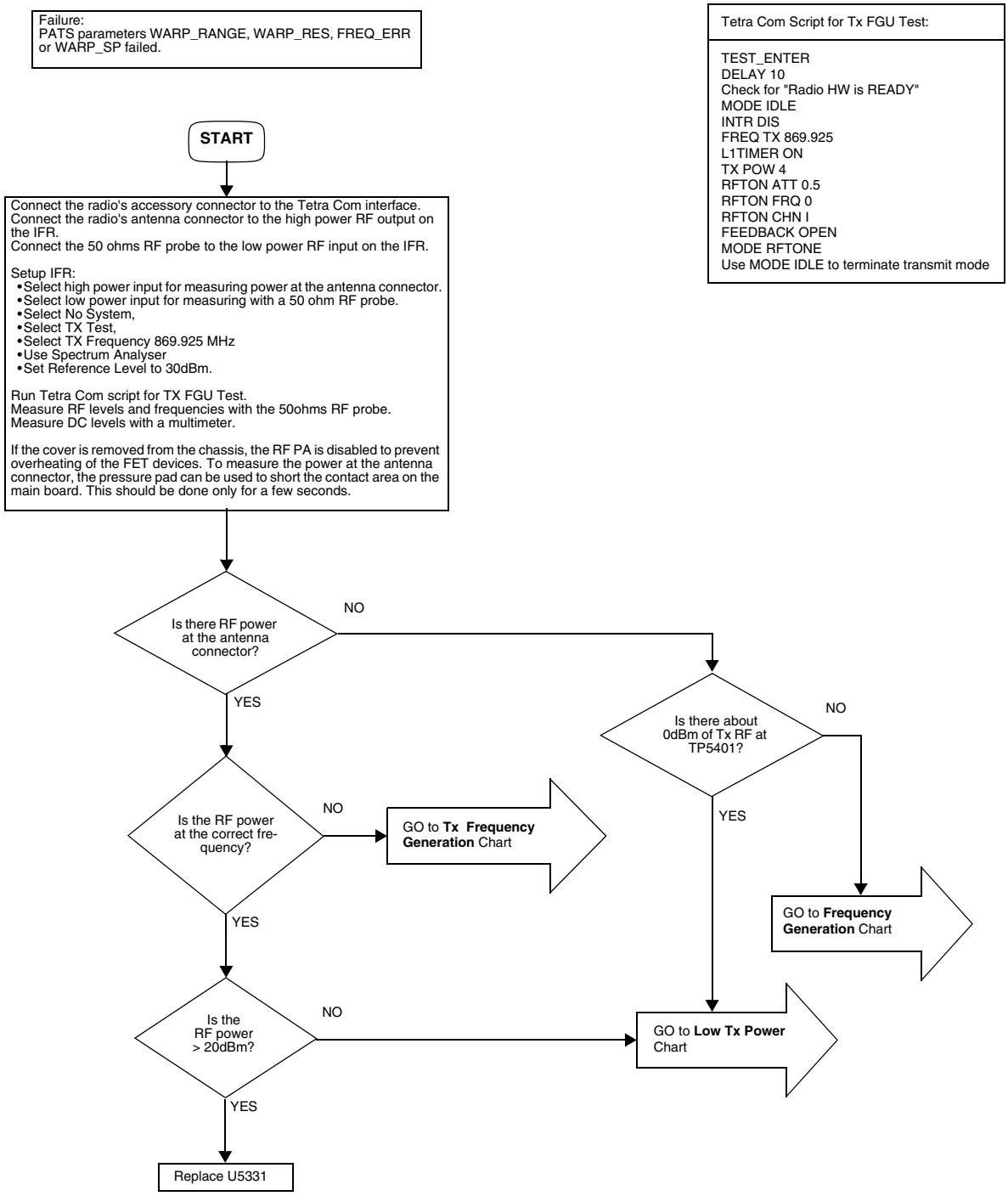
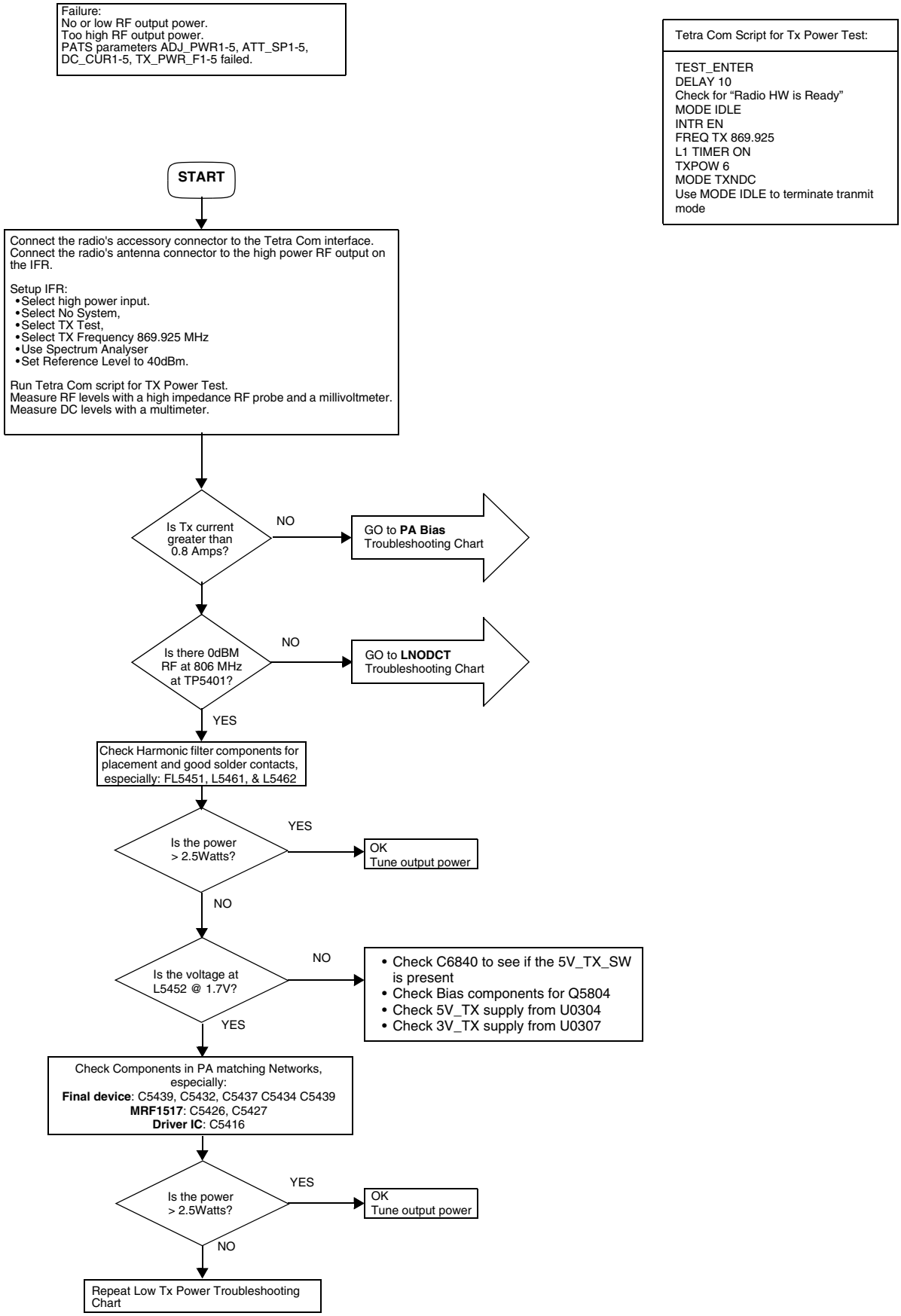
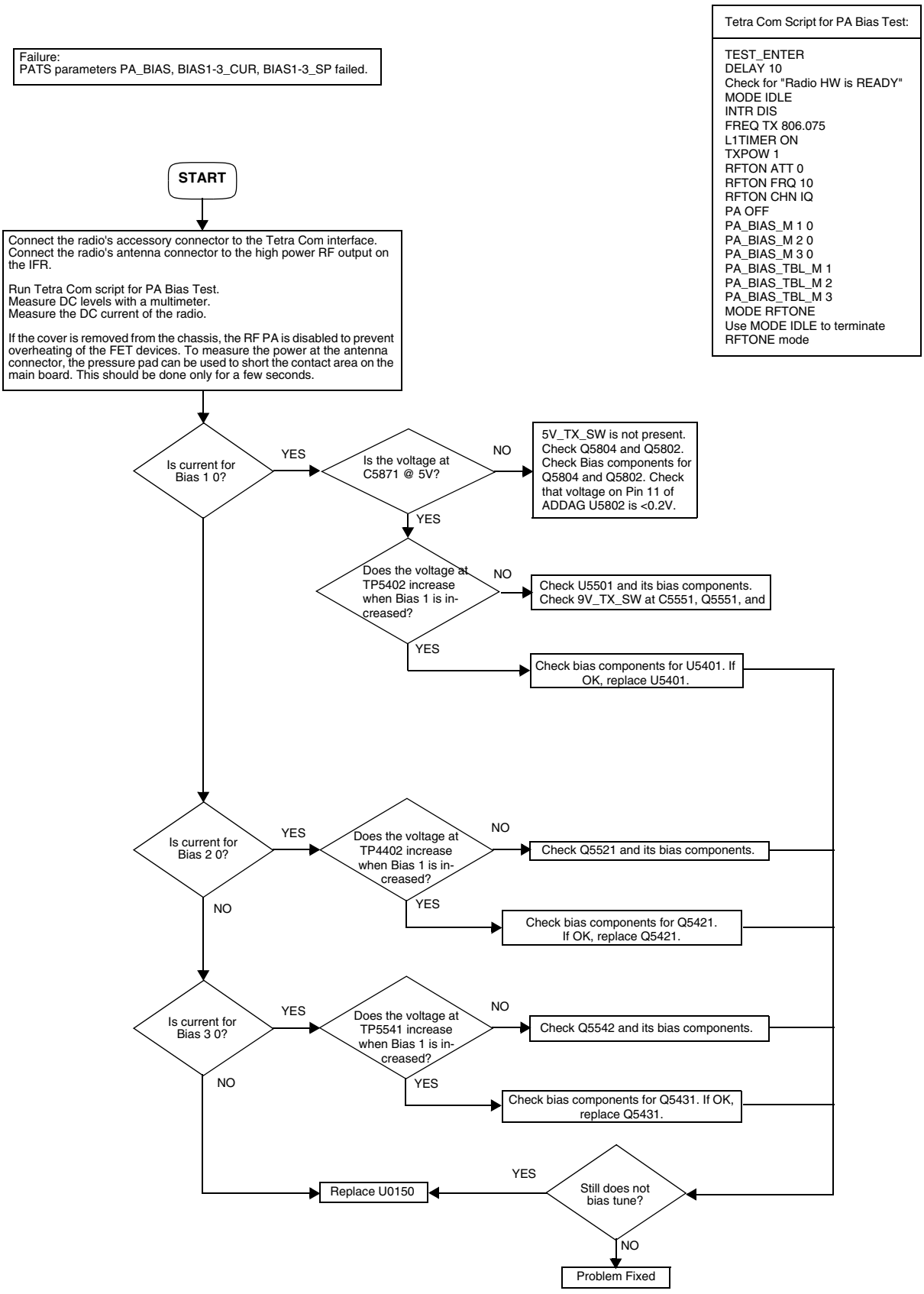
Warping Failure Troubleshooting



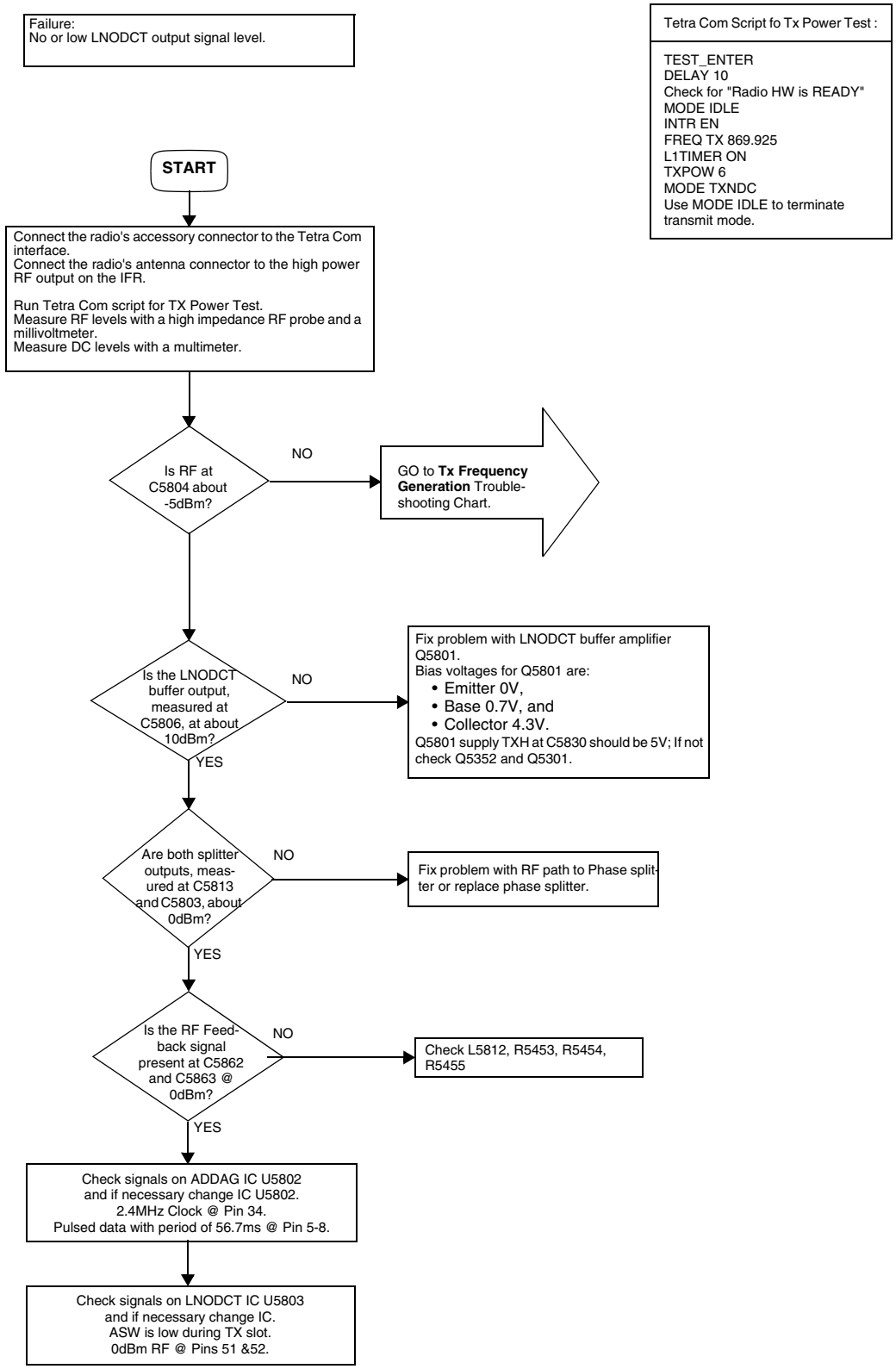
Low Tx Power Troubleshooting



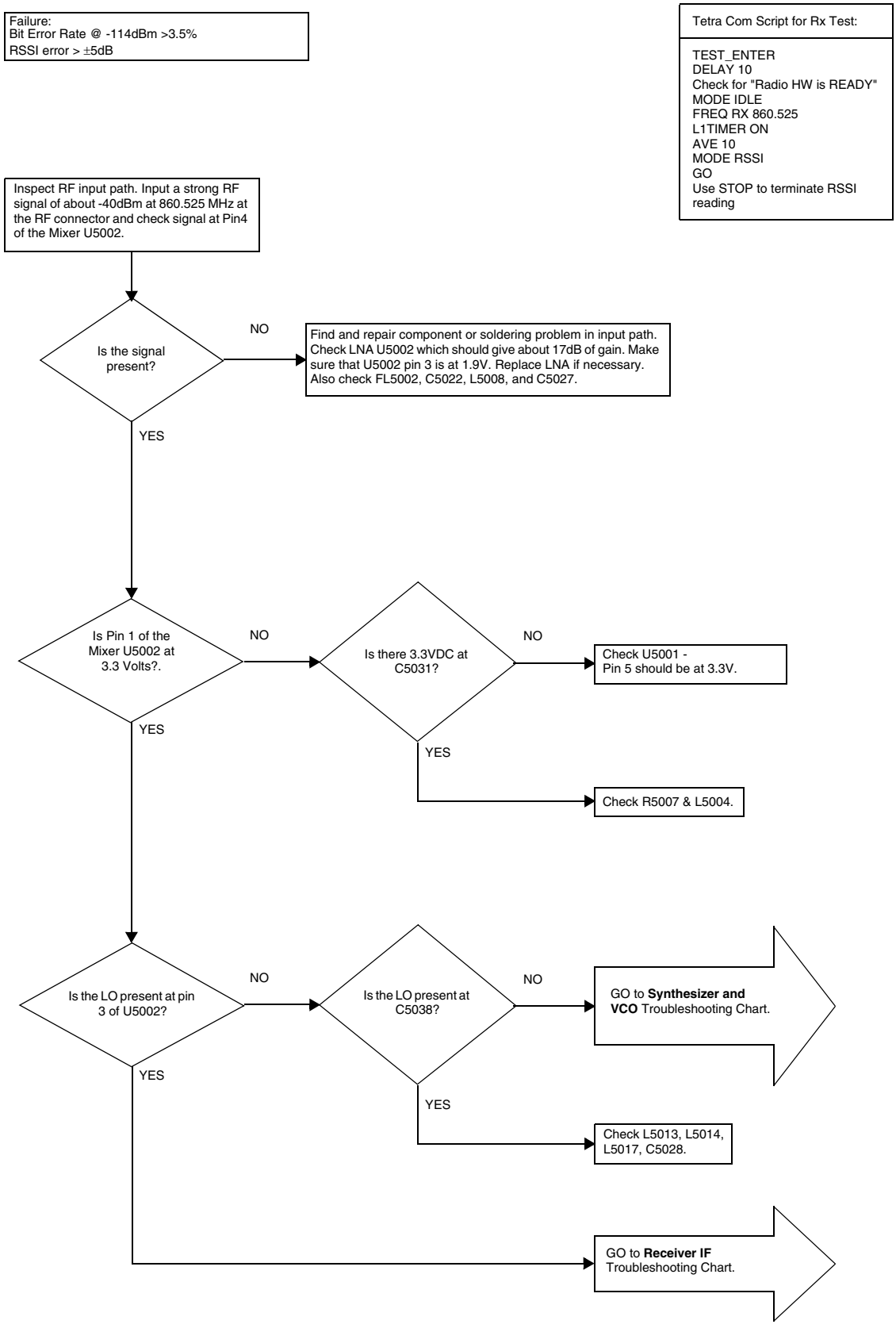
PA Bias Failure Troubleshooting



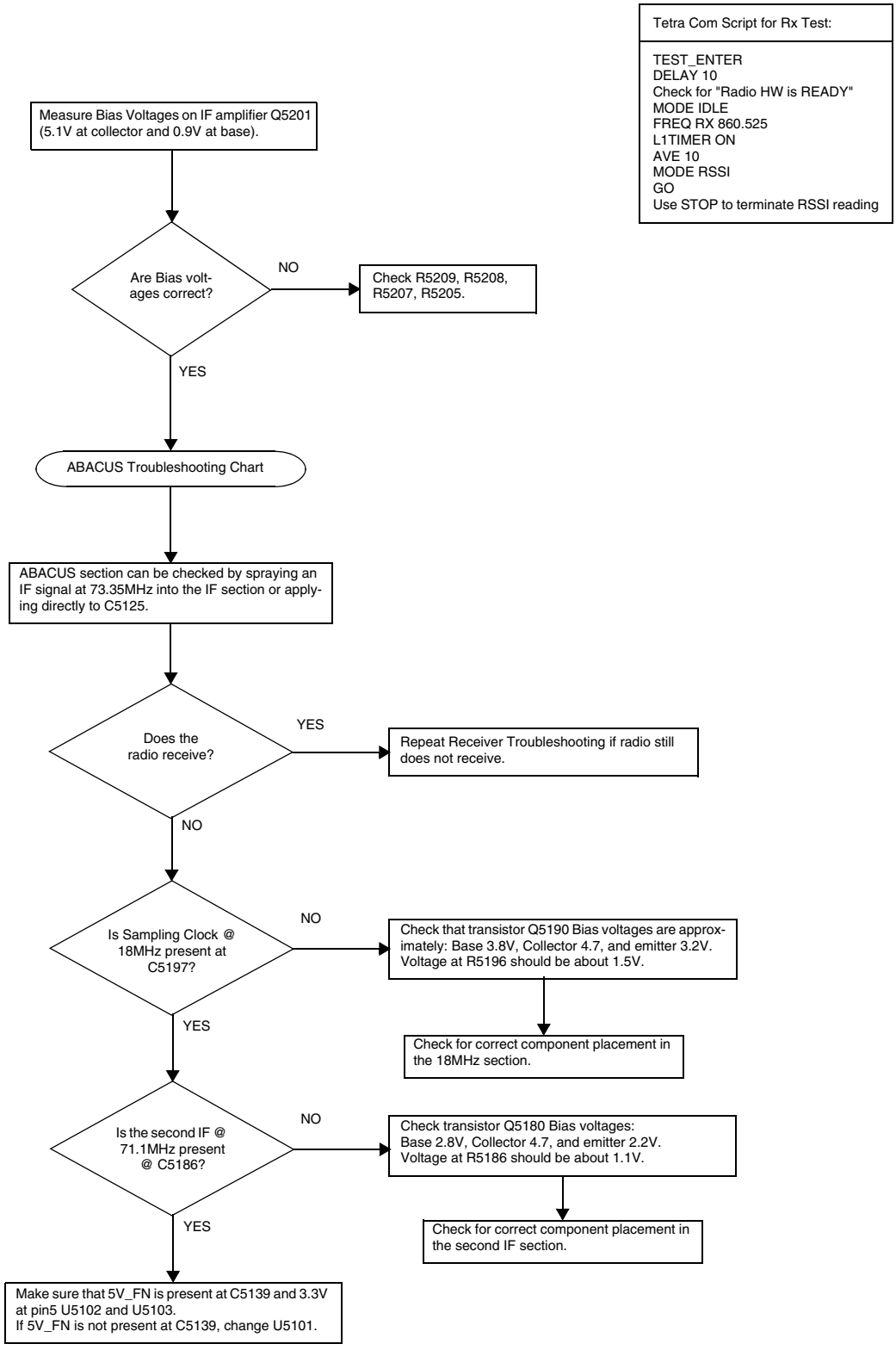
LNODCT Troubleshooting



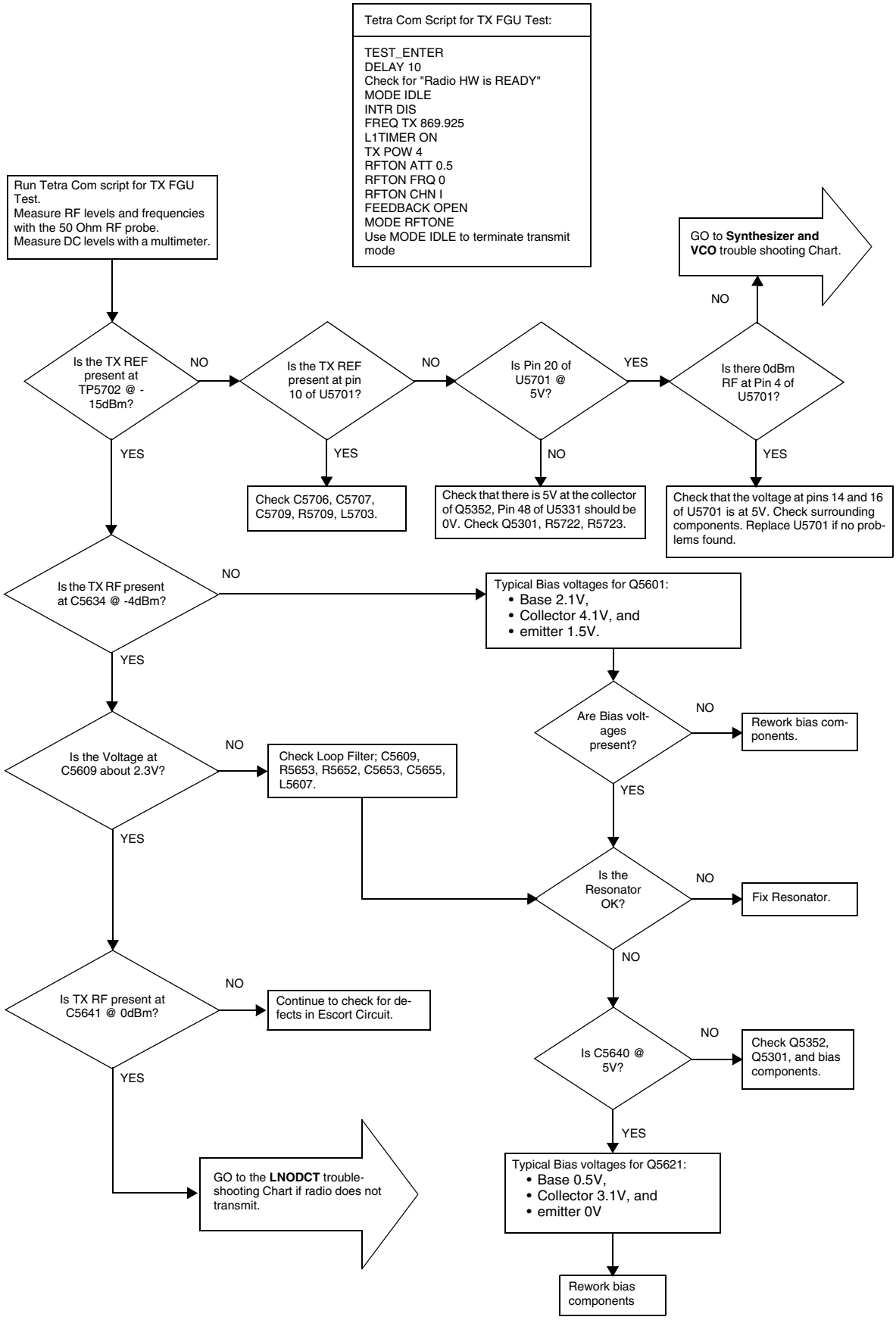
Receiver Troubleshooting (Sheet 1)



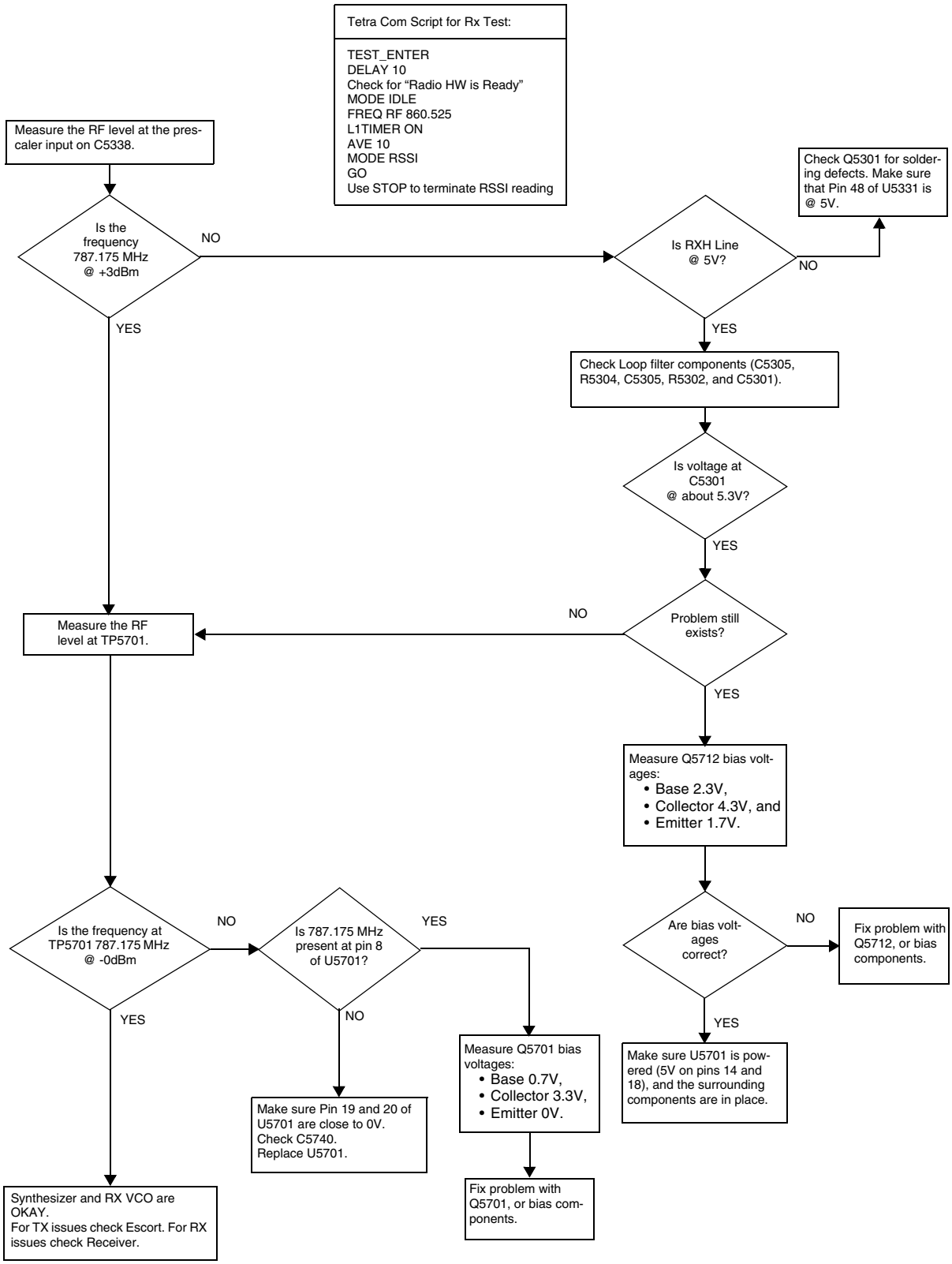
Receiver Troubleshooting (Sheet 2)



Tx Frequency Generation Troubleshooting



Synthesizer & VCO Troubleshooting



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APPENDIX A

CONNECTOR PIN FUNCTIONS

CAUTION: The connections shown are not compatible to some other models of Motorola radios. Check the appropriate accessory or technical manual for further information.

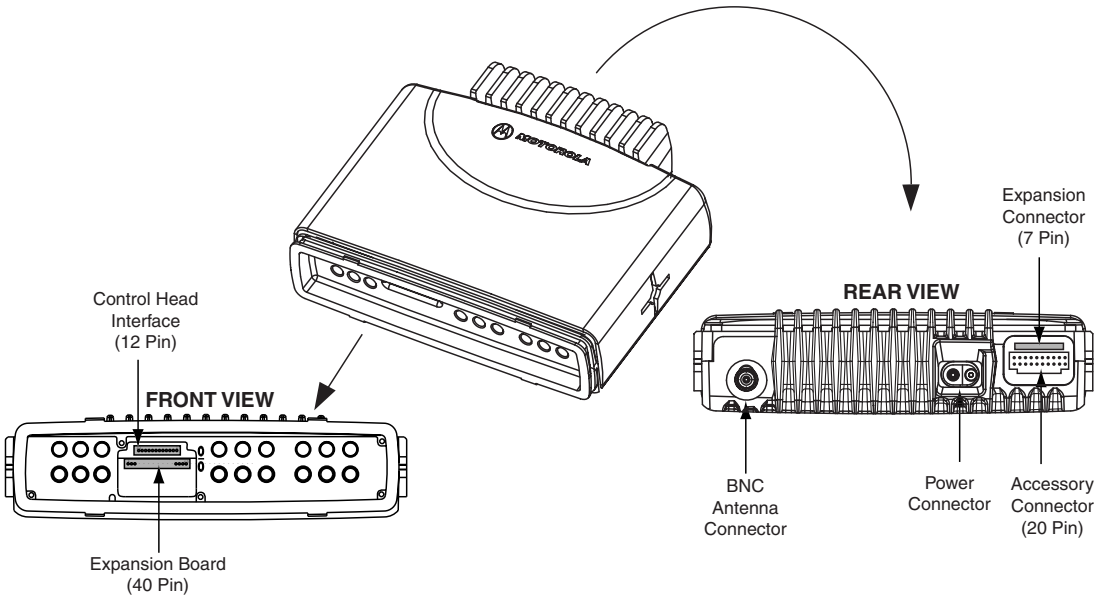

Figure 1 Schematic view of the Connectors / MTM700 Transceiver

Transceiver Rear - Pin Function

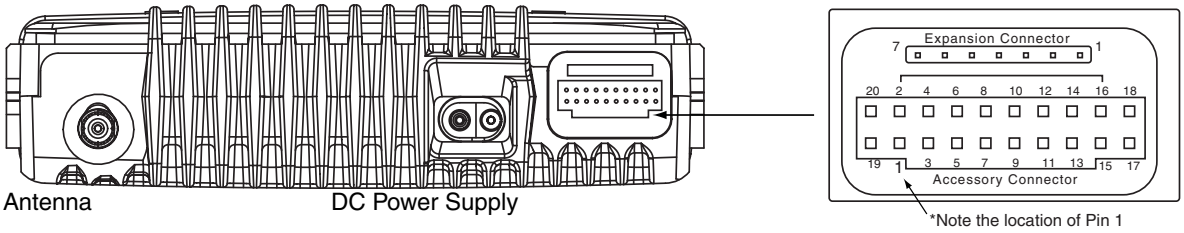

Figure 2 Rear view of the MTM700 with the Accessory and Expansion Connector

Pin	Function	Description
1	GND	Ground
2	NC	Guide pin
3	RTS	Request to Send

Table 16 Transceiver Pin Assignment of the 7 pins Expansion Connector (*Optional* RS232 Interface)

Pin	Function	Description
4	CTS	Clear To Send
5	SCI – RX	Receive Data
6	SCI – TX	Transmit Data
7	GND	Ground

Table 16 Transceiver Pin Assignment of the 7 pins Expansion Connector (*Optional* RS232 Interface)

Pin	Function	Description
1	SPEAKER -	Speaker – and Speaker + (Pin 16) are used to connect an external speaker. The audio PA is a bridge amplifier with a minimum load resistance of 3.2 ohms.
2	EXT_MIC_AUDIO	External-, Emergency-, or Hot-Microphone; depends on CPS programming. This microphone signal is independent of the microphone signal on the microphone connector. The nominal input level is 80mV_{RMS}. The DC impedance is 660Ohms. The AC impedance is 560Ohms.
3	DIG_IN1 (Ext. PTT)	This is a digital input to trigger external PTT; active low; non active high
4	DIG_OUT2 (Ext. Alarm)	This is a digital output for External Alarm / Fault Indication; active low; open collector with 4k7 Ohms pull up to B+;
5	TX_AUDIO	This input is intended for injecting signals into the transmit path. Input impedance > 10 k Ohms; input level = 775mV_{RMS}
6	KEYFAIL / Flash	This line supports the encryption module.
7	ANA_GROUND	Ground
8	DIGITAL_GROUND	Ground
9	DIG_IN_5 WITH WAKE-UP (EMERGENCY)	To activate this functionality the pin has to be connected to ground. This will turn on the radio.
10	DIG_IN_6 WITH WAKEUP (IGNITION)	Connecting this pin to the ignition line of the vehicle that will automatically turn on the radio if the ignition of the vehicle is turned on. High active;
11	RX_AUDIO	This is the received RX signal. Output impedance approximate 600 Ohms unsymmetrical, output level = 775mV_{RMS}
12	DIG_IN_OUT_1 (AUDIO_PA_ENABLE)	This is a digital input. High level or pin open enables the audio PA; Low level disables the audio PA.
13	SWB +	This voltage is available when the radio is switched on. The max. current is 1A.
14	DIG_IN_OUT_2 (HOOK)	This is a high active digital input. Low = on hook; High = off hook
15	SCI_DTR	Reserved for service aid.
16	SPEAKER +	Positive output of radio's audio PA (see Pin 1)
17	SCI_RTS	Request To Send (Reserved for service aid)
18	SCI_CTS	Clear To Send (Reserved for service aid)
19	SCI_TX	Transmit Data (Reserved for service aid)
20	SCI_RX	Receive Data (Reserved for service aid)

Table 17 Transceiver Pin Assignment of the Rear Accessory Connector

Transceiver Front - Pin Function

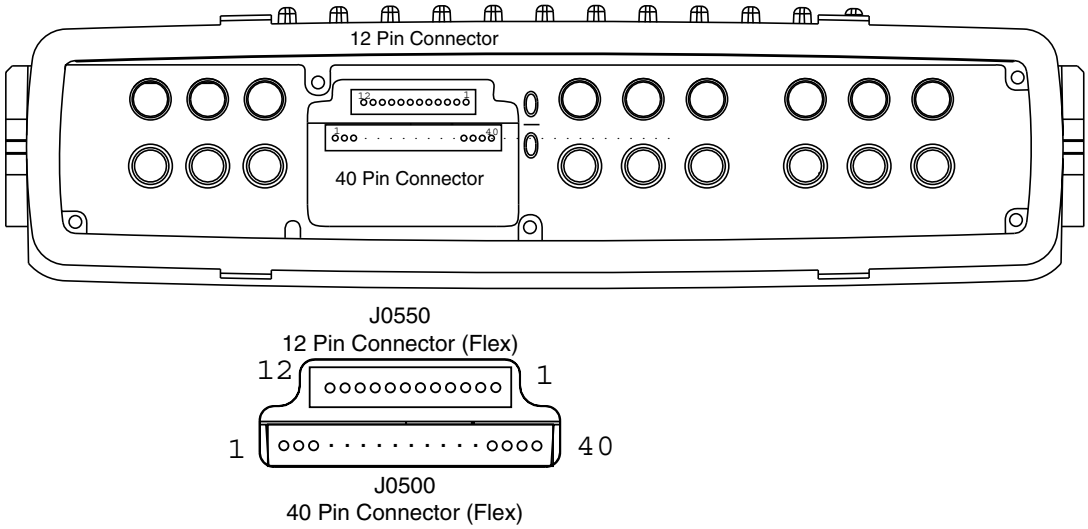

Figure 3 Transceiver Front View to the Standard Control Head Interface (12pins) and Expansion Head Connector (40pins)

Pin	Function	Description
1	SCI_TX	Serial Communication Interface TXD
2	SPEAKER +	Analogue Speaker output +
3	Speaker -	Analogue Speaker output -
4	GND	Ground
5	DIG_IN1 (Ext. PTT)	This is a digital input to trigger external PTT; active low; non active high
6	5VD	+ 5V regulated
7	Handset_audio	Handset audio
8	BUS +	Either SBEP or Serial Communication Interface RXD
9	Int_Mic	Microphone input
10	Flt_A+	Filtered A+
11	On_Off_Control_SV	Radio On/Off Control shared with Control Head request
12	GND	Ground

Table 18 Transceiver Pin Assignment of the Standard Control Head Interface (12 pins)

Pin	Function	Description
1	GND	Ground
2	MUX_CTRL	TBA for future applications.
3	SPIB_CLK	Part of the QSPIB
4	MUX_CTRL_1	To detect RS232 or SB9600 Mode (3V SB9600 / 0V RS232) *
5	A+ (via 22Ohms)	Continuous battery voltage for sense via 22Ohms.
6	RESET_OUT	Reset; its a output to Reset a SB9600 device.*
7	BUSY_OUT	Busy Out for SB9600 Interface Circuit *
8	BUSY_IN	Busy In for SB9600 Interface Circuit *
9	3V3_DIG	3.3V Sense Output (max. 10mA)
10	EXP_REQ	Request Line from 4Wire/SB9600 UART *
11	SPIB_CS1_UART	Part of the QSPIB (ship select) for 4wire RS232 UART
12	SPIB_CS_BT	Part of the QSPIB (ship select) for future applications
13	SPIB_MISO	Part of the QSPIB
14	NC	Not Connected
15	SPIB_MOSI	Part of the QSPIB
16	NC	Not Connected
17	SAP_CLK	Serial Audio Protocol, Clock.
18	GND	Ground
19	INT_MIC	Microphone Input
20	MIC	Microphone Audio; for future applications
21	EXPANSION_PTT	Expansion PTT
22	Blue_T_FSYNC	Serial Audio Protocol, Frame Sync.
23	SAP_SRD	Serial Audio Protocol, Receive Data
24	SAP_STD	Serial Audio Protocol, Transmit Data
25	DGAN_SAP_FSYNC	Serial Audio Protocol, Frame Sync.
26	SP_AUDIO	Audio PA Input; for future applications
27	Radio ON/OFF (IGNITION)	High active.
28	EXT_MUTE	External mute of audio PA; for future applications
29	RS232_DCD	Data Carrier Detect
30	RS232_TX	TX-Data
31	RS232_DSR	Data Set Ready

Table 19 Transceiver Pin Assignment of the Expansion Board Connector (40 pins)

*) For Expansion Head Connection only.

32	RS232_RTS	Request To Send
33	RS232_DTR	Data Terminal Ready
34	RS232_CTS	Clear To Send
35	RS232_RX	RX-Data
36	RS232_RI	Ring Indicator
37	OPTION_DET	Option Detect; for future applications
38	9V3	Regulated 9V3
39	NC	Not Connected
40	Handset Audio	Handset Audio to earpiece

Table 19 Transceiver Pin Assignment of the Expansion Board Connector (40 pins)

*) For Expansion Head Connection only.

Standard Control Head - Pin Function

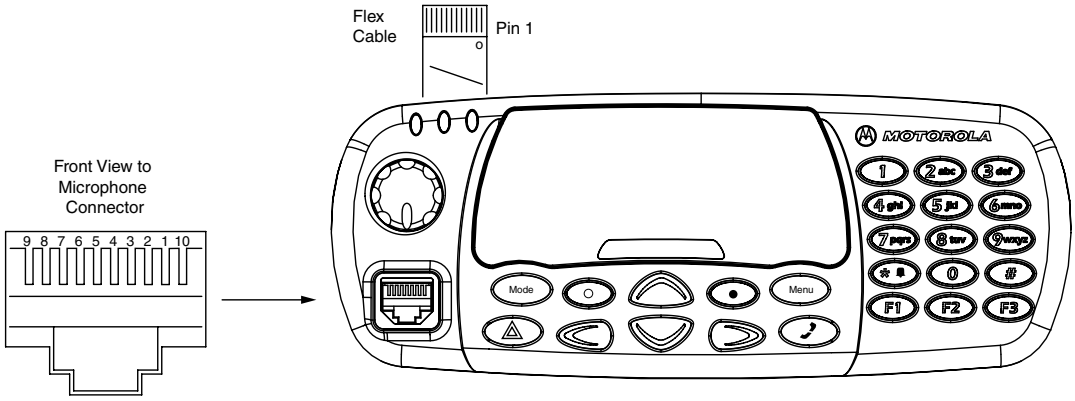

Figure 4 View of the Standard Control Head's Microphone Connector and Flex Cable

Pin	Function	Description
1	SCI_TX	Serial Communication Interface TXD
2	SPEAKER +	Analogue Speaker output +
3	Speaker -	Analogue Speaker output -
4	GND	Ground
5	ExP_BD_PTT	Expansion Head PTT
6	5VD	+ 5V regulated

Table 20 Pin Assignment of the Standard Control Head Interface Flex Cable (12 pins)

7	Handset_audio	Handset audio
8	BUS +	Either SBEP or Serial Communication Interface RXD
9	Int_Mic	Microphone input
10	Flt_A+	Filtered A+
11	On_Off_Control_SV	Radio On/Off Control shared with Control Head request
12	GND	Ground

Table 20 Pin Assignment of the Standard Control Head Interface Flex Cable (12 pins)

Pin	Function	Description
1	FLT A+	Filtered A+
2	5V	+ 5V regulated
3	Hook	Microphone off-hook signal
4	Ground	Ground
5	Mic. High	Microphone analogue audio input
6	PTT / IR decoder	PTT or IR-Decoder PTT
7	BUS +	SBEP bus
8	Handset audio	Handset audio
9	Analogue input 3	Keypad Mic. Control
10	Analogue input 2	Keypad Mic. Control

Table 21 Pin Assignment of the Microphone Connector of the Standard Control Head

Remote Mount Head - Pin Function

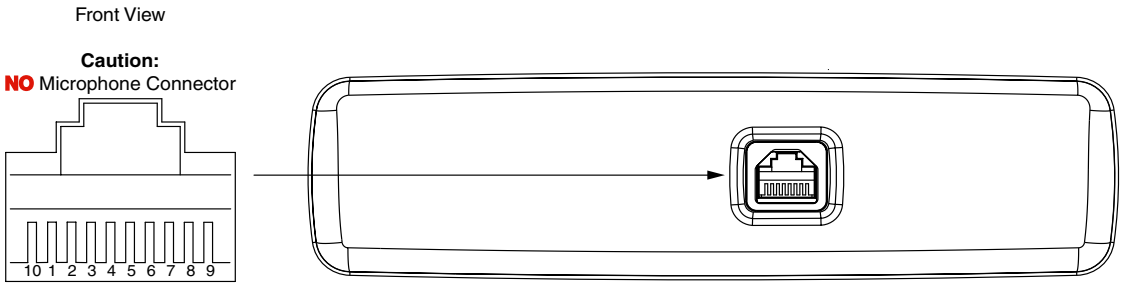

Figure 5 View of the Remote Mount Connector

Pin	Function	Description
1	FLT_A+	Filtered A+
2	5V	+ 5V regulated / 100mA
3	ON_OFF_CONTROL	Radio On/Off Control
4	GROUND	Ground
5	SPEAKER -	Analogue Speaker output +;Speaker impedance has to be > 20 Ohm
6	INT_MIC	Microphone analogue input of 80mVRMS, 600 Ohm impedance, 9V=
7	BUS +	SBEP Bus
8	SPEAKER +	Analogue Speaker output +;Speaker impedance has to be > 20 Ohm
9	HANDSET_AUDIO	Handset audio to earpiece impedance has to be > 200 Ohm
10	GROUND	Ground

Table 22 Pin Assignment of the 10 Pin TELCO-Connector of the Remote Mount Head

Expansion Head - Pin Function

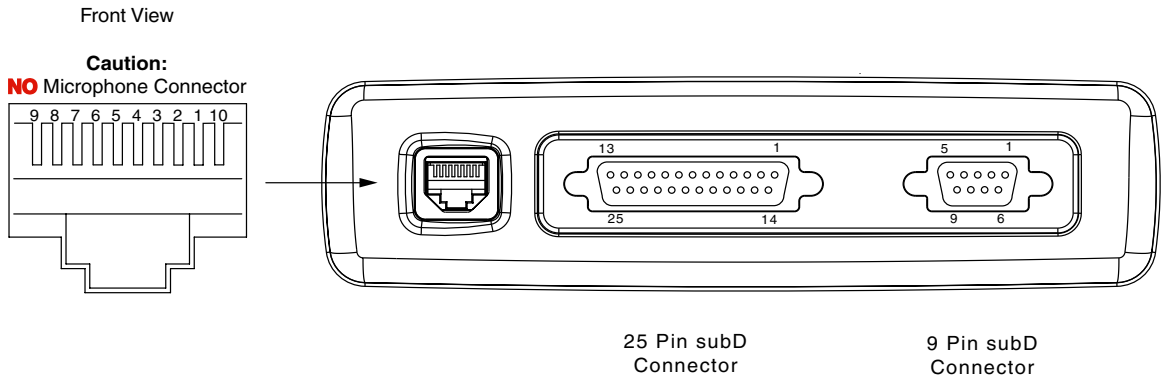

Figure 6 View of the Expansion Head Connectors

Pin	Function	Description
1	FLT_A+	Filtered A+
2	5V	+ 5V regulated / 100mA
3	ON_OFF_CONTROL	Radio On/Off Control
4	GROUND	Ground
5	SPEAKER -	Analogue Speaker output +;Speaker impedance has to be > 20Ohms
6	INT_MIC	Microphone analogue input of 80mVRMS,600 Ohm impedance,9V=
7	BUS +	SBEP Bus
8	SPEAKER +	Analogue Speaker output +;Speaker impedance has to be > 20 Ohms
9	HANDSET_AUDIO	Handset audio to earpiece impedance has to be > 200 Ohms
10	EXPANSION_PTT	Expansion PTT, works together with INT_MIC

Table 23 Pin Assignment of the 10 Pin TELCO Connector of the Expansion Head

Pin	Function	Description	PC direction
1	DCD	Data Carrier Detect	Input
2	RXD	Received Data	Serial IN
3	TXD	Transmitted Data	Serial OUT
4	DTR	Data Terminal Ready	Output
5	GND	Ground	Output

Table 24 Pin Assignment of 9 Pin subD Connector of the Expansion Head

6	DSR	Data Set Ready	Input
7	RTS	Request to Send	Output
8	CTS	Clear to Send	Input
9	RI	Ring Indicator	Input

Table 24 Pin Assignment of 9 Pin subD Connector of the Expansion Head

Pin	Function	Description
1	GND	Ground
2	RS232_SCI_TX	Transceiver data (RS232 line with RS232 level)
3	RS232_SCI_RX	Receive data (RS232 line with RS232 level)
4	RS232_RTS	Request to Send (RS232 line with RS232 level)
5	RS232_CTS	Clear to Send (RS232 line with RS232 level)
6	FLT_A+	Filtered unswitched UB+ / 200mA
7	Signal_GND	Ground for RS232
8	SB9600_BUSY	SB9600 busy
9	NC	Not Connected
10	NC	Not Connected
11	NC	Not Connected
12	SW_B+	Switched UB+ / 100mA
13	SB9600_BUS-	SB9600 BUS-
14	ON_OFF_CONTROL / FLASH_MODE	-Switch into flash mode (connect pin14 with 6) -On/Off control for Std. Control Head
15	SB9600_BUS+	SB9600 BUS+
16	INT_MIC	Microphone analogue input of 80mVRMS, 600ohm impedance, 9V=
17	SB9600_RESET	Reset; its a output to reset a SB9600 device
18	NC	Not Connected
19	GROUND	Ground
20	IGNITION	Connecting this pin to the ignition line of the vehicle that will automatically turn on the radio if ignition of the vehicle is turned on. High active;
21	ON_OFF_GND	On/Off control for Control Head "J"(MTM300 C/H)
22	EXPANSION_PTT	Expansion PTT, works together with INT_MIC
23	SB9600_SW	switched into SB9600 mode if connected to 12V
24	HANDSET_AUDIO	Handset audio to earpiece impedance has to be > 200 Ohm
25	NC	Not Connected

Table 25 Pin Assignment of the 25 Pin subD Connector of the Expansion Head

Motorcycle Control Head - Pin Function

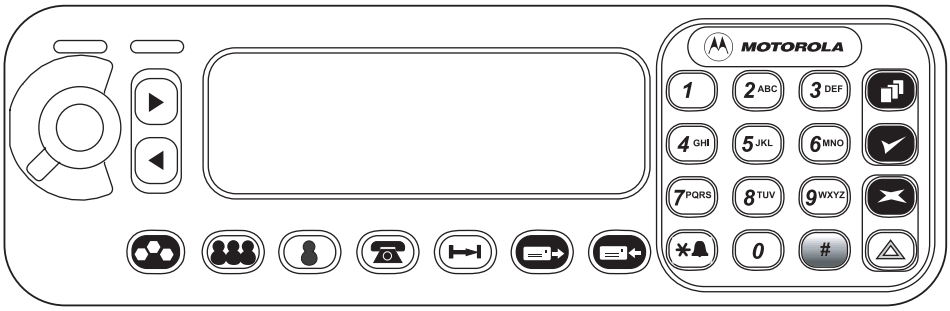

Figure 7 Front View of the Motorcycle Control Head

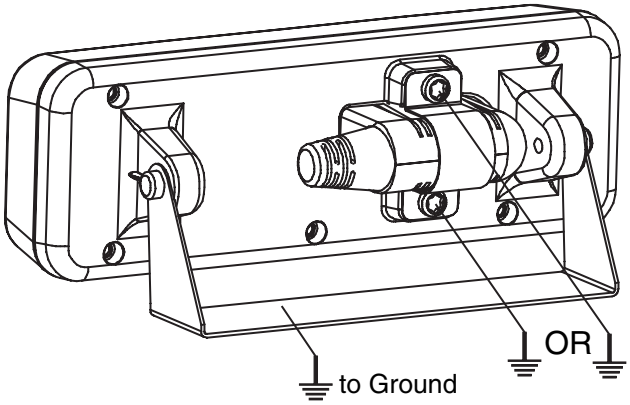

Figure 8 Rear View of the Motorcycle Control Head

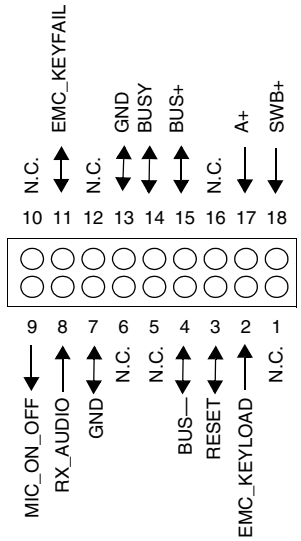

Figure 9 Pin Assignment of the Rear 18pin Connector of the Motorcycle Control Head

Pin	Name	Function	Input/Output	Description
1	N.C.			Not connected.
2	EMC_KEYLOAD	Keyload	In	Used for encryption key loading.
3	RESET	SB9600 Reset	In/Out	This is part of the Motorola Bus to connect external devices.
4	BUS-	SB9600 Bus-	In/Out	This is part of the Motorola Bus to connect external devices.
5	N.C.			Not connected
6	N.C.			Not connected
7	GND	Ground	In/Out	Used as ground.
8	RX_AUDIO	Received Audio	In	The nominal input level of this low level audio is 80mV. The input impedance is 560 ohms. Used as an audio for earpiece.
9	MIC_ON_OFF	Mic On/Off	In	This Microphone input is parallel to the Microphone input of the control head microphone connector. The nominal input level is 80 mV. The DC impedance is 20 kΩ and the AC impedance is 560 ohms. Pulling this line low (below 0.6 VDC) will switch the radio on or off, depending of the previous state. **Note:** Only one microphone should be active at the same time, to make sure that no on/off function is detected by the radio.
10	N.C.			Not connected.
11	EMC_KEYFAIL	Keyfail	In/Out	Used for encryption data.
12	N.C.			Not connected.
13	GND	Ground	In/Out	Used as ground.
14	BUSY	SB9600 Busy	In/Out	This is part of the Motorola Bus to connect external devices.
15	BUS+	SB9600 Bus+	In/Out	This is part of the Motorola Bus to connect external devices.
16	N.C.			Not connected
17	A+	Battery	In	The voltage is 13.2 V nominal. Available when the radio is connected to the battery.
18	SWB+	Battery Switch	In	The voltage is 13 V, nominal. It is available when the radio is switched on.

Table 26 Motorcycle Control Head Connector Pin Functions

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APPENDIX B
REPLACEMENT PARTS & KITS

Servicing MTM700 Mobile Units

Service for the mobile units is based on the substitution method; a faulty part is replaced by a working one, providing quicker service to the customer. For example, if the controller board is faulty, it is replaced. If the mobile requires more complete testing or servicing than that is available at field level, it is sent to the European Radio Service Centre; where it is serviced, and returned to the Regional Service Centre.

Level 1 and Level 2 Maintenance

This manual covers Level 1 and Level 2 Maintenance: at Level 1 maintenance you replace the transceiver and/or accessories and send the faulty transceiver and/or accessories to higher level of maintenance; at level 2 maintenance a transceiver board is replaced.

The MTM700 mobiles are programmed at the factory. They cannot be tuned at the field service level.

Level 3 Maintenance

All Radio Support Depots are level 3 service partners. The depots are capable of performing repairs down to component level where retuning is required. Contact your local CGISS office for information.

Replacement Parts

Damaged parts should be replaced with identical replacement parts.
For complete information on ordering required parts and kits, contact your local customer service representative (see following pages).

SUPPORT CENTERS

Europe, Middle East and Africa Region

The ERSC Customer Information Desk is available through the following service numbers:

Austria:	06 60 75 41	Italy:	16 78 77 387
Belgium:	08 00 72 471	Luxemburg:	08 00 23 27
Denmark:	80 01 55 72	Netherlands:	60 22 45 13
Finland:	08 00 11 49 10	Norway:	80 01 11 15
France:	05 90 30 90	Portugal:	05 05 49 35 70
Germany:	0800 1875 240	Spain:	90 09 84 902
Greece:	00 80 04 91 29 020	Sweden:	02 07 94 307
UK:	08 00 96 90 95	Switzerland:	1 55 30 82
Ireland:	18 00 55 50 21	Iceland:	80 08 147

Or dial Customer Care Centre:

Tel: +49 6128 70 2164

Please use these numbers for repair enquiries only.

Piece Parts

Some replacement parts, spare parts, and/or product information can be ordered directly. If a complete Motorola part number is assigned to the part, it is available from Motorola Radio Aftermarket and Accessory Division (AAD). If no part number is assigned, the part is not normally available from Motorola. If a parts list is not included, this generally means that no user-serviceable parts are available for that kit or assembly.

Note on this digital Tetra Radio: **The CPS has no capability to tune the radio. Tuning the radio can only be performed at the factory or at the appropriate Motorola Repair Centre. Components replacement can affect the radio tuning and must only be performed by the appropriate Motorola Repair Centre.**

Parts identification and ordering

Request for help in identification of non-referenced spare parts should be directed to the Customer Care Organization of Motorola's local area representation. Orders for replacement parts, kits and assemblies should be placed directly on Motorola's local distribution organization or via Motorola Online (Extranet).

EMEA Test Equipment Support

Information related to support and service of Motorola Test Equipment is available via Motorola Online (Extranet), through the Customer Care Organization of Motorola's local area representation or by calling the Motorola switchboard in Germany using phone no. +49 6128 700.

Asia, Pacific Region

The Asia/Pacific Radio Support Center Customer Information Desk is available through the following service numbers:

Toll-Free:

China	800-810-0976	Philippines:	1800-16510271
Indonesia:	0800-1-686868	Singapore:	1800-4855333
Malaysia	(60-3) 7803-922	Thailand:	1800-225412

Non-Toll Free

China:	(86-10) 6843-8231	Malaysia:	(60-3) 703-9922
Hong Kong SAR:	(852) 2966-4188	Philippines:	(63-2) 810-0762
India:	(91) 80-658-7677-7678	Singapore:	(65) 486-7171
Indonesia:	(62-21) 251-3050	Taiwan:	(886) 2-27058000 ext. 6308
Korea:	(822) 3466-5401	Thailand:	(66) 2254-8388
Vietnam:	(84) 8-8294091	All Other Countries IDD Code +(65)-4855333	

Please use these numbers for repair enquiries only.

Piece Parts

Some replacement parts, spare parts, and/or product information can be ordered directly. If a complete Motorola part number is assigned to the part, it is available from Motorola Radio Aftermarket and Accessory Division (AAD). If no part number is assigned, the part is not normally available from Motorola. If a parts list is not included, this generally means that no user-serviceable parts are available for that kit or assembly.

Note on this digital Tetra Radio: **The CPS has no capability to tune the radio. Tuning the radio can only be performed at the factory or at the appropriate Motorola Repair Centre. Components replacement can affect the radio tuning and must only be performed by the appropriate Motorola Repair Centre.**

All orders for parts/information should include the complete Motorola identification number. All part orders should be directed to your local AAD office. Please refer to your latest price pages.

SERVICE KITS

Table 1 Model Information

Type No.	Sales Model No.	Short Description	Model
MT912	M47PCN6TZ5AN	MTM700 380-430 MHz, STD DASH/DESK	M1
MT912	M47PCN6TZ6AN	MTM700 380-430 MHz, STD REMOTE	M2
MT912	M47PCC6TZ5AN	MTM700 380-430 MHz, EXP DASH/DESK	M3
MT912	M47PCW6TZ2AN	MTM700 380-430 MHz, M'CYCLE	M4
MT712	M47UCN6TZ5AN	MTM700 806-870 MHz, STD DASH/DESK	M5
MT712	M47UCN6TZ6AN	MTM700 806-870 MHz, STD REMOTE	M6
MT712	M47UCC6TZ5AN	MTM700 806-870 MHz, EXP DASH/DESK	M7
MT712	M47UCW6TZ2AN	MTM700 806-870 MHz, M'CYCLE	M8

Table 2 Service Kits-To-Model Chart

MTM700 Service Kits		380-430 MHz				806-870 MHz			
Description	**Part Number**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**
Service Boards									
MTM700 Transceiver 380-430MHz	PMUE1840BS	X	X	X	X				
MTM700 Transceiver 806-870MHz	PMUF1080BS					X	X	X	X
MTM700 Transceiver 380-430MHz-TEA1 *	PMUE1844BS	X	X	X	X				
MTM700 Transceiver 806-870MHz-TEA1 *	PMUF1084BS					X	X	X	X
MTM700 Transceiver 380-430MHz-TEA2 *	PMUE1848BS	X	X	X	X				
MTM700 Transceiver 806-870MHz-TEA2 *	PMUF1088BS					X	X	X	X
Control Heads/Kits									
Standard Control Head	GMWN4062_	X	X	X		X	X	X	
Expansion Control Head	GMCE4053_			X	X			X	X
Remote Mount Head	GMHN4080_		X				X		
Remote Mount Back Housing	GMCN4060_		X	X			X	X	
Motorcycle Control Head	SDLN4506_				X				X
Cables/Kits									
Motorcycle to Control Head Cable	3066516B01				X				X
Remote Mount Cable (radio to C/H) - 3m	RKN4077_		X	X	X		X	X	X
Remote Mount Cable (radio to C/H) - 5m	RKN4078_		X	X			X	X	
Remote Mount Cable (radio to C/H) - 7m	RKN4079_		X	X			X	X	

*) Tetra Encryption Algorithm 1 or 2

APPENDIX C

PRODUCT SPECIFIC INFORMATION

for Digital Radios Type MT912 and MT712

This section gives the Service Personnel an overview about product specific notes. This is necessary to take special precautions to avoid the introduction of hazards when operating, installing, servicing or storing equipment. This radio meets the applicable safety standards if it is used as described. All operating and safety instructions are to be followed carefully.

Equipment Electrical Ratings

Rated Voltage: 12 Volt DC

Rated Voltage Range: 10.8 to 15.6 V DC

Rated Current:

MT912 (380-430MHz): 3 Amps @ 3Watts RF power
MT712 (806-870MHz): 3.5Amps @ 3Watts RF power

Please be aware when planning the installation that there is a current consumption of approximately 30 mA even when the installed radio is switched off.

Transmitter Frequency Range:

TMO: 380 to 430 MHz (MT912); 806 to 825 MHz (MT712)
DMO: 380 to 430 MHz (MT912); 851 to 870 MHz (MT712)

Receiver Frequency Range:

380 to 430 MHz (MT912);
851 to 870 MHz (MT712)

Normal Load Conditions:

Rated RF Power: 3Watts

Rated Audio Power: 10 Watts @ 4 Ohms; 6 Watts @ 8 Ohms

Antenna Impedance: 50 Ohms

Operating Temp. Range: -30 to +60°C

Operating Time*: Continuous / Intermittent

*Note: In general, the radio transmit and receive time (operating cycle time) is determined by the communication system. On overload, respectively on extensive use beyond the systems specifications at high ambient temperatures, the radio is protected by its thermal control, which cuts down the RF output power, thus reducing the radio coverage range.

Fuse Identification

In case of blown fuses during the installation only replace those with identically value. **Never insert different values.**

Fuse for Power Cable GKN6270/GKN6274: 10A (Motorola Part Number: 65C80283E05)
Fuse for Ignition Sense Cable HKN9327: 4A (Motorola Part Number: 65C80283E02)

Spezielle Produkt INFORMATION
für Funkgeräte des Typs MT912 und MT712

Dieses Kapitel gibt dem geschulten Servicepersonal einen Überblick über wichtige produktspezifische Informationen. Diese Informationen sind wichtig, um Risiken beim Bedienen, Installieren und Service zu vermeiden. Dieses Funkgerät erfüllt die allgemeinen Sicherheitsstandards, sofern es so betrieben wird, wie in der Bedienungsanleitung beschrieben.

Nennwerte für das Funkgerät

Nennspannung: 12 Volt DC

Nennspannungsbereich: 10.8 bis 15.6 V DC

Nennstrom:

MT912 (380-430MHz): 3 A @ 3W HF Leistung
MT712 (806-870MHz): 3,5A @ 3W HF Leistung

Bevor Sie die Installation planen, bedenken Sie, dass das Sprechfunkgerät auch im ausgeschalteten Zustand einen Strom von ca. 30 mA verbraucht.

Sender-Nennfrequenzbereich:

TMO: 380 bis 430 MHz (MT912); 806 bis 825 MHz (MT712)
DMO: 380 bis 430 MHz (MT912); 851 bis 870 MHz (MT712)

Empfänger-Nennfrequenzbereich:

380 bis 430 MHz (MT912);
851 bis 870 MHz (MT712)

Betriebsbedingungen

HF Nennleistung: 3 Watt

Lautsprecher Nennleistung:10 Watt an 4 Ohm; 6 Watt an 8 Ohm

Antennenimpedanz: 50 Ohm

Betriebstemperatur Bereich: -30 to +60°C

Betriebszeit*: fortwährend / periodisch

*Hinweis: Im allgemeinen wird die Sende- und Empfangsszeit (Betriebszeit) des Funkgerätes durch das Funksystem bestimmt. Bei Überlastung bzw. extensivem Betrieb über die Systemsspezifikationen hinaus bei hohen Umgebungstemperaturen wird das Funkgerät durch eine Temperaturkontrollschaltung geschützt, die die HF-Leitung reduziert. Daraus kann sich eine Verringerung der Leistungsmerkmale des Gerätes ergeben.

Sicherungen

Sollte während der Installation die Sicherung durchbrennen, darf sie **nur durch eine gleichwertige** Sicherung ersetzt werden.

Sicherung für DC Kabel GKN6270/GKN6274: 10A (Motorola Bestellnummer: 65C80283E05)

Sicherung für Ignition Sense Kabel HKN9327: 4A (Motorola Bestellnummer: 65C80283E02)