Maintenance Manual

ALLEGRA - EDACS®

800 MHz DUPLEX PORTABLE

ERICSSON

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NOTICE!

This manual covers Ericsson and General Electric products manufactured and sold by Ericsson Inc.

NOTICE

Repairs to this equipment should be made only by an authorized service technician or in a facility designated by the supplier. Any repairs, alterations or substitutions of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

NOTICE!

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SPECIFICATIONS*

SYSTEM

FCC Identification Number	AXATR-331-A2
Frequency Range	800 MHz
Channel Spacing	25 kHz
Batteries	Rechargeable Nickel-cadmium battery, 6.5 Volts nominal; high capacity DYPA5Z or ultra high capacity DYPA7A
Current Drain (maximum)	
Receive	120 ma
Standby	105 ma
Transmit	750 ma (high power)

ENVIRONMENTAL

Temperature Range	-25° C to +50° C (-13° F to -58° F)
Relative Humidity	0% at 40° C non-condensing

PHYSICAL

Dimensions	
Radio 6”H x 2.75”W x 1.25”D	
Weight	
Radio (includes high capacity battery)	11.7 ounces

TRANSMITTER

Output Power - High	0.75 Watts
Low	0.4 Watts
Frequency Stability	1.5 PPM
FM Hum and Noise	-37 dB
Audio Distortion	Less than 5%
Deviation	
HSD 3.25 kHz	
LSD 1.00 kHz	
DTMF	3.50 kHz
Limit 4.70 kHz	
Microphone Sensitivity	317.5 Volts

RECEIVER

Sensitivity	
12 dB SINAD (Simplex Radio)**	-115 dBm
20 dB (Duplex Radio)	-114 dBm
Squelch 9.5 dB SINAD	
Audio Power Output	1.0 Volts rms
Audio Distortion	Less than 5%

** Interconnect/Dispatch Models Only

* These specifications are intended primarily for use by the service technician during servicing. Refer to the appropriate Specification Sheet for complete specifications.

DESCRIPTION

This manual contains essential information needed to maintain the Ericsson ALLEGRA EDACS® 800 MHz Duplex Portable radio. Included in this manual is a brief description of the radio, troubleshooting and alignment information, radio disassembly and reassembly procedures, battery replacement and disposal procedures, and circuit descriptions.

The ALLEGRA Duplex Portable radio is synthesized, microprocessor based, high performance duplex portable FM radio. Operation in the 800 MHz frequency range this radio provides reliable two-way radio communications in EDACS environments. The ALLEGRA EDACS radio is available in two models: Interconnect only or Interconnect/Dispatch. A wide variety of options and accessories are available.

Duplex operation is provided in EDACS systems while operation in the Telephone Interconnect mode. At all other times, the radio operates in the half-duplex mode, i.e. when placing group calls in the EDACS environments.

Advanced state- of- the -art technology is used in the design and manufacture of this synthesized radio to provide the most in flexibility, capability, and adaptability to various system configurations. This flexibility allows the user to have the operation of his radio customized or tailored (by programming) to satisfy his needs by activating the desired features. The ALLEGRA is small, compact, lightweight, yet ruggedly constructed to provide reliable service.

RELATED MANUALS

Operator’s Manual	AE/LZT 123 1872
Installation, Vehicle Handsfree	AE/LZT 123 1874
User’s Guide, Vehicle Handsfree	AE/LZT 123 1873
EDACS II Programming Software	TQ3373
Programming Cable	RPM 113 1460

OPTIONS AND ACCESSORIES

DYCH5B	Rapid Multi-Charger, 120 VAC (for high and ultra high capacity batteries)
DYCH5D	Rapid Travel Charger, 12 Vdc
DYCF1F	Power Adapter, 12 VDC
DYMC5V	Portable Handsfree (includes microphone and earpiece
DYMN7A	Vehicle Handsfree Installation Package
DYPA5Z	High Capacity Battery
DYPA7A	Ultra High Capacity Battery

PROGRAMMABLE FEATURES

The Allegra is PC programmable, allowing it to be customized or upgraded quickly and easily. All programmable functions are controlled by the microcomputer and are field programmable through a compatible DOS based PC. The microcomputer reads specific information from the EPROM. Refer to the EDACS Software Programming manual for programming details.

In addition to the 50 number memory, the ALLEGRA duplex portable radio allows several time-out options to accommodate user needs.

User programmable features include:

- 50 number memory
- Carrier Control Timer - A single value can be selected that applies to all trunked operation.
- Voice Scan Lockout Timer - Provides a time limit that disables group scanning following initiation of a voice call.
- Special Call Time Out - Drops the radio out of special call mode after a specified period of operator inactivity.
- Individual/Interconnect Call time-out - A time-out that drops the radio out of an individual/interconnect call after a specified period of time.

OTHER PROGRAMMABLE FEATURES

- Flex Keys - Any one of these three keys (**A**, **B**, or **C**) can be programmed to function as the emergency button.
- Automatic Login - Supported for EDACS Systems
- Wide Area Scan - Supports wide area roaming. When scanning, there is a programmable time interval that determines when the radio starts scanning the next site.
- Supervisory Mode - Allows the radio to handle all normal supervisory functions.
- Programmable Audio/Display - This programmable option handles display and audio during emergency situations. The display can be programmed to hold the display unchanged until PTT is pressed or the

emergency is cleared. The audio option similarly , causes the radio to remain muted until PTT is pressed or the emergency is cleared.

- Priority System Scan - Allows the ALLEGRA Duplex Portable to search for a second operating system while locked onto the c control channel of the selected system. The scan frequency is programmable.
- TX Disable Group - Prevents keying the radio on a selected group (monitor operation only)/
- RX Disable Group - Prevents unmuting a radio on a selected group.
- Control Channel Limits - Provides limited scanning of a frequency set for a control channel.

CONTROLS AND INDICATORS

The 20 button keypad, and internal speaker and a liquid crystal display (LCD) are located on the front of the radio. Viewed from the front, a PTT (push-to-talk) button is located on the left side adjacent to the display. (Interconnect/Dispatch models only). The microphone is on the lower left and the earpiece on the top center. The fold-up antenna is on the top right side.

The keypad is used for manual number entry, access to a telephone interconnect system and activation of various EDACS features. The keypad is divided into a function portion and a numeric portion as is found on a basic touch-tone telephone.

The display has an eight alphanumeric character line (upper line) used to show the operational mode of the radio and has a numeric character line (middle line) used to show talk time. Eight status indicators, used to indicate various operating conditions, such as; function key pressed, transmitter on, service available, radio in use, horn alert active, radio locked or transmit muted, are located below the character lines within the display.

The Allegra Duplex radio also generates a unique set of alert tones to indicate the operating status of the radio when used in EDACS applications. The alert tones are defined in the operator's manual.

Figure 1 identifies the location of all controls and status indicators.

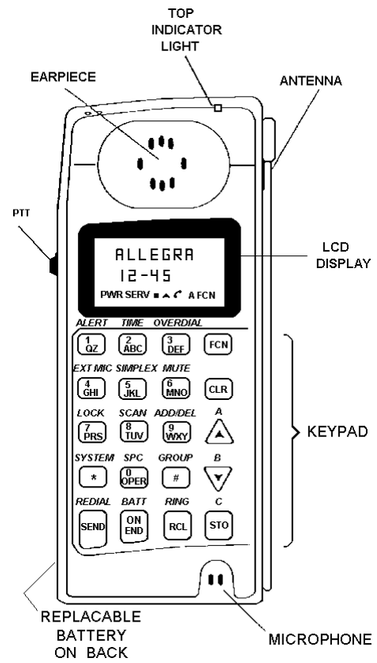


Figure 1. Allegra Controls and Indicators

OPERATION

The radio is powered **ON** by pressing and holding the ON END button. All status indicators turn on momentarily and after 2 seconds a short beep will be heard and a message *"---ON---"* will be displayed on the LCD. A self diagnostic test is performed when the radio is first turned on if enabled through programming. In the Interconnect Only Model, the display will then display *"CC SCAN"* if looking for the contact channel or *"READY"* when the control channel has been found and a call request can be placed. To turn the radio **OFF,** press and hold the O button again. After 2 seconds a short beep will be heard and a message *"TURN OFF"* will be displayed on the LCD. When turned off, the radio retains the last user selections (unless programmed for a particular power up option). Additionally, the ON END key is used to terminate interconnect and individual calls.

Refer to EN/LZT 123 1872 for detailed operating procedures.

CIRCUIT DESCRIPTION

LOGIC BOARD

The logic board, through the use of a microprocessor, controls the operation of the radio. The keyboard accepts user inputs and forwards this information on to the microprocessor. The microprocessor executes the user selected functions and then displays related user information on the LED to facilitate operation.

Microprocessor

The control center for operations on the logic board is the Intel 80C51GB microprocessor, D701. The microprocessor is connected by a parallel bus to a 128K x 8 flash prom (D703) for operational software, a 32K x 8 RAM (D707) for temporary data storage, and an Ericsson ASIC modem chip (D702). It controls the Audio Signal Processor (ASP) (D601), a DTMF generator, the LCD display, and the personality EEPROMS by way of serial lines. The microprocessor has five single bit I/O ports for controlling the synthesizer, keypad, and audio functions not provided in the ASP's registers. There is an A/D port on the microprocessor which is used to make battery voltage and RSSI (Receive Signal Strength Indicator) measurements and also as input lines for the keyboard. The microprocessor's async serial port is used to provide a path into the radio for personality programming, flash programming and test. The async serial port is available at the UDC connector of the radio at a 5 volt level. These levels must be converted to RS232 levels by an external device, such as a TQ3370, before being connected to a computer.

Modem ASIC

The modem ASIC, D702, executes a variety of housekeeping chores in addition to its data function. It also controls the ALE Latch function of separating the lower address byte from the microprocessor's multiplexed data and address lines. The demultiplexed lower address byte is used by the ram and flash prom.

The power-up reset pulse from the LM2951 5V (N805) regulator and level inverter N712/1 pin 3 comes into the modem on RESIN (33). It is OR'ed with the output of an internal watchdog timer circuit before being outputted on RESOUT (43). This line is then inverted by N712-4 before being used as the system reset line. The watchdog waits about two seconds before resetting the system.

The system clock is generated from an 11.059 MHz crystal (B701) by an oscillator circuit in the modem chip. The buffered output of this oscillator (Clk1) provides the master clock to the microprocessor and the ASP chip. The modem chip also divides the 11.059 MHz frequency down to 614 kHz at CLK2. This line is used to generate the floating voltage required by the LCD display. It is also used as a clock for the busy tone notch filter and the clock into the Bertram ASIC on the RF board. Transistor V701 is used to add another capacitor to the crystal circuit to move its frequency slightly to avoid micro spurs. V701 is controlled by open collector switch SW3 of the ASP IC.

The timing for the data modem part of the ASIC is also derived from the chip's oscillator. The modem consists of a digital phase locked loop (PLL), receive data detector, an eight bit shift register for transmit, and a sync word detector. It will also generate an interrupt to the microprocessor. The register bit that resets the watchdog is also located in one of the data modem registers.

Device address decoding is accomplished by a simulated 74HC138 within the modem ASIC. Addresses A15, A14, and A13 are brought into the 'C,' 'B', and 'A' inputs of the "HC138" to divide the data space into 8K segments. The lower two spaces, Q0 and Q1, are AND'ed with gate U710-3 and used to select the lowest 16K of the microprocessor address space and the upper 16K of the 32K x 8 ram.. (Note that A14 of the ram is pulled to 5V, forcing the chip to selection the upper 16K. Q3 selects the data modem registers of the modem chip. The 32K combined decode of Q4 through Q7 is not used. The HC138 is enabled on its "G2B" input by P5.6 of the microprocessor. This allows the microprocessor to remove the ram and data modem from the address space during flash prom programming.

Flash Prom Circuitry

The flash prom containing the radio's operating software (D703) is an Intel 28F001 128K x 8 byte memory. The block feature of this device is not used. The VPP flash voltage connects to both VPP (9) and PD (6). The 128K byte memory is segmented into 64K banks by connecting P5.7 of the microprocessor to A16. The micro's PSEN enable is connected directly to the prom's output enable for read operations. PSEN is AND'ed with the micro's P5.6 flash write enable line to form the prom's chip select. In normal operation, the device is only selected when PSEN is low. During flash programming, the prom is always selected.

Flash programming requires the use of software inside the microprocessor. Normally, the VPP flash voltage is not connected to any source. For flash programming, it is connected to a +12V supply at the UDC connector. This voltage is divided down to provide a 5V level to the processor's EA pin. This sets the processor into a mode where the lower 16K of the address space is internal to the microprocessor. This space contains the software to address the flash prom, read and write

a packaged protocol from the microprocessor's serial port, keep the watchdog occupied, and implement the prom manufacturer's programming algorithm.

Normally, the radio is flashed through a TQ3370 interface device. This TQ3370 contains circuitry to convert the battery output of the radio to 12 volts. The radio should be power cycled when being flashed so that the microprocessor is reset with the VPP supply on. This will allow it to begin running with EA high and to execute code from its internal memory. Note, there is no solid mechanism for causing a reset when VPP is applied. However, there is an implied mechanism in that when one applies VPP, one changes the system's memory map. This will probably crash the operating software. The modem's watchdog may then fire and the microprocessor should come up with its internal program running.

For flashing, the prom is broken down into four 32K banks. This is so the prom can "appear" to be in the upper 32K of the microprocessor's data space. A16, controlled from P5-7 of the microprocessor, handles half of this task just as it does in normal operation. A15 is AND'ed with the P3.5 of the microprocessor. In this way, it is possible to physically write prom address 0000H while it appears to be at address 8000H to the microprocessor. The write line into the flash is also AND'ed with P5.6, the flash write enable line. This provides some protection against inadvertent writes into the flash and also keeps the write line off of the prom during normal operation. The flash write enable line also removes the ram and modem registers from the data space by disabling the address decoder circuitry inside the modem ASIC.

I^2C Device Interface

The microprocessor runs several sets of serial devices through its data I/O lines. One set of lines forms an I^2 C bus. This is a standard arrangement involving a bi-directional data line and a microprocessor generated clock line. The data line is called 'DATA, K-R3 and is on P1.2 of the microprocessor. Note it is multiplexed with row three of the keyboard and the data lines of the synthesizers. The clock line is called IIC-CLK and is generated by P4.4 of the microprocessor. There are three 24164 serial EEPROMS (D801-D803), a DTMF generator D804, and the LCD display (N806) on the I^2 C lines.

The serial EEPROMS are 2K x 8 devices. There is an address field in the I^2 C data stream. The 24164 device is easily paralleled with other I^2 C devices by setting its three hard-wired upper address lines. Their flexibility is also useful for working around the less adaptable DTMF generator and LCD display. The EEPROMS are used to store personality data.

The DTMF generator runs off of a color burst crystal (B801). It can generate any of the sixteen tone combinations under control of the microprocessor. It also has power saving and spur reducing functions that cut off the oscillator. DTMF tone out of the IC goes into the external microphone input of the ASP ASIC.

The LCD display is another I^2 C device. It can be considered as a six pin connector on the board. One line is ground and two are the I^2 C clock and data lines. The display also requires a 5V supply and a high value resistor to ground for its oscillator circuit. The VLCD line provides a variable voltage for contrast. It is generated by rectifying the 614 kHz clock to develop a floating voltage. It is then run through a simple transistor regulator with a thermistor in the reference setting voltage divider. The voltage at the pin varies from -0.5 to +0.5 volts, referenced to ground depending on temperature. Low temperatures will generate negative voltages.

Bertram IC Interface

Another set of serial control lines is used to talk to the Bertram chip on the RF board. Bertram requires four lines, called CLOCK, LATCH, DFO, and DTO. The CLOCK line is generated from the modem's 614.4 kHz line. It is gated on and off under control of 'CLK-SEL, bit P4.6 of the microprocessor. The clock line is also capable of being read by the SEP-CLK(P4.0) line of the microprocessor. The LATCH line is generated by bit BERT-LE (P4.5) of the microprocessor. Data from Bertram comes in on the SEP-DAT (P4.1) line of the microprocessor. It is also AND'ed with the data to Bertram by an AND gate. This is because Bertram expects a closed loop circular serial bus. Data to Bertram comes from the DI-EW, K-R2 on P1.1 of the microprocessor. Note, it is multiplexed with row two of the keyboard. The complex timing of these lines is accomplished under software control by the microprocessor.

Bertram is used to provide divider information to the synthesizers and return lock status. The chip also generates a TTL level CAS signal when the received signal strength is above a threshold value. This is called RXCD at the J101 RF board to logic board connector and RSSI or microprocessor A/D bit ACH5 on the logic board.

Synthesizer Interface

Four microprocessor bit ports are used to load and control the synthesizers on the RF board. They form a serial bus consisting of a data, clock and latch line. They are DATA, K-R3, CLK, K-R1, LTX, and LRX. The synthesizer data line is DATA, K-R3 from microprocessor port P1.2. It goes to both synthesizers. The synthesizer clock line, CLK, K-R1 comes from microprocessor port P1.0 and is also used for both synthesizers. The latch lines are separate for each synthesizer. The latch line for the receive side is LRX (P5.4). The latch line for the transmit side is LTX (P5.3). The timing of these signals is under control of the microprocessor's software.

ASP Interface

The microprocessor receives and sends information to the ASP ASIC over a three wire serial bus. The information consists of a data, clock, and enable line. DATA, K-R3 (P1.2) is used once more as the data line. CLK, K-R1 (P1.0) is used as the clock and is also multiplexed with the synthesizer and keyboard. The enable line is unique to the ASP. It comes from P4.7 (ASP-EN) on the microprocessor. The master clock for the ASP is the buffered 11.059 MHz (ASP-CKIO) clock out of the modem ASIC. The ASP is discussed in more detail in the audio section.

Keyboard Interface

The Allegra radio uses a software scanned keyboard consisting of 20 keys in a five row by four column matrix. It is not an actual keyboard. Instead, it consists of interweaved gold plated runs of signal and ground on the logic board that get shorted together by conductive pads on the front panel's rubber keypad. The keyboard is scanned by pulling down the row lines one at a time and reading the column inputs. The rows are output on the lower five bits of port 1 of the microprocessor. The columns are read as digital inputs on the lower four bits of the microprocessor's A/D port.

The first three row lines are multiplexed with other functions. Each row control pin (except for row 5) pulls the keyboard row low through the associated diode. This prevents a user who is using the keyboard from corrupting the multiplexed functions. There are also two keys that are direct inputs to the microprocessor. The first is the PTT switch. It is connected to microprocessor port P3.2. The second is ON/END. It is connected to microprocessor A/D port ACH4. This switch is also connected to the radio's power switch circuitry. The PTT and ON/END switch also exit the radio through the UDC connector.

The radio's LCD display and keypad are backlit by 12 LED's. The display consists of six paralleled lines of two LED's in series. The bottom of these lines is pulled to ground by two transistors to distribute the power dissipation. These transistors are controlled by microprocessor port P5.5 through a PNP buffer transistor.

Battery Power Control Circuits

Power is supplied by the battery and applied to the radio through power FET (field effect transistor) V801. The FET is controlled by P-HOLD (ASP switch SW4) or from the keyboard's ON/END switch. When the radio is "off", no power is applied to the system, thus keeping P-HOLD open and V806 off. When ON/END is not pressed, it is open. This keeps PNP transistor V803 off which in turn keeps NPN transistor V805 off. Transistor V805 actually controls the power FET's gate. Pressing the ON/END key brings the line low turning on V803. V803 then turns on V805 which then turns on power FET V801. The system will power up. This includes turning on the 5V regulator and generating a reset pulse for the system.

NOTE

The microprocessor is capable of reading the ON/END key directly. It will heavily debounce the key to prevent accidental key presses. Then it will set P-HOLD which will turn on V806, keeping V805 turned on. The radio will then remain "on" after the ON/END key is released.

When the radio is "on", pressing the ON/END key long enough will tell the radio to turn itself off. It does this by clearing P-Hold, which then turns off V806. When the ON/END key is released, V803 turns off which turns off V805. V805 will then turn off power FET V804, cutting off power to the radio.

Three other circuits relate to the battery. First, the battery voltage is divided by 2 and applied to the BATT-TEST input on the microprocessor's A/D (ACH7). Second, microprocessor port BATT-LED (P3.4) is used to control the LED at the top of the radio. It is used when the microprocessor detects low battery voltage. Third, microprocessor port P5.2 (SWDIS) is used to control the SWDC 5V at the UDC connector through a PNP transistor.

Receive Audio

The 450 kHz IF is brought in from the RF board and applied to the logic board. It is then fed into a phase lock loop discriminator (N603). The difference in frequency between the incoming signal and an internal VCO produces an error voltage that corresponds to the transmitter's modulation. The VCO is set to 900 kHz by R603 and C605. There is an internal divide by two circuit within the IC. The audio output is then passed through an emitter follower (V601) to the ASP ASIC at pin 50 of the DISC for squelch and the A1-IN (pin 44) input for the data and receive audio circuits.

The ASP chip includes two op amp bias supplies: One for receive functions and one for transmit functions. The inputs for the supplies originate internally from the chip for bypass capacitors. The input for the Rx bias voltage is pin 39 and the output is pin 40. For the Tx bias, the input is on pin 64 and the output is on pin 63. There is also a 1 uF bypass capacitor on the Rx supply output and a 2.2 uF on the Tx output. The 3V bias generator of the ASP is not used.

The ASP chip controls the squelch function. Discriminator audio is received on DISC pin 50 as DISC. It is passed through a high pass filter to remove voice frequency components and

then rectified. This voltage is compared with a voltage supplied under software control, D/A. on the ASP's. The output of this comparator is passed to the microprocessor on the ASP CAS (ACH.6) A/D input line. It is then used in conjunction with the tracking data to determine if a signal is present. The response time of the circuit is controlled by external capacitor C640 in fast squelch mode with C641 being paralleled by ASP switch SW2 (Pin 16) for the slow squelch function. An external resistor network including thermistor R642 is used to track out temperature variations. The resistor network interfaces with pins 53-55 of the ASP's "A" op amp. Squelch hysteresis is assumed to be a software function.

Demodulated audio also enters the ASP chip RAFI (Pin 44). It passes through a gain stage and then through a 300 to 3000 Hz bandpass filter before exiting the ASP as HP10 on Pin 45. Software switches provide for bypassing the bandpass filter. This is desirable when looking for high speed (9600 baud) data. In this case, the output HP10, is applied to limiter comparator NRI (Pin 31) against a 1 uF averaging capacitor at pin 32. Something wrong in here. ASP switch SW5 (Pin 13) is used to block the output of the busy tone filter when looking for high speed data. The output of this comparator is called LOSC (Pin 21). It is buffered by transistor buffer V606 and applied to the data input of the modem ASIC and the ASP-LDSC (P4.2) input of the microprocessor.

The notched audio returns to the ASP on pin 28, VGAF. It then goes into a switch array. This array decides which device to connect to the speaker. The choices are the unnotched output of the bandpass filter, the audio from the notch filter, an ASP generated alert tone, or the output of the DTMF generator as a side tone. Two external resistors allow adjustment of the alert tone level. The DTMF input is on pin 29, DTMF.

The de-emphasis network is after the switch. It can also be switched in and out. The volume control is after the de-emphasis network. It allows 32 levels of volume under software control. The digital volume control allows for separate levels for normal operation and operation in a vehicular charger. The audio passes through one more mute switch before leaving the ASP on pin 27, RXAF. From here, the audio goes to the expander portion of a NE578D compander IC, D605. This IC attempts track out large swings in the volume level to provide a constant level into op amp N604, which is used as a driver for the earpiece audio. The compandor function can be defeated by ASP switch SW0 (pin 18). Earpiece audio also goes out the UDC connector as EXT-SPKR.

The audio input at RAFI (pin 44) can also be connected to a 210 Hz low pass filter. This strips voice information off to leave Channel Guard or low speed data information. This information exits the ASP on pin 37, CGO, and passed through limiter comparator C3 with a 10 uF averaging capacitor, C660. The data input is on pin 35. The averaging input is on pin 34. The output of the comparator, LCGO (pin 22) is applied to microprocessor pin ASP-LCG (P4.3). The low speed data decode or Channel Guard detection is accomplished in software.

The logic board contains a buzzer, H803, which is used to provide an audible alerting signal. This is accomplished under software control by toggling microprocessor port BUZZER (P1.7) on and off at the desired frequency. The port pin, D701-29, drives transistor V802 which, in turn, switches the 5v supply on and off through a 10 ohm resistor.

Transmit Audio

Audio from the internal mic is received by the ASP ASIC on pin 74, IMIC. Audio from the UDC connector is received by the ASP ASIC on pin 75, TTON. Both mic inputs provide a bias voltage from the ASP generated TX BIAS supply. The mic inputs are then fed to a switch. A third input into this switch is the DTMF encoder chip on the EMIC (73) pin. (There is a 20 dB pad between the DTMF IC and the ASP input.) After the switch, the audio passes through a software selectable gain stage. It then passes through the pre-emphasis filter and then a 300 Hz high pass circuit to keep voice from conflicting with Channel Guard or low speed data. From there, the audio leaves the ASP on pin 70, TONE and applied to the compressor side of the NE578D compandor, D605. The compressor provides an AGC function to hold the mic audio more constant. From the compressor, the audio is returned to the ASP on pin 57, TIN. It passes through a limiter circuit and summed with the data and tone components of the Tx modulation at a common summation junction.

High speed data from the modem ASIC is received by the ASP on D601-80 as IDAT. It passes through a data filter before being combined with the Tx audio at the common summing junction. It is possible to bypass the data filter.

Channel Guard and low speed data are generated at digital levels by the microprocessor on walsh bit outputs WB1 (P5.0) and WB2 (P5.1). The walsh bits are combined in a resistor network to act as a two bit D/A. For tone generation, a sine wave is approximated in six steps to create a more easily filtered signal. The combined walsh bits enter the ASP at pin 38, TOIN, for Channel Guard and low speed data.

The DTIN input to the ASP, D601, connects directly to the common summing junction through a switch. Its audio frequency tones are sufficiently filtered by the post limiter filter in the ASIC. The low frequency TIN is passed through the 210 Hz low pass filter to filter out the waveform. This is required since higher level harmonics tend to significantly degrade hum and noise. Note, this is the same filter that is used on the receive side. The filtered signal exits the ASP on pin 37, CGO. It then goes to ASP D601-58, CGIN, and into C3, limiter comparator. CGIN is connected directly to the common summing junction by a switch.

A 3000 Hz low pass post limiter filter follows the common summing junction. (This filter can be bypassed when sending high speed data.) Following the filter is a 32 position deviation control. The output of this attenuator is passed through a switch before exiting the ASP on pin 60, TXAU. It then passes through a resistor network before going to the modulation circuits on the RF board.

RF BOARD

Refer to schematic diagram 188D6251. Each sheet of the drawing contains a major board function. These functions and locations are listed below:

- Sheet 1 RF board control and block diagram.
- Sheet 2 Transmitter
- Sheet 3 Transmit synthesizer
- Sheet 4 Receiver synthesizer
- Sheet 5 Receiver

Power Distribution

DC power is supplied to the radio by a NiCd battery At full charge the battery delivers 7.2 volts to the radio. If the output voltage falls to is less than 5.3 volts, the Audio/logic board turns the radio off.

DC voltage from the GEL Cell battery pack is applied to the RF board through J103.1, 2 and fuse F101. Test points TP168 and TP108 allow you to monitor the battery voltage on either side of the fuse. Unregulated, unswitched voltage only is applied to the transmitter power amplifiers U200, Q200, and to the Audio/logic board through J101.8. Battery voltage is connected to accessory connector X201 and to 5 volt regulator and switching circuitry consisting of V804, MBT3904 and MBT3906. This switching circuitry generates SWDC (switched 5 Vdc) which is returned to the RF board on J101.1 as SWDC. SWDC is applied to Power Regulator U161, Bertram RF Controller (U101-3) as VBAT and pin 1 as STARTUP, and to DC control Transistor Q131. Control transistor Q131 supplies SWDC to 5 volt regulator D100. The output of the regulator is distributed as VREG to the receiver, TCXO, Bertram U101-5 (TP131) and pins 16 and 37 through respective voltage dividers, and to MOSFETS Q511 and Q531.

VRX is originated by U161 and applied to receiver synthesizer U400, RXVCO U410 and driver U430 and to pass transistors Q161 and Q162. The pass transistors are controlled by the Bertram RF Controller and supply voltages VTX1 (TP162) and VTX2 (TP164) to the transmitter circuitry: U200, U300, TXVCO U310, and MOSFET driver Q330.

C116 provides low frequency filtering while capacitors C101 through C115 decouple any noise transients that may be present on the control lines to the Bertram Radio Interface Controller. TP109 allows the technician to monitor the POW-DET line.

Transmitter:

The transmitter contains preamp Q200 and power amp U200, with a broadband 815 MHz filter feeding the antenna connection. The transmitter PA delivers 0.75 watts (0.4 watts on low power***)*** to the antenna.

Bertram Radio Interface Controller U101 receives instructions form the Audio/Logic board via serial data link, J101.11, identified as "DFO". Information is returned to the Audio/Logic board through J101-13 and is identified as "DTO". Both DFO and DTO are clocked by J101.12 (C1008).

Transmit on-off switching is controlled by Bertram Radio Interface Controller using two switching circuits. Bertram output, Dout4 (U101-20), controls voltage switching transistor Q161 (TP162). Q161 switches power on/off to transmitter PA U200, transmit synthesizer U300, RF power sense D240, RF amplifier Q200, and buffer Q330. TXON control from the Bertram (DOUT1, U101-41) controls transmit on-off switch Q201. Q201 switches amplifier Q200 on and off as required by the current status of the radio.

Transmitter output power is regulated to its high or low tracking data setting (see Audio/logic board) by sensing (transformer W202/W203) and detecting (D240, C241) final power (Bert op amp #1 pin 38, 39, and 40) relative to the DAC setting (Bert output pin 35) obtained by Bertram from the Audio/Logic board.

Tx-Synthesizer:

The channel frequency is set by loading transmit synthesizer chip U320 from the Audio/Logic board via J101.5 and J101.6, "Syntcl" and "Syntdata". The synthesizer chip sets the channel center frequency through its fN pin U320-10 and monitors/locks the frequency by "listening" to the VCO output via C312. Audio signals from the audio/logic (J101.7 "Mod") varies the VCO (U310) frequency according to the audio amplitude set on the Audio/Logic board. Transmit synthesizer chip voltage is switched on-off in the same fashion as the transmitter power out, by Bertram 'Dout3', via voltage switching transistor Q162. The switched voltage is designated as VTX2. Q330 is used to buffer the VCO out, and feeds the transmitter pre-amp. Power to buffer Q330 is brought in from VTX1 under control of Bertram 'Dout4'.

Rx-Synthesizer:

The receive channel frequency is set in the same manner as the transmit channel frequency, except its components, the Synthesizer chip (U420), the buffer (U430), and the VCO (U410), get power from VRX. VRX is controlled from the Audio/Logic board (J101.1 “SWDC”) through power control chip U161.

Receiver

The antenna input feeds broadband filter FL501 which, in turn, feeds input buffer/amp Q511. “The output of buffer/amp Q511 is then filtered by FL521. The 1st IF frequency is provided by mixer Q531. Q531 combines the Rx Synthesizer output with the antenna signals to generate the 1st. IF frequency. The output of the 1st mixer is coupled to the input of 77.25 MHz SAW filter FL541 through a parallel resonant tank consisting of L531, C538, and C539. The IF filter FL541 passes only the tuned channel frequency at 77.25 MHz. This first IF is down converted to 450 kHz (into Bert) 2nd mixer U501. The output of the mixer U501-14 is routed to pin 15 of the Bertram Radio Controller and to the Audio/Logic board through J101.15 (TP115).

SERVICE SECTION

The Service Section contains information designed to assist you in the proper care and maintenance of your radio and to insure optimum performance. Alignment of the radio consists of performing the tracking procedures included in this section. Various display indicators and tones provide the current operating status of the radio.

CARE OF EQUIPMENT

1. Keep the exterior of the radio clean. Use a soft damp cloth.

2. To ensure efficient power transfer from the battery to the radio, wipe the contacts of the battery and radio to remove dirt or grease; Use a soft dry cloth.

3. When the accessories connector is not in use, cover the connector with the protective dust cap to prevent he build up of dust or water particles.

CAUTION

Do not carry the radio by the antenna. Do not use chemical cleaners, spray or petroleum based products. They may damage the radio housing.

NOTE

Field repair is limited to removal and replacement of the RF or Logic Board and case assembly parts such as PTT switch, covers, antenna, keypad, etc. If more intense servicing is required, return the radio to your local Ericsson Dealer for factory repairs.

SERVICE & TROUBLESHOOTING

Troubleshooting the radio in the field consists of board substitution using boards taken from a radio that has been proven to operate in accordance with manufacturers specifications. Service and tracking procedures are provided for reference only. Successful completion of these procedures assure the radio will perform in accordance with the manufacturers specifications.

LOGIC BOARD TEST PROCEDURE

Test Fixtures:

The logic board is tested using a TQ3370 interface box and interface cable to connect the logic board to a DOS based computer. The cable between the TQ3370 box and the logic board is shown in Table 1. The cable connects to X201 of the logic board. The logic board is powered from a 7.0 volt supply through the TQ3370 interface box.Figure 2 shows a test setup diagram to test the logic board.

Table 1. Logic Board to TQ3370 Interface Cable

Radio Pin Number	TQ3370 Pin Number	Description
1	16	External Mic
2		Service - 1
3		Unmute
4	1, 2, 3, 4, 13	Ground
5	14	External Speaker
6		Service - 2
7	9, 25	Service - 3
8		
9	12	Rxd (TQ3370 to Logic Board)
10	11	Txd (Logic Board to TQ3370)
11	17	ON/END
12		SW 5V
13	6, 8, 18, 20	Vbatt (Power To Logic Board)
14	15	Ptt Switch
15	5	12V Flash Voltage
16	1, 2, 3, 4, 13	Ground

Reference Drawings

344A4736 .....Flash Programming Specification
350A1225 .....Personality Specification
CXC 112 874 .....Dispatch and Interconnect Software
CXC 112 873 ..... Interconnect Only Software

Test mode software allows access to most radio functions. It consists of binary commands with appropriate parameters. The logic board responds to a command by executing the requested action, returning any appropriate data: a completion code of 01h if “successful” and 02h if “failed”, and a ““ to indicate it is ready for the next command. Table 2 is a list of test functions.

Visual Inspection:

Carefully inspect the solder connections to the pins on X101 (Connector to RF board), D601 (ASP Chip), D703 (Flash Prom), and D707 (Ram). These are fine pitched parts. The use of a microscope is recommended.

POWER-UP:

1. Verify DTR on the computer is in its positive voltage state.

2. Verify the power supply is off.

3. Connect the Logic Board under test to the TQ3370 Interface Box.

4. Apply 7.5 volts to the TQ3370 Interface Box. Note, there are two diode drops in the TQ3370 box between the power supply and the logic board. The TQ3370 box will use about 50 Ma of current. Current from the supply must be under 150 Ma

Flash Program Code:

Flash the current version Allegra operating software into the logic board with the current ‘FLASH.EXE program. Successfully flashing the radio verifies that most of the logic circuitry is operating properly. The flash programming protocol for the Allegra Portable is:

Interconnect w/Dispatch: CXC 112 874 (Identified by the presence of a PTT switch on the side.)

Interconnect Only: CXC 112 873 (No PTT switch)

Initiate Test Mode:

1. Power cycle the radio.

2. Put a “break” condition on the serial port for about one second. The logic board will respond with an ASCII “>“ (3eh).

3. Send an ASCII “GE” (47h 45h) to the logic board. This puts it in programming mode. The logic board will show the software revision on the display and will respond with six bytes (plus a “>“) per the personality programming specification.

4. Send an ASCII “GF” (47h 46h) to the logic board. This places the radio in test mode. The logic board will respond with an ASCII “>“ (3eh).

Table 2. Test Mode Functions

Test Mode Code	Function	Test Mode Code	Function
(01)	Select Channel	(19)	Enable/Disable The Busy Tone Filter
(02)	Select Frequency	(1A)	Enable/Disable The Busy Tone Filter
(03)	Toggle Transmitter On/Off	(1B)	Initialize The Asp To A Known State
(04)	Toggle Receive Audio On/Off	(1C)	Generate Standard/Alternate Busy Tone
(06)	Toggle High Speed Data On/Off	(1E)	Manipulate The Synth Bandwidth
(07)	Toggle Low Speed Data On/Off	(1F)	Manipulate MDR/MDX Specific Parameters
(08)	Report Receiver Carrier Sense	(20)	Read Tracking Data
(09)	Generate Alert Tone	(21)	Write Tracking Data
(0A)	Write External Ram	(22)	Set D/A And Read Output Bit Of Squelch
(0B)	Read External Ram	(23)	Set Tx Deviation
(0C)	Report Software Checksum	(24)	Set Volume
(0D)	Conduct Modem Loopback Test	(25)	Set Tx Output Power Value
(0E)	Report Key Press/Releases	(26)	Xram Test
(0F)	Write 1 Audio ASIC Registers	(27)	Set Bertram Chip On/Off
(10)	Write All Audio ASIC Registers	(28)	Write 1 Audio ASIC Registers With Bit Mask
(11)	Report Audio ASIC Registers	(29)	Test Of Rx And Tx Synthesizer Lock
(12)	Do A Dacs Control Channel Transmission	(2A)	Test Of Personality EEPROM
(13)	Return To Programming Mode	(2B)	Report Battery Sense A/D Value
(14)	Generate DTMF Tone	(2C)	Receive Audio Motorboating Test
(15)	Transmit Digital Data	(2D)	Toggle All LCD Segments And LED’s On And Off
(16)	Receive Digital Data	(2E)	Report Current Keypad Condition
(17)	Detect A Tone	(2F)	Toggle Buzzer On/Off
(18)	Generate/Decode Digital Channel Guard	(30)	Bertram Reference Voltage Trimming

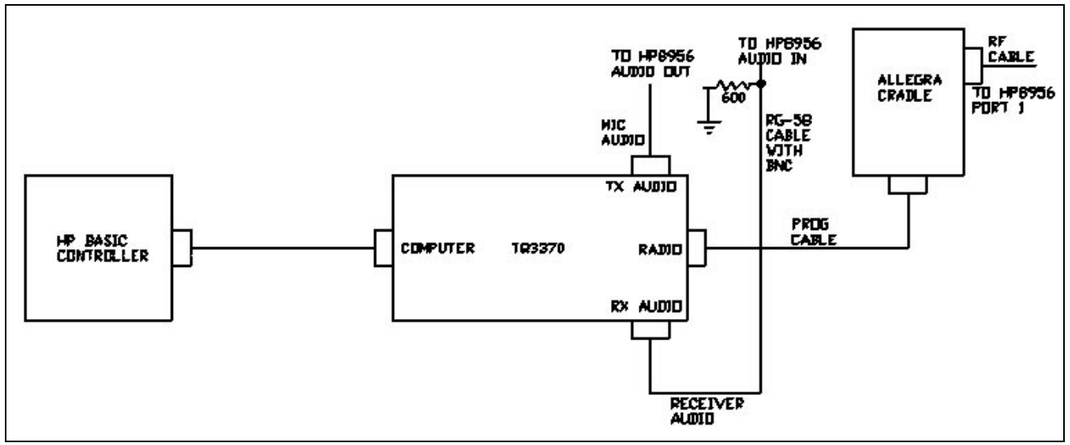


Figure 2. Logic Board Test Setup Diagram

MEMORY TESTS:

1. Run the Xram test by sending a 26h command to the logic board. If successful, the logic board will respond with a 01 3e.

2. Program default tracking data with the 21h test command. The format is:

   21h
   addr
   data

   where the tracking data address is listed below in Table 3. The logic board will respond with a 01 3e if the command was successful.

3. Verify the tracking data with the 20h test command. The format is:

   20h
   addr

   where addr is the same as the programming tracking data test command 21h. The logic board will respond with the requested tracking data value and a 01 3e.

4. Send a 13h test mode command to get back into programming mode.

5. Program a default personality with the current PC Programming program.

6. Send an ASCII “GF” (47h 46h) command to get the radio back into the test mode.

AUDIO TESTS:

1. Test DTMF by sending the following sequence to the logic board:

1b	Initialize asp
04 01	Turn on the speaker
24 3f	Set max volume
14 0e	Generate 1477 Hz

2. Measure at least 1 Vrms at X201 Pin 1.

3. Measure 1477 Hz +/- 5 Hz at X201 Pin 1.

4. Measure distortion at X201 Pin 1. It should be less than 5%.

5. Disable DTMF generation

6. Test the alert tone by sending the following sequence to the logic board:

   09 01 Generate tone

7. Measure at least 1 Vrms at X201 Pin 1.

8. Measure less than 5% distortion at X201 Pin 1.

   09 00 Disable alert tone generation

9. Test the buzzer by sending the following sequence to the logic board:

   2f 01 Enable buzzer

10. Verify the buzzer is sounding

    2f 00 Disable buzzer

DISPLAY TEST:

1. Send a 2d 01 command to the logic board. All segments in the display must turn on. All LED’s must turn on.

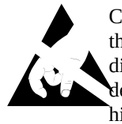
2. Send a 2d 00 command to the logic board. All segments in the display must turn off. All LED’s must turn off.

KEYBOARD TEST:

The logic board takes one sample of the keypad and reports a code out the serial port when it receives a 2eh command. Test for each of the logic board’s keys. Note the ON/END key can not be tested. It can not be read because it is being held low by a ground in the TQ3370 box on X201 Pin 11. The return codes are listed below in Table 4.

ELECTROSTATIC DEVICES

CAUTION



CMOS Integrated Circuit devices used in this equipment can be destroyed by static discharges. Before soldering one of these devices, the service person should discharge himself by touching the case of a bench test instrument that is equipped with a 3-prong power cord connected to an outlet with a known good earth ground. When soldering or desoldering a CMOS device, the soldering iron being used should also have a 3-prong power cord connected to an outlet with a known good earth ground. A battery operated soldering iron may be used in place of a standard soldering iron.

Table 3.Tracking Data Address For Test Mode Commands 20 & 21

00 High Power - Low Split	04 High Power - Mid Split	08 High Power -High Split
01 Low Power - Low Split	05 Low Power - Mid Split	09 Low Power - High Split
02 Voice Deviation - Low Split	06 Voice Deviation - Mid Split	0a Voice Deviation - High Split
03 Data Deviation - Low Split	07 Data Deviation - Mid Split	0b Data Deviation - High Split
0c Battery Correction Factor		
18 Squelch Setting		

Table 4. Keyboard Return Codes

KEY	CODE	KEY	CODE	KEY	CODE	KEY	CODE
1	01 80 3E	2	01 40 3E	3	01 20 3E	FCN	01 10 3E
4	02 80 3E	5	02 40 3E	6	02 20 3E	CLR	02 10 3E
7	04 80 3E	8	04 40 3E	9	04 20 3E	UP	04 10 3E
*	08 80 3E	0	08 40 3E	#	08 20 3E	DOWN	08 10 3E
SEND	10 80 3E	ON/END	----------	RCL	10 20 3E	STORE	10 10 3E
PTT	10 01 3E	NO KEY	10 00 3E				

DISASSEMBLY AND REASSEMBLY

The following procedures are intended to facilitate the disassembly and re-assembly of the radio. The complete set of procedures are given since the antenna assembly requires complete disassembly. Refer to assembly diagram ROA 117 2224.

Tool Recommended: Disassembly Tool 19B802630, 1/4” Hex driver

Disassembly

1. Remove the antenna connector screw on the back of the case, next to the antenna. NOTE: Some versions have a rubber cover over this coaxial connector.

2. Remove the battery. Refer to procedures ”Inserting and Removing the Battery”.

3. After removing the battery, remove the two screws (now exposed) from the case assembly.

4. Using the antenna tool, (or carefully bend the case sides outward) to release the plastic tabs, two in each side.

5. Tilt the case backwards and upward toward the antenna end. Remove the coaxial collar.

6. Lift off the RF board assembly with the shield box.

7. Remove the antenna assembly.

8. Lift out the audio logic board.

9. Lift off the PTT button.

Reassembly

1. Check the placement of the buzzer and microphone. Be sure the buzzer gasket is properly seated over the edge of the board.

2. Be sure the LCD is placed against alignment edges on the lightguide.

3. Guide the audio/logic board into the case. If the buzzer and/or microphone keep the board from seating, realign and retry.

4. Place the RF board onto the frame.

5. Place the antenna assembly into the frame making sure that the coaxial connector protrudes through the RF board.

6. Place the coaxial collar onto the RF board assembly.

7. Carefully seat the RF assembly onto the audio/logic

board, carefully align the connector (16-pin) while also aligning the PTT button.

8. Place back cover (tilted top to top) and lower onto back; push lightly on the coaxial connector if need be.

9. Using the antenna tool, replace the two screws (removed during disassembly, step 3) in the case assembly

10. Replace battery and check operation by powering up the radio and sending a test message.

BATTERY REMOVAL AND INSTALLATION

Standard Battery Removal and Insertion

Removal

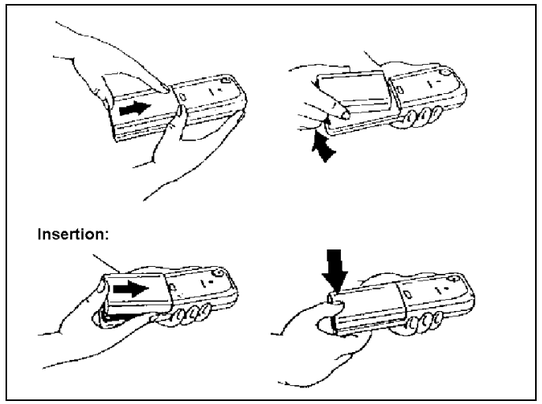


Figure 3. Standard Battery

High Capacity Battery Removal and Insertion

Removal:

Grasp and move buttons away from radio unit	Lift battery up and in direction away from radio unit

SMD COMPONENT REMOVAL AND REPLACEMENT

When removing and replacing the SMD components follow the procedure given below using a soldering iron and a solder sucker.

Removing SMD Components

1. Unsolder the component by heating one pad and using a solder sucker to remove the solder. Then apply heat to the other pad and lift the component from the board.

Replacing SMD Components

With the PCB appropriately held in the best position for repair:

1. Ensure that all excess solder and old glue is removed from the board and the pads on the printed circuit board and component solder pads are mechanically clean.

2. Centrally locate the component between the printed circuit board pads.

3. Using the soldering iron, apply sufficient heat to the SMD component pads and the corresponding printed circuit board pads to set the component in position.

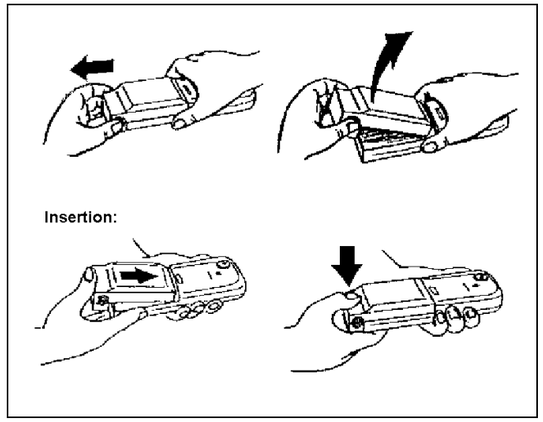


Figure 4. Optional High Capacity Battery

CAUTION

Do not allow the soldering iron tip to come in contact with the body of the replacement SMD component.

Avoid prolonged application of heat to the pads of the replacement SMD component. Damage to the component may result.

Do not use SMD components that do not accept solder properly. They may not function as required or the working life of the component may be reduced due to chemical contamination.

PROGRAMMING THE RADIO

Refer to programming manual TQ3373 when programming the radio. Programming cable RPM 113 1460 is required to interconnect the radio and PC Programmer.

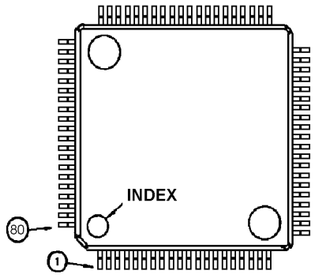
SERVICING THE BATTERY

To insure peak performance from your radio, the battery pack must be fully charged. Proper care and charging will allow maximum performance and life of your battery pack.

New batteries or batteries that have been stored for a long period of time, should be fully charged before placing into service. The battery should be replaced if the charge state is in doubt. If the rechargeable battery is only sparingly or seldom used and is left on continuous charge for one or two months at a time, it could experience reduced capacity. This would severely reduce the life of the battery between charges.

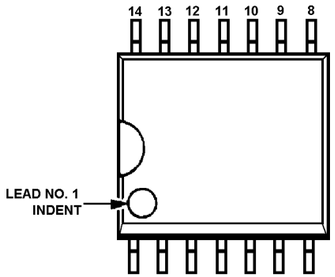
The rechargeable nickel-cadmium battery packs may be recharged using the Rapid Multi-Charger (DYCH5B) separately or while attached to the radio. The battery should be recharged whenever the charge state is in doubt. To recharge a battery insert the battery pack (without or without the radio) into the charger. Refer to Operator's Manual AE/LZT 123 1872 for charging instructions.

D601 - Audio Signal Processor (ASP)
(RYS 105 402 R1A)

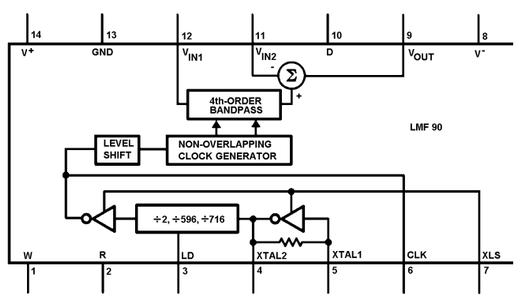


N602, Notch Filter
RYT 114 6006/1

Lead Identification

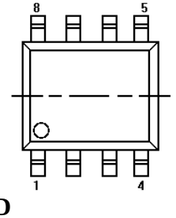


Functional Block Diagram



D603, Phase Lock Loop Oscillator
RYT 113 6077/1

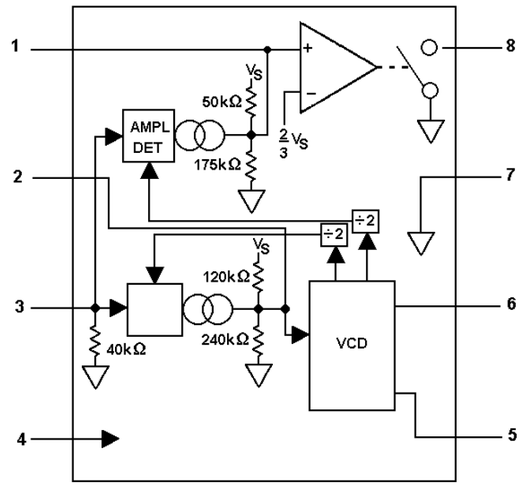
Lead Identification



LOGIC BOARD

(ROA 117 2224)

Functional Block Diagram

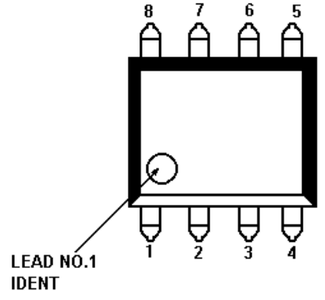


Pin Out

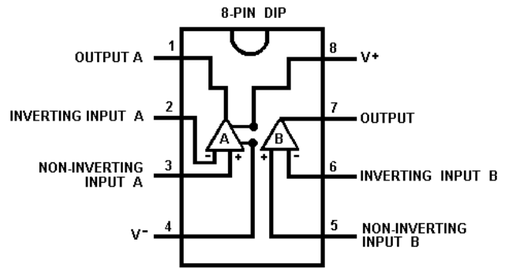
Termi-nal	Symbol	Func-tion	Termi-nal	Symbol	Func-tion
1	O_F	Output Filter	5	R_t	Timing Resistor
2	L_F	Loop Filter	6	C_t	Timing Cap.
3	V_{IN}	Ph. Det. In	7	GND	Ground
4	V_S	Supply Voltage	8	V_{out}	Out Voltage

N604, Dual Operational Amplifiers
RYT 101 6043/2

Lead Identification

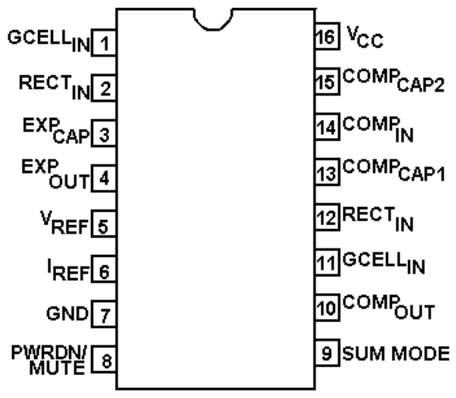


Pin Out Diagram

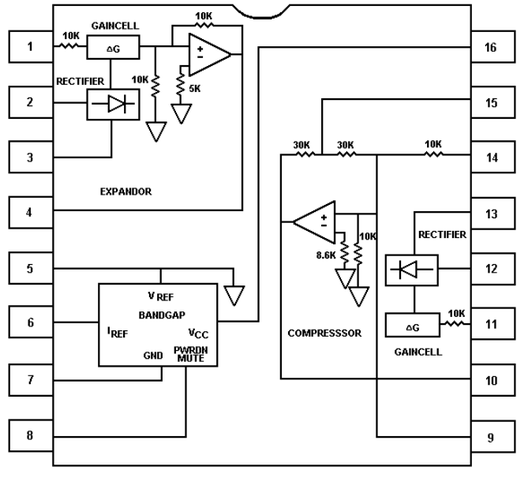


D605, Compandor
RYT 101 6119/2C

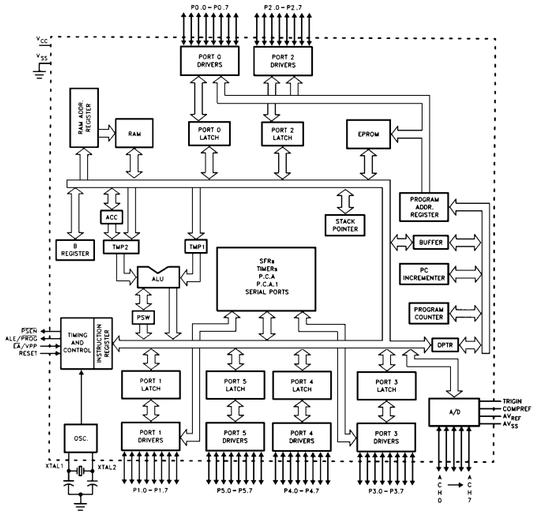
Lead Identification & Pin Out



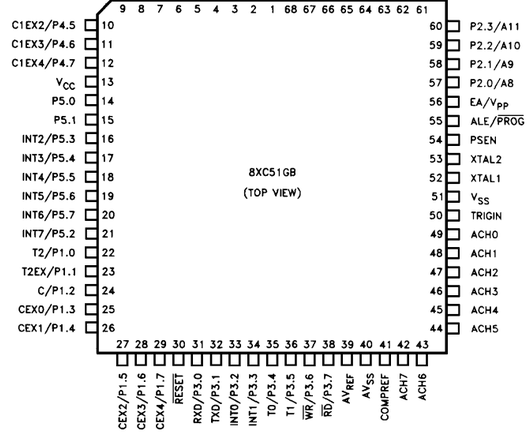
Functional Block Diagram



D701 8-Bit Microprocessor
RON 107 603 R1

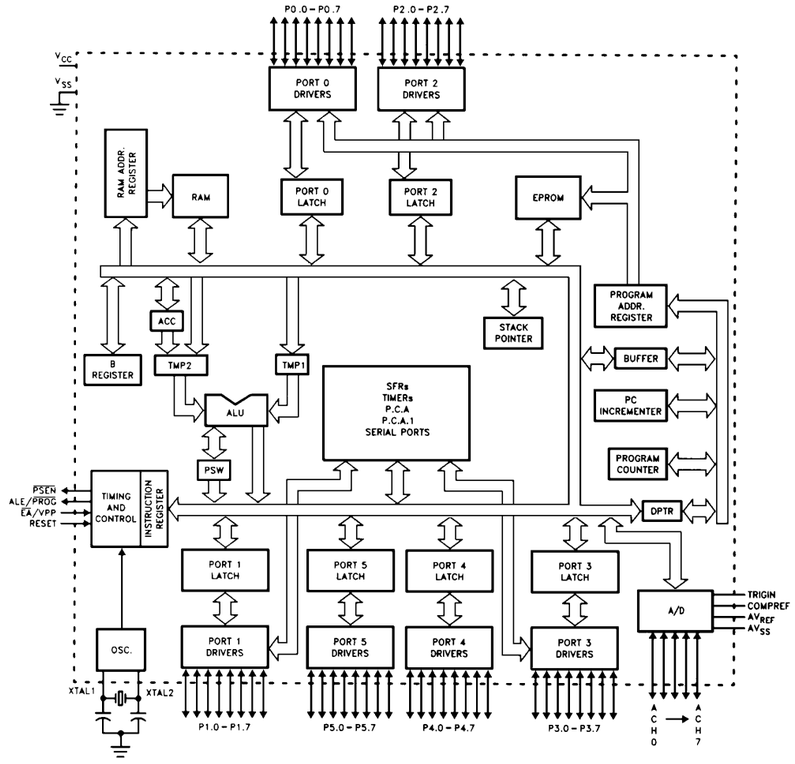


Lead Identification & Pin Out



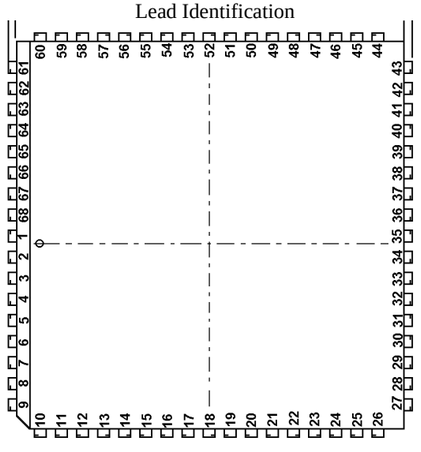
D701 8-Bit Microprocessor
RON 107 603 R1

Functional Block Diagram



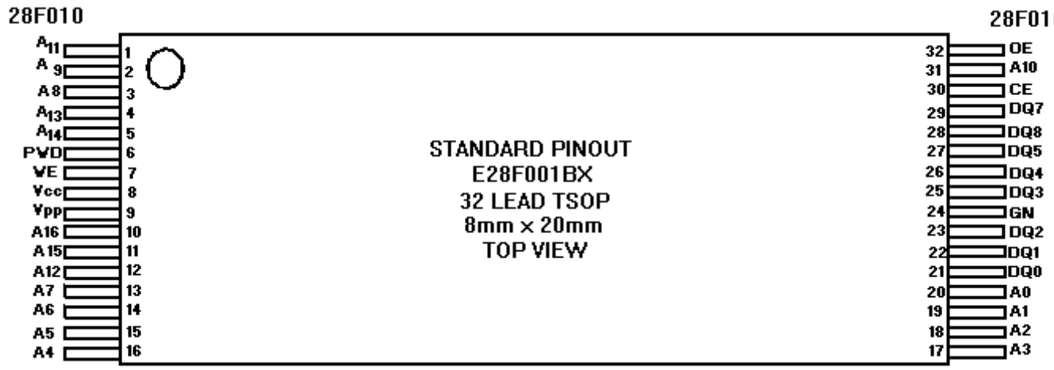
D702, Custom Modem
RON 107 603 R1

Lead Identification

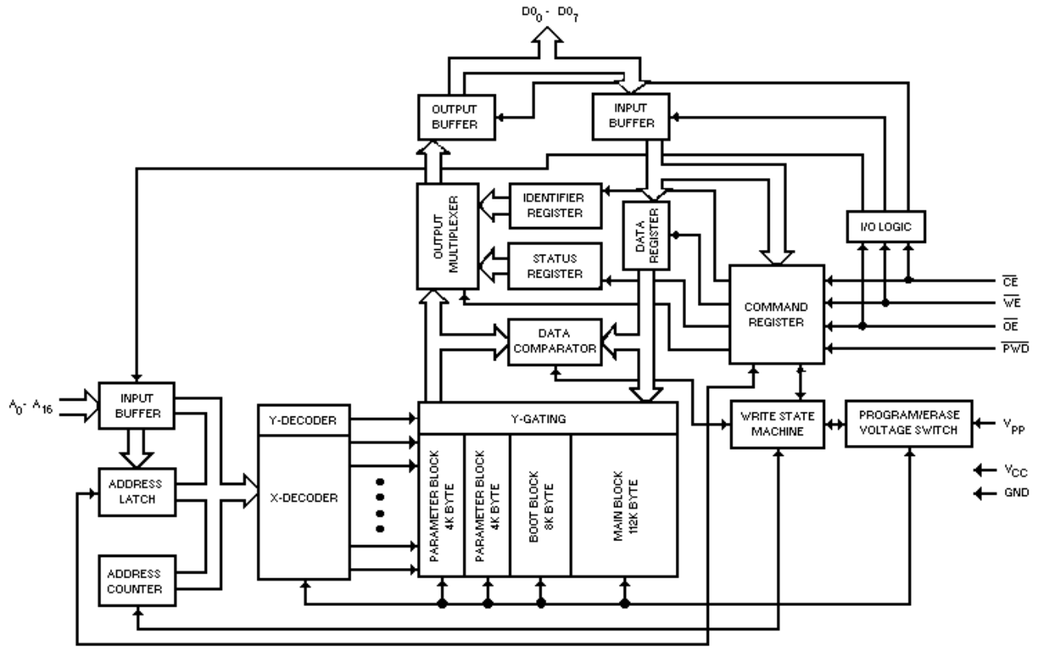


D703, Flash Memory 128 x 8
RYT 118 038/6C

Lead Identification & Pin Out



Functional Block Diagram

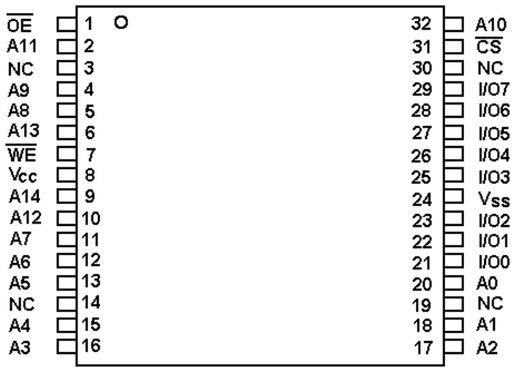


LOGIC BOARD

(ROA 117 2224)

U707, Static RAM, High Speed: 32768 x 8-Bit
RYT 119 6005/6C

Lead Identification

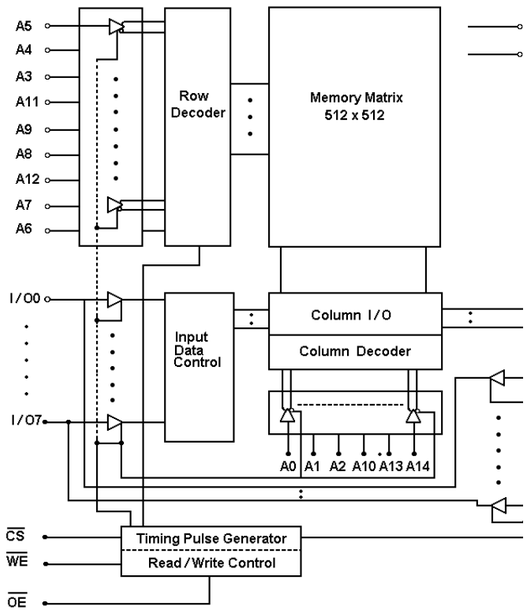


Pin Out

Symbol	Function
AO-A14	Adress
VO 0-VO 7	Input/Output
CS	Chip Select
WE	Write Enable
OE	Oootput Enable
NC	No Connection
Vcc	Power supply
Vss	Ground

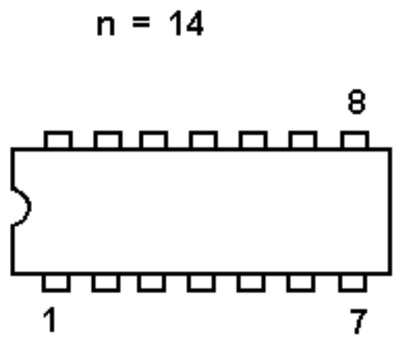
U710, Quad AND Gate
RYT 304 0008/C

Functional Block Diagram



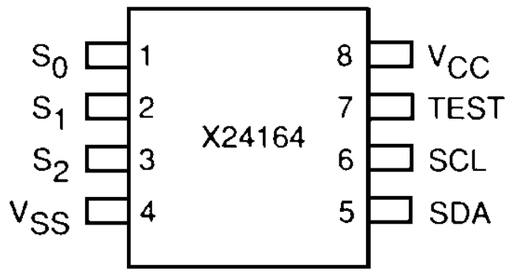
U711, NAND Gate, Quad
RYT 306 2001/C
D712, NAND Gate, Quad
RYT 306 6056/C

Lead Identification

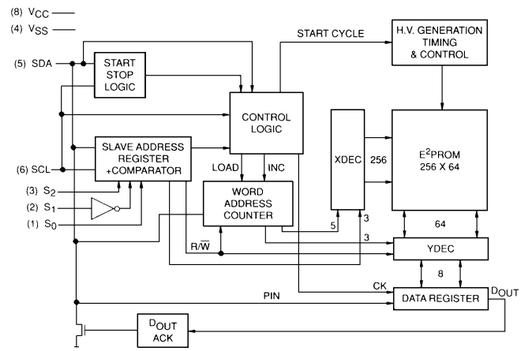


D801-D803, EEPROM 256 X 8 Bit
RYT 118 6047/1

Lead Identification & Pin Out

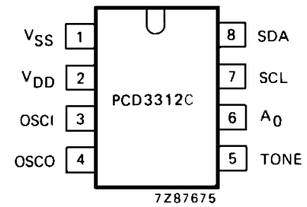


Functional Block Diagram

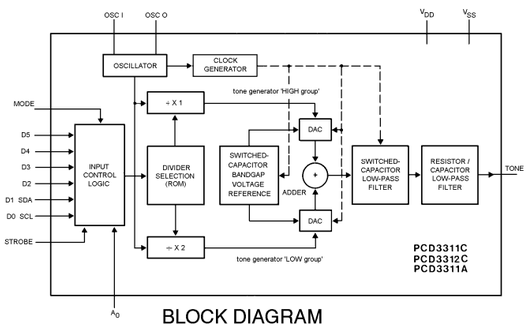


D804, Tone Generator, (DTMF & Modem Frequencies)
RYT 108 6012/1

Lead Identification & Pin Out



Functional Block Diagram



BLOCK DIAGRAM

LOGIC BOARD

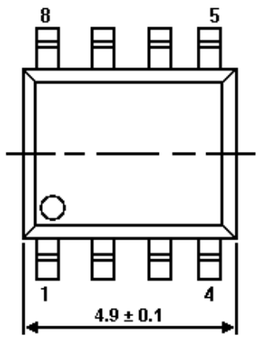
(ROA 117 2224)

Pin Out Descriptions

Signal	Function	Signal	Function	Signal	Function
OSCI	Oscillator Input	TONE	Single or Dual Tone Out.	VDD	Positive Supply
OSCO	Oscillator Output	AD	Slave Addr; Serial Mode	VSS	Negative Supply
MODE	Mode Select Input	DO/SCL	Parallel Data In	STROBE	Strobe Input
D5	Parallel Data In.	D1/SDA	Parallel Data Out	D2-D4	Parallel Data In

N805, Voltage Regulator, 4.8 Volts
RYT 113 6005C

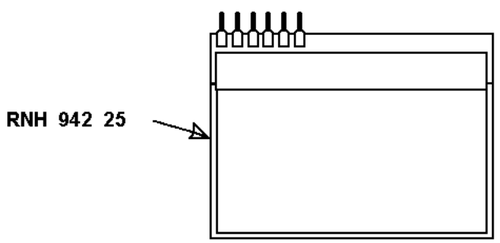
Lead Identification



Pin Out Descriptions

Term	Symbol	Function	Term	Symbol	Function
1	VOUT	Output Voltage	5	COMP	Error Out
2	IN	Sense Input	6	TAP	TAP In
3	ON/OFF	Shutdown In	7	FBOUT	Feedback Out
4	GND	Ground	8	VIN	Input Voltage

N806, Display
NTZ/RNH 942 25

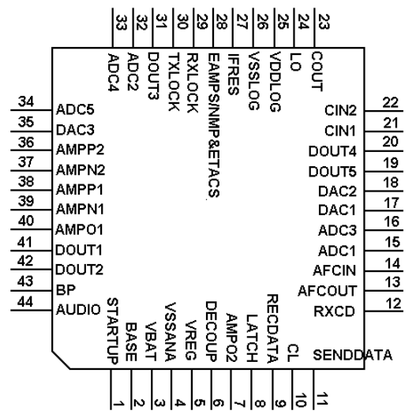


Pin Out Descriptions

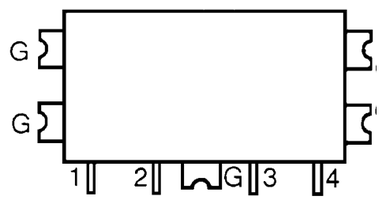
Pin	Function
1	SDA: Serial Data Line, I2 C-bus
2	SCL: Serial Clock Line, I2 C-bus
3	VSS: Ground
4	OSC: Oscillator Input
5	VDIG: Positive supply Voltage
6	VLCD: LCD Supply Voltage

U101, Radio Interface Controller - Bertram
RYT 312 6027/C

Lead Identification

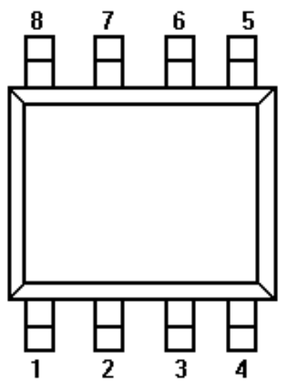


U200, Preamplifier
344A3953P1

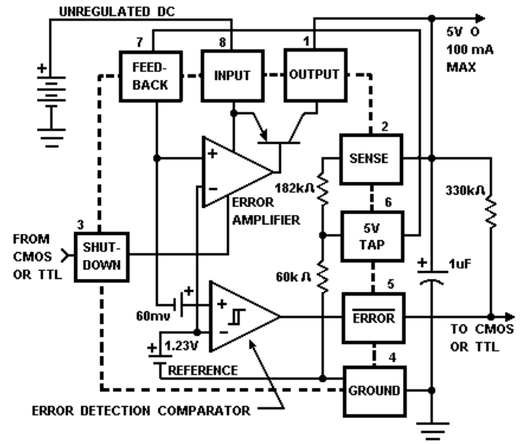


U161, 5 Volt Regulator
RYT 113 6005/3C

Lead Identification Block Diagram

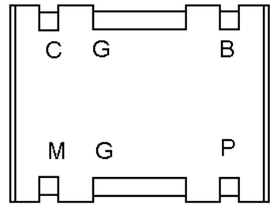


Functional Block Diagram



U310, Voltage Controlled Oscillator
RTL 402 654/01

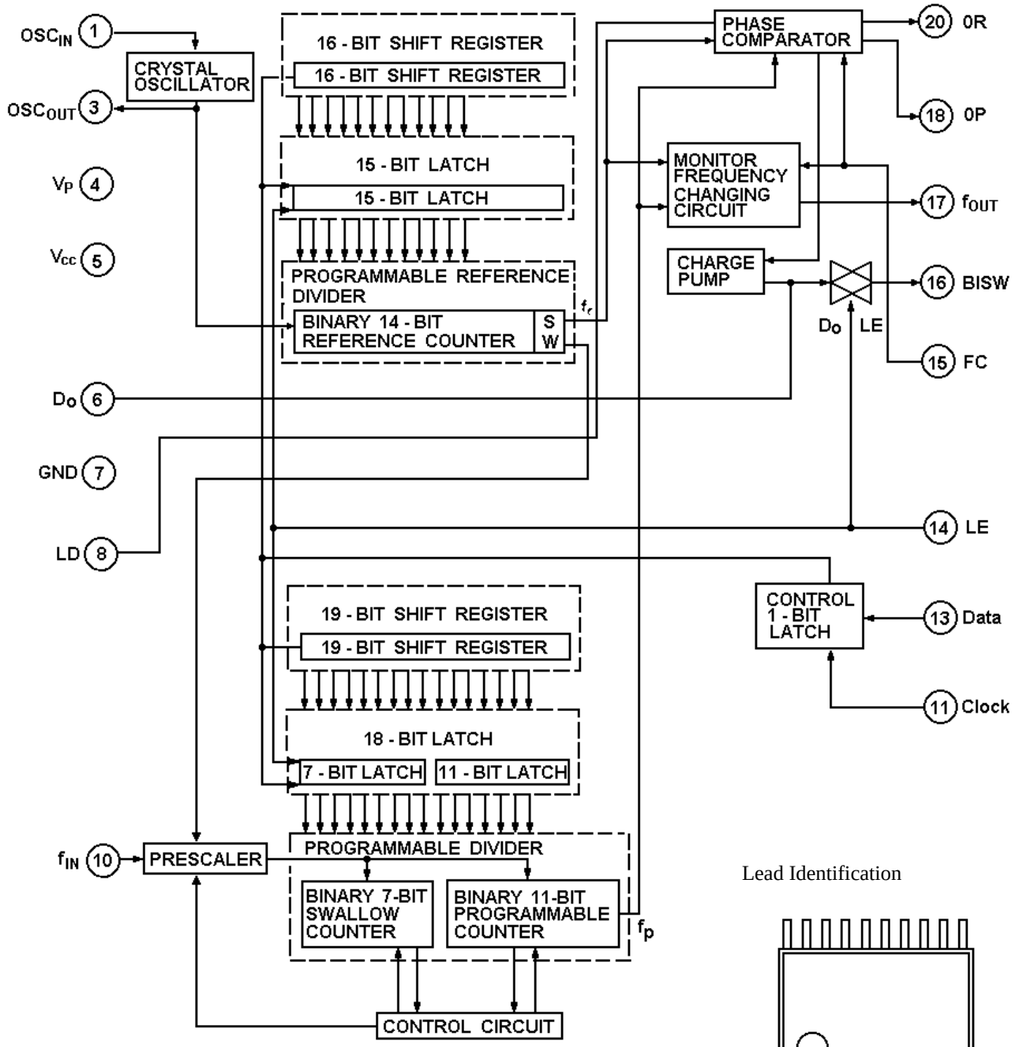
Lead Identification



LOGIC BOARD
(ROA 117 2224)

U320, U420 Frequency Synthesizer, 1.1 GHz
RYT 102 6007/2C

Block Diagram



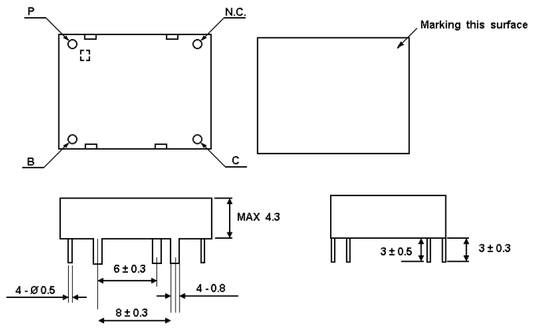
Lead Identification

RF BOARD

(ROA 117 2229)

U410, Voltage Controlled Oscillator, 925-950 MHz
RTL 402 653/01

Lead Identification

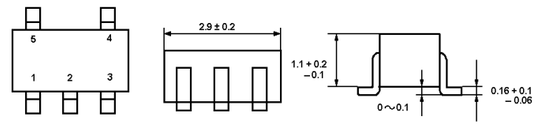


Pin Descriptions

TERM	FUNCTION
B	Power Supply
C	Frequency Control
P	Output
NC	No Contact

U430, Wideband Amplifier
RYT 101 6089/2C

Lead Identification

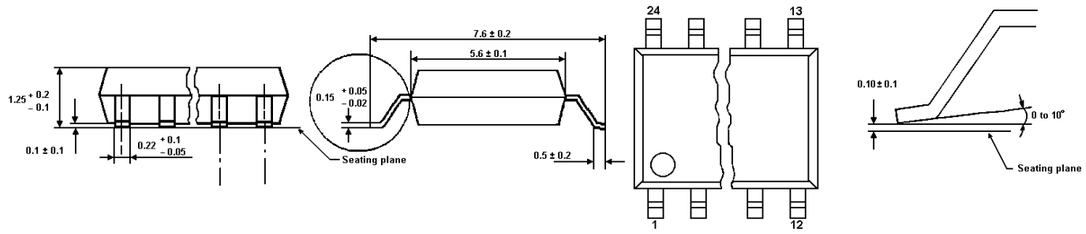


Pin Descriptions

TERM	SYMBOL	FUNCTION
1	IN	Input
2	GND	Ground
3	VCC	Supply Voltage
4	OUT	Output
5	C	Collector

U501, IF Amplifier, 455 kHz
RYT 101 6091/2C

Lead Identification



Pin Functions

TERM	SYMBOL	FUNCTION	TERM	SYMBOL	FUNCTION
1	GND1	Ground 1	13	QUADIN	Quad Input
2	GND2	Ground 2	14	LIM OUT	LIM Output
3	OSCIN	Oscillator In	15	NC	NC
4	OSCOUT	Oscillator Out	16	NC	NC
5	VCC2	Supply Voltage 2	17	LIM DEC2	-
6	VCC1	Supply Voltage 2	18	LIM INt	LIN Input
7	MIXIN1	Mixer In. 1	19	LIM DEC1	-
8	MIXIN2	Mixer In 2	20	IFOUT	IF Output
9	MUTEIN	Mute Input	21	IF DEC2	-
10	DATAOUT	Data Output	22	IFIN	IF Input
11	AUDIOOUT	Audio Output	23	IF DEC1	-
12	RSSIOUT	RSSI Output	24	MIXOUT	Mixer Output

Allegra Radio
DY101 - Duplex, Interconnect Only
DY102 - Duplex, Interconnect / EDACS (w/PTT)

LOGIC BOARD
ROA 117 2224 (Rev. 2)

SYMBOL	PART NO.	DESCRIPTION
		- - - - - - - -CAPACITORS - - - - - - -
C601	RJC4643035/1	Ceramic: 10 nf, ±10%, 50 VDCW.
C602	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C603	RJC4643046/1	Ceramic: 100 nf, ±10%, 25 VDCW
C604	RJC4633033/1	Ceramic: 100 pF ±5%, 50 VDCW.
C605	RJC4633033/1	Ceramic: 100pF ±5%, 50 VDCW.
C606	RJE5843638/1	Tantalum: 10 uF ±20%, 10 VDCW.
C607	RJC4643034/1	Ceramic: 1 nf, ±10%, 50 VDCW.
C608	RJC4643034/1	Ceramic: 1 nf, ±10%, 50 VDCW.
C609	RJC4633033/22	Ceramic: 220pF ±5%, 50 VDCW.
C610	RJC4643034/33	Ceramic: 3.3 nf, ±10%, 50 VDCW.
C611	RJC4643034/33	Ceramic: 3.3 nf, ±10%, 50 VDCW.
C612	RJC4643034/47	Ceramic: 4.7 nf, ±10%, 50 VDCW.
C613	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW..
C614	RJC4633032/33	Ceramic: 33 pF ±5%, 50 VDCW.
C616	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW.
C617	RJE5992108/1	Tantalum: 10 uF ±20. 10 VDCW.
C618	RJE5843107/22	Tantalum: 2.2 uF ±20%, 10 VDCW..
C619	19A702052P45	Ceramic: 0.22 uF, ±10%, 50 VDCW.
C620	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C621	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C622	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C623	RJC4643034/1	Ceramic: 1.0 nf, ±10%, 50 VDCW.
C624	RJC4643035/1	Ceramic: 10 nf, ±10%, 50 VDCW.
C625	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C627	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C628	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C629	RJC4633033/47	Ceramic: 470 pF ±5%, 50 VDCW.
C630	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C631	RJC4633033/1	Ceramic: 100 pF ±5%, 50 VDCW.
C635	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C636	RJE5992108/1	Tantalum: 10 uF ±20. 10 VDCW.
C640	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C641	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW.
C651	RJC4643034/68	Ceramic: 6.8 nF ±10%, 50 VDCW.
C653	RJC4643034/1	Ceramic: 1.0 nF ±10%, 50 VDCW.
C654	19A702052P45	Ceramic: .22 UF, ±10%, 50 VDCW.
C654	RJC4643046/22	Ceramic: 220 nF ±10%, 16 VDCW.
C657	RJC4643035/22	Ceramic: 22 nF ±10%, 25 VDCW.
C658	RJC4643033/22	Ceramic: 220 pF ±10%, 50 VDCW.
C659	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C660	RJE5992108/1	Tantalum: 10 uF ±20. 10 VDCW.
C663	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW.
C664	RJC4643035/1	Ceramic: 10 nF ±10%, 50 VDCW.
C665	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW.
C710	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C713	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C714	RJE5992108/1	Tantalum: 10 uF ±20. 10 VDCW.
C715	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C716	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C717	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C718	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C719	RJC4643046/	Ceramic: 100 nF ±10%, 25 VDCW.
C720	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C721	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C722	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C723	RJC4633032/18	Ceramic: 18 pF ±5%, 50 VDCW.
C724	RJC4633032/1	Ceramic: 10 pF ±5%, 50 VDCW.
C725	RJC4633032/33	Ceramic: 33 pF ±5%, 50 VDCW.
C726	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C802	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C803	RJE5843637/47	Tantalum: 4.7 uF ±20%, 6.3 VDCW.
C804	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C805	RJE5843107/22	Tantalum: 2.2 uF ±20%, 35 VDCW.
C810	RJC4643035/1	Ceramic: 10 nF ±10%, 50 VDCW.
C811	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C812	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C816	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C817	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C818	RJE5992108/1	Tantalum: 10 uF ±20. 10 VDCW.
C819	RJC4643046/1	Ceramic: 100 nF ±10%, 25 VDCW.
C820	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW.
C821	RJE5843167/1	Tantalum: 1.0 uF ±20%, 16 VDCW.
C822	RJC4643034/1	Ceramic: 1.0 nF ±10%, 50 VDCW.
C824	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C825	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C826	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
C827	RJC4643035/1	Ceramic: 10 nF ±10%, 50 VDCW.
C828	RJC4633033/22	Ceramic: 220 pF ±5%, 50 VDCW.
		- - - - - - - - - CRYSTALS - - - - - -
L601	RTM 501 693/01	Resonator, Ceramic: 586.5 kHz.
B701	RTM 501 659/02	Crystal 11.0592 MHz.
B801	RTM 501 659/01	Crystal: 3.579545 MHz.
		- - - - - - - - -DIODES - - - - - - - -
V607	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V811	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V812	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V813	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V814	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V815	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V816	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V817	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V820	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V821	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V822	RKZ433645/1	LED, surface mount: red, reverse voltage 5volts, pwr disp. 65mW.
V830	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V831	RKZ12303/3	Diode, surface mount, reverse voltage: 70 volts.
V833	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V834	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V835	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V836	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V837	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V838	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V839	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V840	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V841	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V842	RKZ12303/3	Diode, surface mount, reverse voltage: 70 volts.
V843	RKZ12303/3	Diode, surface mount, reverse voltage: 70 volts.
V602	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V847	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V848	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V849	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V850	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V851	RKZ12303/1	Diode, surface mount, reverse voltage: 70 volts.
V852	RKZ123616/1	Diode, Reverse voltage peaK100 volts, (sim to MURS110).
V856	RKZ433645/1	LED, surface mount: red, reverse voltage 5 volts, pwr disp. 65mW.
		- - - INTEGRATED CIRCUITS - -
D601	RYS105 402 R1A	CMOS: Audio Signal Processor; sim to Fu-jitsu MB87780PFV-G-BND.
N602	RYT 114 6006/1	Notch filter, switched capacitor; sim to Na-tional LMF90CC.
N603	RYT1136077/1	Oscillator, Phase Lock Loop (PLL); sim to LMC568.
N604	RYT1016043/2C	Dual OP. AMP.; (Sim to LMC 662).
D605	RYT 101 6119/2C	Compandor; sim to Phillips NE578.
D701	RON 107 603 R1	Microprocessor, 8-bit; sim to Intel 87C51GB.
D702	ROP 101 688/2C	Modem, Custom ASIC.
D703	RYT 118 038/6C	Memory, flash: 128K x 8; sim to Intel E28FOO1BX-T120.
U707	RYT1196005/6C	Static RAM, high ;speed: 32768 X 8-bit: (sim to HM62256A)
U710	RYT3040008/C	AND Gate, quad; (sim to 74HC08).
U711	RYT3062001/C	NAND Gate, quad;(Sim to 74HC00).
N712	RYT3066056/C	NAND Gate, quad;(Sim to 74HC03D).
D801 thru D803	RYT 118 6047/1	EEPROM,CMOS: 2048 X 8 Bit; sim to Xicor X24164.
D804	RYT 108 6012/1	Tone Generator: DTMF & Modem tone freq.; (sim to Phillips PCD3312C).
N805	RYT1136005/C	Microcircuit; (sim to LP2951).
N806	RNH94225	Display, LCD.
		- - - - - - -RESISTORS - - - - - -
R601	REP623643/56	Resistor, chip: 560 Ohms, 1%, 50 wvdc, .06w.
R603	REP623644/62	Resistor, chip: 6.2K Ohms, 1%, 50 wvdc, .06w.
R604	REP623644/27	Resistor, chip: 2.7K Ohms, 1%, 50 wvdc, .06w.
R605	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w.
R606	REP623645/68	Resistor, chip: 68K Ohms, 1%, 50 wvdc, .06w.
R607	REP623646/24	Resistor, chip 240K Ohms, 1%, 50 wvdc, .06w
R610	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w.
R611	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R612	REP623645/33	Resistor, chip: 33K Ohms, 1%, 50 wvdc, .06w.
R613	RP623645/15	Resistor, chip: 15K Ohms, 1%, 50 wvdc, .06w.
R614	REP623645/82	Resistor, chip: 82K Ohms, 1%, 50 wvdc, .06w.
R615	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R620	REP623645/82	Resistor, chip: 82K Ohms, 1%, 50 wvdc, .06w.
R621	REP623645/82	Resistor, chip: 82K Ohms, 1%, 50 wvdc, .06w.
R622	REP623644/82	Resistor, chip: 1.8K Ohms, 1%, 50 wvdc, .06w.
R623	REP623646/24	Resistor, chip: 240K Ohms, 1%, 50 wvdc, .06w.
R625	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R627	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R628	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R629	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R630	REP623644/1	Resistor, chip: 1K Ohms, 1%, 50 wvdc, .06w.
R631	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R632	REP623644/27	Resistor, chip: 2.7K Ohms, 1%, 50 wvdc, .06w.
R634	REP623644/27	Resistor, chip: 2.7K Ohms, 1%, 50 wvdc, .06w.
R635	REP623644/27	Resistor, chip: 2.7K Ohms, 1%, 50 wvdc, .06w.
R636	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R637	REP623644/68	Resistor, chip: 6.8K Ohms, 1%, 50 wvdc, .06w.
R639	REP623643/56	Resistor, chip: 560 Ohms, 1%, 50 wvdc, .06w.
R640	REP623642/1	Resistor, chip: 10 Ohms, 1%, 50 wvdc, .06w.
R641	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc,.06w.
R642	REZ40114/2	Thermistor: 100K ohms 10%, 25°C = -4.32.
R643	REP623645/39	Resistor, chip: 39K Ohms, 1% 50 wvdc, .06w.
R644	REP623645/33	Resistor, chip: 33K Ohms, 1% 50 wvdc, .06w.
R645	REP623645/33	Resistor, chip: 33K Ohms, 1% 50 wvdc, .06w.
R646	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R650	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R651	REP623645/68	Resistor, chip: 68K Ohms, 1%, 50 wvdc, .06w.
R653	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R660	REP623645/33	Resistor, chip: 33K Ohms, 1%, 50 wvdc, .06w.
R661	REP623646/33	Resistor, chip: 330K Ohms, 1%, 50 wvdc, .06w.
R671	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R672	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R673	REP623645/33	Resistor, chip: 33K Ohms, 1%, 50 wvdc, .06w.
R676	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R680	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R681	REP623644/1	Resistor, chip: 1K Ohms, 1%, 50 wvdc, .06w.
R682	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R683	REP623646/68	Resistor, chip: 680K Ohms, 1%, 50 wvdc, .06w.
R684	REP623644/27	Resistor, chip: 2.7K Ohms, 1%, 50 wvdc, .06w.
R685	REP623646/68	Resistor, chip: 680K Ohms, 1%, 50 wvdc, .06w.
R686	REP623644/62	Resistor, chip: 6.2K Ohms, 1%, 50 wvdc, .06w.
R710	REP623645/15	Resistor, chip: 15K Ohms, 1% 50 wvdc, .06w.
R711	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R715	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R716	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R717	REP623642/1	Resistor, chip: 10 Ohms, 1%, 50 wvdc, .06w.
R718	REP623642/1	Resistor, chip: 10 Ohms, 1%, 50 wvdc, .06w.
R719	REP623645/1	Resistor, chip: 10K Ohms, 1% 50 wvdc, .06w.
R720	REP623645/1	Resistor, chip: 10K Ohms, 1% 50 wvdc, .06w.
R721	REP623642/1	Resistor, chip: 10 Ohms, 1%, 50 wvdc, .06w.
R722	REP623645/47	Resistor, chip: 47K Ohms, 1% 50 wvdc, .06w.
R723	REP623645/33	Resistor, chip: 33K Ohms, 1% 50 wvdc, .06w.
R724	REP623644/33	Resistor, chip: 3.3K Ohms, 1%, 50 wvdc, .06w.
R810	REP623644/27	Resistor, chip: 2.7K Ohms, 1%, 50 wvdc, .06w.
R811	REP623644/33	Resistor, chip: 3.3K Ohms, 1%, 50 wvdc, .06w.
R812	REP623644/1	Resistor, chip: 1K Ohms, 1%, 50 wvdc, .06w.
R813	REP623644/33	Resistor, chip: 3.3K Ohms, 1%, 50 wvdc, .06w.
R814	REP623645/1	Resistor, chip: 10K Ohms, 1% 50 wvdc, .06w.
R815	REP623645/2	Resistor, chip: 20K Ohms, 1% 50 wvdc, .06w..
R816	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R817	REP623645/2	Resistor, chip: 20K Ohms 1%, 50 wvdc, .06w.
R818	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R819	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R820	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w.
R823	REP623646/22	Resistor, chip: 220K Ohms, 1%, 50 wvdc, .06w.
R824	REP623643/56	Resistor, chip: 560 Ohms, 1%, 50 wvdc, .06w.
R825	REP623643/56	Resistor, chip: 560 Ohms, 1%, 50 wvdc, .06w.
R826	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R827	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w
R828	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w
R829	REP623646/33	Resistor, chip: 330K Ohms, 1%, 50 wvdc, .06w.
R830	REZ40114/1	Thersmistor:, 2786 Ohms ±10%, NTC temp coeff @ 25°C = -4.68.
R831	REP623645/2	Resistor, chip: 20K Ohms 1%, 50 wvdc, .06w.
R832	REP623645/68	Resistor, chip: 68K Ohms, 1%, 50 wvdc, .06w.
R833	REP623645/15	Resistor, chip: 15K Ohms, 1%, 50 wvdc, .06w.
R834	REP623644/1	Resistor, chip: 1K Ohms, 1%, 50 wvdc, .06w.
R835 thru R838	REP624652/47	Resistor, chip: 47 Ohm 1%, temp coeff.: 200 ppm. 0.1w.
R839	REP623642/68	Resistor, chip: 68 Ohms, 1%, 50 wvdc, .06w.
R840	REP623642/68	Resistor, chip: 68 Ohms, 1%, 50 wvdc, .06w.
R841 thru R845	REP623645/33	Resistor, chip: 33K Ohms, 1%, 50 wvdc, .06w.
R846	REP623643/2	Resistor, chip: 200 Ohms, 1%, 50 wvdc, .06w.

SYMBOL	PART NO.	DESCRIPTION
R847	REP623642/1	Resistor, chip: 10 Ohms, 1%, 50 wvdc, .06w.
R848	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R849	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R850	REP623643/56	Resistor, chip: 560 Ohms, 1%, 50 wvdc, .06w.
R851	REP623643/56	Resistor, chip: 560 Ohms, 1%, 50 wvdc, .06w.
R852	REP623645/33	Resistor, chip: 33K Ohms, 1%, 50 wvdc, .06w.
R853	REP623645/56	Resistor, chip: 56K Ohms, 1%, 50 wvdc, .06w.
R854	REP623645/1	Resistor, chip: 10K Ohms, 1%, 50 wvdc, .06w.
R855	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w.
R856	REP623644/15	Resistor, chip: 1.5K Ohms, 1%, 50 wvdc, .06w.
R857	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w.
R858	REP623645/47	Resistor, chip: 47K Ohms, 1%, 50 wvdc, .06w.
R859	REP623646/1	Resistor, chip: 100K Ohms, 1%, 50 wvdc, .06w.
R860	REP623644/62	Resistor, chip: 6.2K Ohms, 1%, 50 wvdc, .06w.
R865	REP623644/15	Resistor, chip: 1.5K Ohms, 1%, 50 wvdc, .06w.
		- - - - - - - SWITCHES - - - - - -
S801	RMD955008/01	PTT Switch., single pole (NO), momentary pushbutton.
		- - - - - - - -TRANSISTORS - - - - - -
V601	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V603	RYN120619/1	Transistor, PNP: Surface mount; (sim to 3906).
V605	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V606	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V701	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904
V802	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V803	RYN120619/1	Transistor, PNP: Surface mount; (sim to 3906).
V804	RYN 122 623/1	Transistor, FET, TMOS; (Sim to MTD4P06).
V805	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V806	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V807	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V808	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V809	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904).
V810	RYN120619/1	Transistor, PNP: Surface mount; (sim to 3906).
V845	RYN120619/1	Transistor, PNP: Surface mount; (sim to 3906).
V855	RYN121675/1	Transistor, NPN: Surface mount; (sim to 3904)..
		- - - - - - MISCELLANEOUS PARTS - - - - - -
D810	RLE 90605/2	Earphone Speaker.
N806	RNH94225	Liquid Crystal Display
H803	KLJ 107 03/2	Buzzer (Speaker)
	SXA 105 5736	Buzzer gasket
B802	RLC 509 105/2	Microphone
	SXA 105 5675	Microphone Gasket
	SXK 107 1843	Light Guide
X201	RPV 403 119/16	System connector
	SXA 120 4147	Shield, Logic Board

RF BOARD
188D6249G1

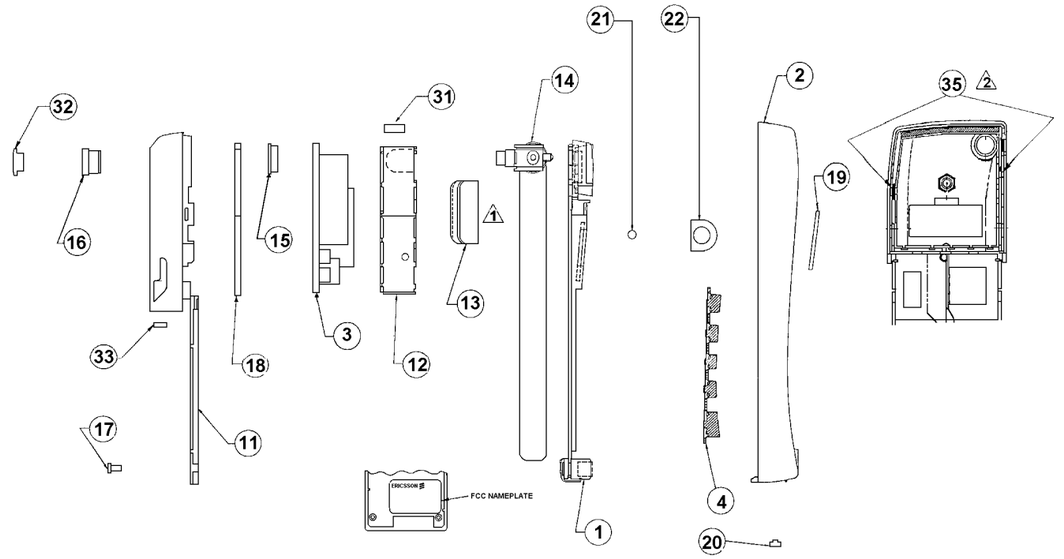
SYMBOL	PART NO.	DESCRIPTION
		CAPACITORS
C101 thru C115	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C116	RJE5992167/68	Tantalum, 6.8 uF ±10%, 16DCWV.
C121	19A149897P15	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C122	19A149897P37	Ceramic, 82pF ±5%, 50 DCVW, Temp Comp ±30ppm.
C123	RJC4643035/22	Ceramic chip: 22nF ±10% 50 DCWV.
C131	RJE5992108/1	Tantalum: 10uF ±10%, 10DCWV.
C132 and C133	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV.
C141	19A149897P35	Ceramic, 68pF ±5%, temperature compen-sating
C142	RJE5992167/1	Tantalum Chip: 1uF ±10%, 16DCWV.
C150	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C161	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C162	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C163	RJE5992108/1	Tantalum: 10Uf + OE - 10%, 10DCWV.
C200	19A149897P12	Ceramic, 5.6 pF ±0.25 pF, temperature compensating.
C201	19A149897P9	Ceramic, 3.3 pF ±0.25 pF, temperature compensating.
C202 and C203	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C204	19A149897P11	Ceramic: 4.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±60 PPM.
C205	19A149897P8	Ceramic, 2.7 pF ±0.25 pF, temperature compensating
C207	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C210	RJE5992167/68	Tantalum, 6.8 uF ±10%, 16DCWV.
C211	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C220 and C221	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C230	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C240 and C241	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C250 and C251	19A149897P51	Ceramic, 330 pF ±5%, temperature com-pensating.
C301	RJC4643035/68	Ceramic Chip: 68nF ±10%.
C302	RJE5993048/1	Tantalum chip 10 uF ±5%, 4 DCWV.
C304 and C305	19A702052P8	Ceramic: 3300 pF ±10%, 50 VDCW.
C306	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C307	19A149897P51	Ceramic, 330 pF ±5%, temperature com-pensating.
C310	RJE5992107/47A	Tantalum chip: 4.7 uF ±10%, 10 DCWV.
C311	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C312	19A149897P15	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C320 and C321	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C322 and C323	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C324	RJE5992107/47A	Tantalum chip: 4.7 uF ±10%, 10 DCWV.
C330	19A149897P10	Ceramic: 3.9 pF ±.25 pF, 50 VDCW.
C331	19A149897P11	Ceramic: 4.7 pF ±0.25 pF, 50 VDCW, temp coef 0 ±60 PPM.
C332	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C333	19A149897P9	Ceramic, 3.3 pF ±0.25 pF, temperature compensating.
C334	19A149897P6	Ceramic, 1.8 pF ±0.25 pF, temperature compensating.
C335	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C336	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C401	RJC4643035/47	Capacitor, ceramic chip: 47 nF ±10%.
C403	RJE5993167/1	Capacitor, Tantalum chip: 1.0 uF ±5%, 16 DCWV.
C404	19A149896P121	Ceramic: .01 uF ±10%, 50 VDCW.
C405	19A702052P12	Ceramic: 6800 pF ±10%, 50 VDCW.
C406	19A702052P8	Ceramic: 3300 pF ±10%, 50 VDCW.
C410	RJE5992107/47A	Tantalum chip: 4.7 uF ±10%, 10 DCWV.
C411	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C412	19A149897P15	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C413	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C420	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C422	19A702052P38	Ceramic, 0.039 uF ±10%, 50 DCWV.
C423 C430 and C431	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C501	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C502 C503 and C504	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C505	RJE5992108/1	Tantalum: 10Uf + OE - 10%, 10DCWV.
C507	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C512	19A149897P6	Ceramic, 1.8 pF ±0.25 pF, temperature compensating.
C513	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C514	19A149897P7	Ceramic: 2.2 pF ±.25 pF, 50 VDCW.
C515	19A149897P39	Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C531	19A149897P6	Ceramic, 1.8 pF ±0.25 pF, temperature compensating.
C533	19A149896P121	Ceramic: .01 uF ±10%, 50 VDCW.
C535	19A149897P15	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C536	19A149896P118	Ceramic: 5600 pF ±10%, 50 VDCW.
C537	19A149897P27	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C538	19A149897P3	Ceramic, 1.0 pF ±0.25 pF, temperature compensating.
C539 C542 and C543	19A149897P23	Ceramic: 22 pf ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C543	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C551 and C552	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C561 and C562	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C571	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C583	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
C584	19A149897P25	Ceramic: 27 pF ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C585	19A149897P23 Ce	Ceramic: 22 pf ±5%, 50 VDCW, temp coef 0 ±30 PPM.
C591 and C592	RJE5992108/1	Tantalum: 10 uF ±10% 10 DCWV.
C593 and C594	RJC4643035/22	Ceramic: 22nF ±10% 50 DCWV
		DIODES
D100	19A700083P112	Diode, Silcon, Zener 5.8 Volts;(sim to BZX84C6V2).
D240 and D241	VC607603-0001	Diode, Silcon: Schottky-barrier.
		FUSES
F101	NGH324004/315	Fuse, 3 Ampere, Quick Blow.
		FILTERS
FL200	RTN202726/02	Filter, ceramic:Bandpass, 5-pole, 806-825 MHz.
FL501	RTN202726/01	Filter, Bandpass, 5-pole, 860.5 MHz.
FL521	RTN201668/01	Filter, Bandpass, SAW, 856.5 MHz.
FL541	RTN201684/02	Filter, Bandpass, SAW, 77.25 MHz (Bandpass ±15 kHz).
FL551	RTN202643/02	Filter, Ceramic, Bandpass 450 kHz (Bandwidth ±11 kHz).
FL561	RTN202643/02	Filter, Ceramic, Bandpass 450 kHz (Bandwidth ±11 kHz).
		JACKS
J101 J102 and J103	344A3955P3	Connector, 16 position; (sim to ODU 525-030-035-016).
	SXA1055696	Contact Bracket
		INDUCTORS
L121	REG704272/47	Inductor, 0.047 uH ±20%.
L531	344A3678P681	Inductor, Chip: 680 nH ±5%; sim to Coil-craft 1008CS Series.
L541	REG7041253/39	Inductor, chip: 390 nH ±5%.
L591 and L592	REG704274/33	Inductor chip: 3.3 uH ±10%.
		TRANSISTORS
Q131	RYN120614/1	Transistor, switching, PNP.
Q161 and Q162	RYN120617/1	Transistor: sim to RN2308.
Q200	RYN121618/1	Transistor, NPN; sim to HSMX-3655.
Q201	RYN123602	Transistor: N-Channel vertical D-MOS.
Q230	RYN123602	Transistor: N-Channel vertical D-MOS.
Q330	RYN123619/1	Transistor: N-Channel dual gate MOSFET.
Q511	344A4537P1	Transistor, N-Channel Dual Gate: MOS FET; sim to Sony 3SK165-1E.
Q531	344A4537P1	Transistor, N-Channel Dual Gate: MOS FET; sim to Sony 3SK165-1E.
		RESISTORS
R109	REP623645/22	Resistor, metal oxide: 22K ohms ±1%.
R119	REP623644/27	Resistor, metal oxide: 2.7K ohms ±1%.
R124	REP623645/1	Resistor, metal oxide: 10K ohms ±1%.
R125	REZ401055/1	Thermistor, NTC: 10K ohms ±10%.
R131	REP623647/1	Resistor,metal oxide: 1 megohm ±1%.
R141	REP623645/18	Resistor, metal oxide: 18K ohms ±1%.
R142	REP623645/12	Resistor, metal oxide: 12K ohms ±1%.
R143	REP623645/18	Resistor, metal oxide: 18K ohms ±1%.
R151	REP623646/1	Resistor, metal oxide: 100K ohms ±1%.
R152	REP623645/1	Resistor, metal oxide: 10K ohms ±1%.
R200	REP623644/33	Resistor, metal oxide: 3.3K ohms ±1%.
R201	REP623644/22	Resistor, metal oxide: 2.2K ohms ±1%.
R202	REP623643/1	Resistor, metal oxide: 100 ohms ±1%.
R203	REP623643/27	Resistor, metal oxide: 270 ohms ±1%.
R204	REP623642/18	Resistor, metal oxide: 18 ohms ±1%.
R205 and R206	REP623643/27	Resistor, metal oxide: 270 ohms ±1%.
R207	REP623642/18	Resistor, metal oxide: 18 ohms ±1%.
R208	REP623643/27	Resistor, metal oxide: 270 ohms ±1%.
R233	REP623644/1	Raesistor, metal oxide: 1.0K ohms ±1%.
R240	REP623645/1	Resistor, metal oxide: 10K ohms ±1%.
R241	REP623644/22	Resistor, metal oxide: 2.2K ohms ±1%.
R242	REP623642/47	Resistor, metal oxide: 47 ohms ±1%.
R243 and R244	REP623646/1	Resistor, metal oxide: 100K ohms ±1%.
R250 thru R252	REP623646/1	Resistor, metal oxide: 100K ohms ±1%.
R253	REP623645/47	Resistor, metal oxide: 47K ohms ±1%.
R254	REP623646/1	Resistor, metal oxide: 100K ohms ±1%.
R255	REP623645/47	Resistor, metal oxide: 47K ohms ±1%.
R301	REP623644/15	Resistor, metal oxide: 1.5K ohms ±1%.
R303 thru R305	REP623645/22	Reesistor, metal oxide: 22K ohms ±1%.
R307	REP623642/1	Resistor, metal oxide: 10 ohms ±1%.
R310	REP623642/47	Resistor, metal oxide: 47 ohms ±1%.
R311	REP623642/15	Resistor, metal oxide: 15 ohms ±1%.
R312	REP623643/27	Resistor, metal oxide: 270 ohms ±1%.
R313	REP623642/18	Resistor, metal oxide: 18 ohms ±1%.
R314	REP623643/27	Resistor, metal oxide: 270 ohms ±1%.

SYMBOL	PART NO.	DESCRIPTION
R320 thru R325	REP623645/47	Resistor, metal oxide: 47K ohms ±1%.
R326	REP623643/22	Resistor, metal oxide: 220 ohms ±1%.
R330 and R331	REP623644/56	Resistor, metal o xide: 5.6K ohms ±1%.
R332	REP623643/1	Resistor, metal oxide: 100 ohms ±1%.
R333	REP623642/56	Resistor, metal oxide: 56 ohms ±1%.
R401	REP623644/27	Resistor, metal oxide: 2.7K ohms ±1%.
R403 thru R405	REP623645/15	Resistor, metal oxide: 15K ohms ±1%.
R410	REP623642/39	Resistor, metal oxiade: 39 ohms ±1%.
R411	REP623642/15	Resistor, metal oxide: 15 ohms ±1%.
R426	REP623642/39	Resistor, metal oxiade: 39 ohms ±1%.
R430	REP623643/47	Resistor, metal oxide: 470 ohms ±1%.
R431	REP623642/33	Resistor, metal oxide: 33 ohms ±1%.
R501	REP623643/18	Resistor, metal oxide: 180 ohms ±1%.
R511	REP623645/22	Reesistor, metal oxide: 22K ohms ±1%.
R512	REP623645/18	Resistor, metal oxide: 18K ohms ±1%.
R513	REP623643/18	Resistor, metal oxide: 180 ohms ±1%.
R531	REP623644/47	Resistor, metal oxide: 4.7K ohms ±1%.
R533	REP623644/39	Resistor, metal oxide: 3.9K ohms ±1%.
R534	REP623643/22	Resistor, metal oxide: 220 ohms ±1%.
R571	REP623645/1	Resistor, metal oxide: 10K ohms ±1%.
R581	REP623644/15	Resistor, metal oxide: 1.5K ohms ±1%.
		INTEGRATED CIRCUITS
U101	RYT3126027/C	LSI, Radio Interface Controller (Bertram).
U102	RTL204620/01	Oscillator, Voltage Controlled, Temp comp., 12.8 MHz ±2.5ppm.
U161	RYT1136005/3C	5 Volt regulator; sim to LP2951C.
U200	344A3953P1	RF Power Module, MOSFET; sim to Hitachi PF0025.
U310	RTL402654/01	Oscillator, Voltage Controlled, 806-825 MHz.
U320	RYT1026007/2C	Frequency Synthesizer, PLL w/1.1GHz prescaler.
U410	RTL402653/01	Voltage Controlled Oscillator, 925-950 MHz, (used with Rx.)
U420	RYT1026007/2C	Frequency Synthesizer, PLL w/1.1GHz prescaler.
U430	RYT1016089/2C	Buffer Amplier, Wideband, 1.2 GHz.
U501	RYT1016091/2C	Amplifier,low power IF Mixer: 450 kHz; sim to CXA 1293N.
		MISCELLANEOUS
	SXA1055695	Plate.
	19B802431P1	Insulator, Duplexer.

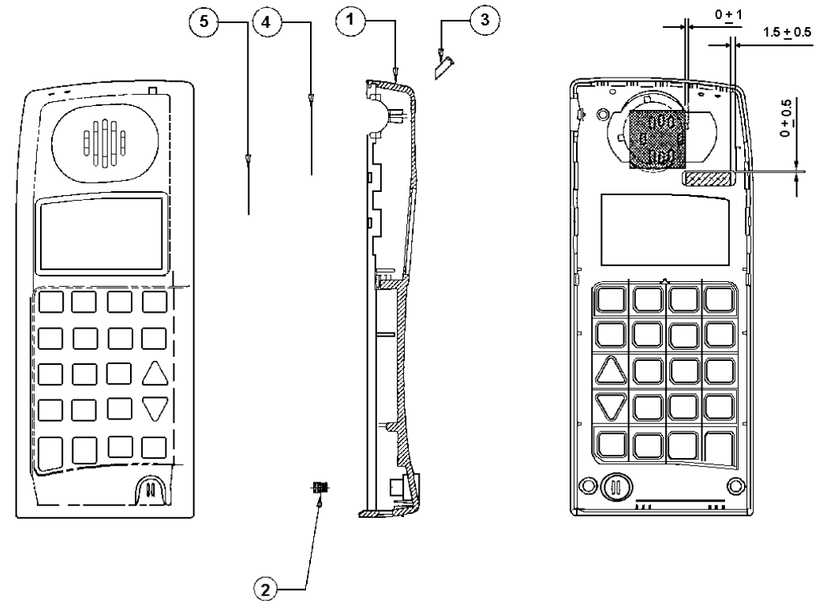
MISCELLANEOUS PARTS
RADIO CASE ASSEMBLY

(Refer to 151-88-KRD-103 109)

SYMBOL	PART NO.	DESCRIPTION
	SXA1204146	Shield, RF (used with Allegra RF Board).
2		Front Cover Assembly
		SXK 107 38201.1 (Interconnect Only)
		SXK 107 3820/2 (Interconnect W/Dispatch)
		(refer to 151 88-SXK 107 3820)
1,,2	SXK 107 1833/8	Front Cover, (Interconnect Only)
1,,2	SXA 105 5663/54	Front Cover, (Interconnect W/Dispatch)
3	SXA 105 5692	Diode Lens
4	SXA 105 5757	Protecting Grid
5	SXA105 5789/1	Tape
4	SXA 105 5689/10	Keyboard
11	SXK 107 3819	Back Cover (includes threaded insert, contact clip, rubber bumper, & insl tape)
12	SXK 107 1851/54	Frame Shield
	SXA 105 5667/54	Frame
13	SXA 105 5668/2	Clip
14	SXK 107 3335	Antenna Assembly (includes an-tenna, swivel & spacer)
15	SXA 105 5686	Antenna Collar
16	SXA 105 5687	Antenna Nut
17	SBA 133 025/006	Screw
18	SXA 105 5684	Gasket
19	SXK 107 3822	Window (LCD Lens)
20	SXA 105 5781/2	Plug, System Connector
21	SXA 120 4143	PTT Pin
22	SXA 120 4144	PTT Button
31	344A4953P2	RF Frame Pad
32	344A4632P1	Plug, Antenna Connector
33	344A4079P1	Battery Spacer Pad

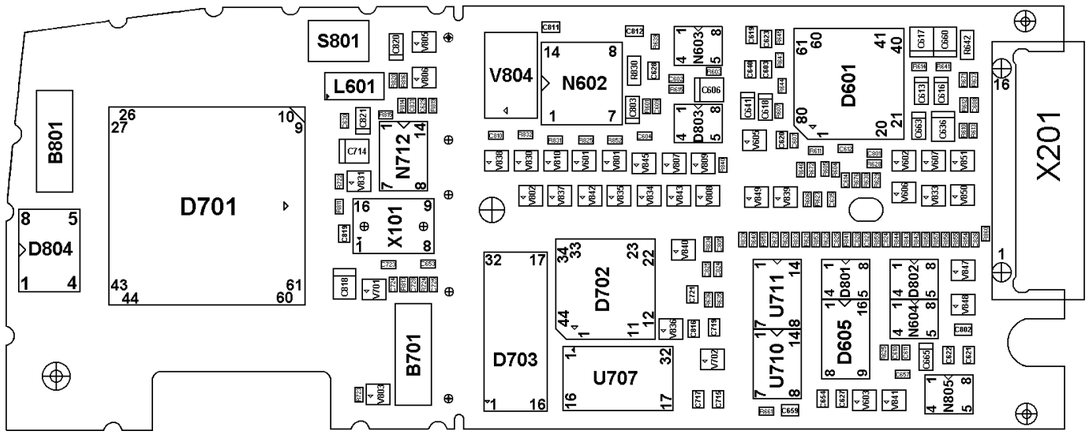


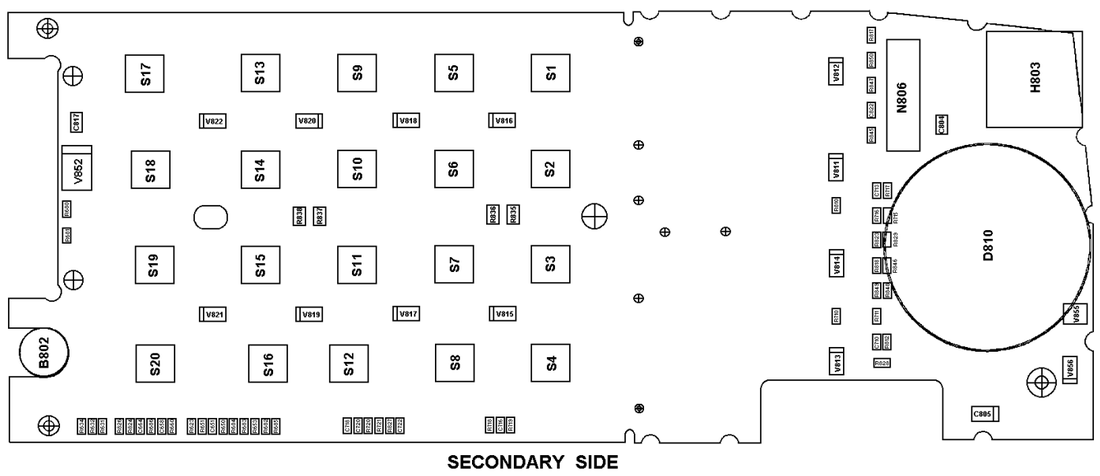
⚠1 CENTER CLIP ON PA MODULE
⚠2 ADHESIVE PROCESS P7C-EA147P1 OR EQUIV.



RADIO ASSEMBLY DIAGRAMS

(151-88 KRD-103 109 Rev. A)
(151 88-SXK 107 3820 Rev A)



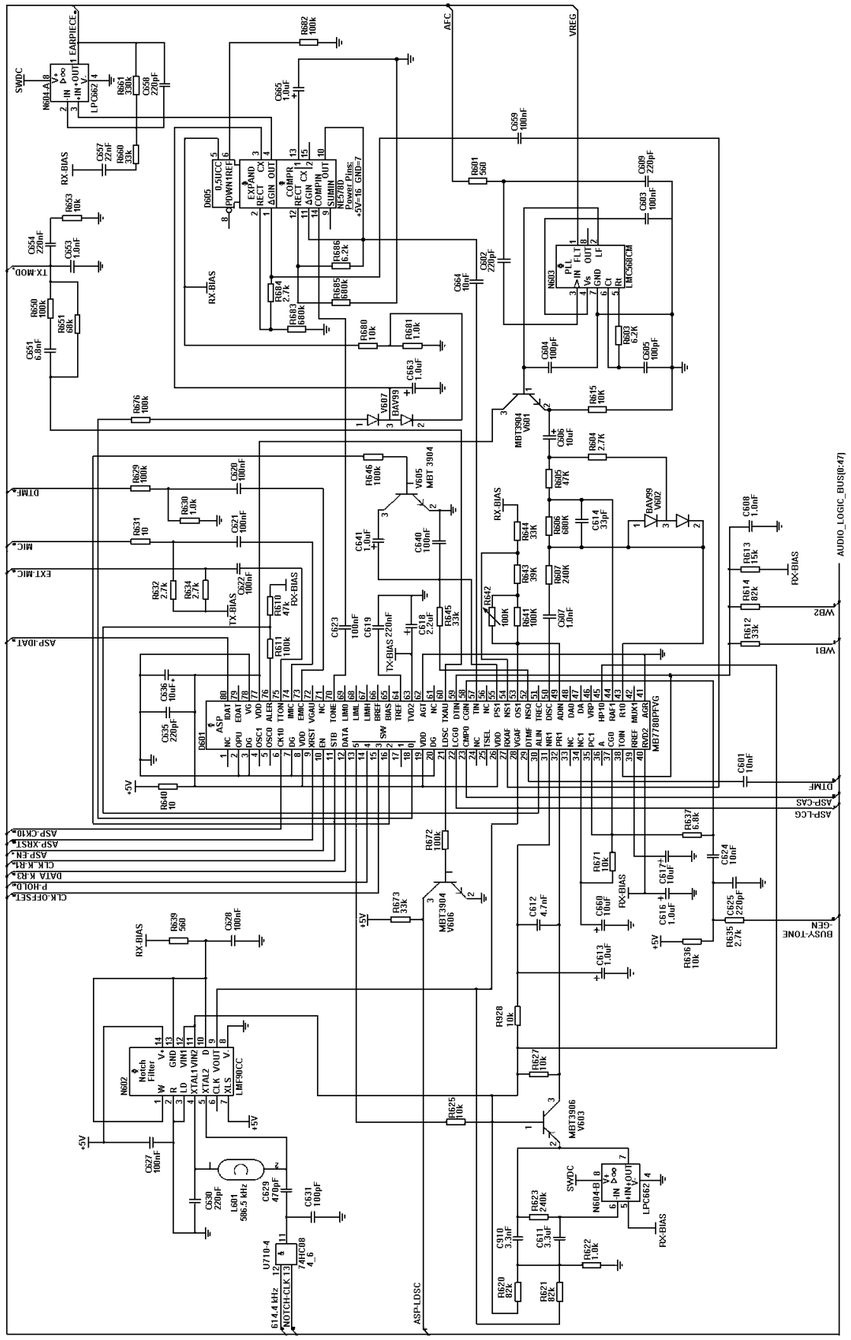


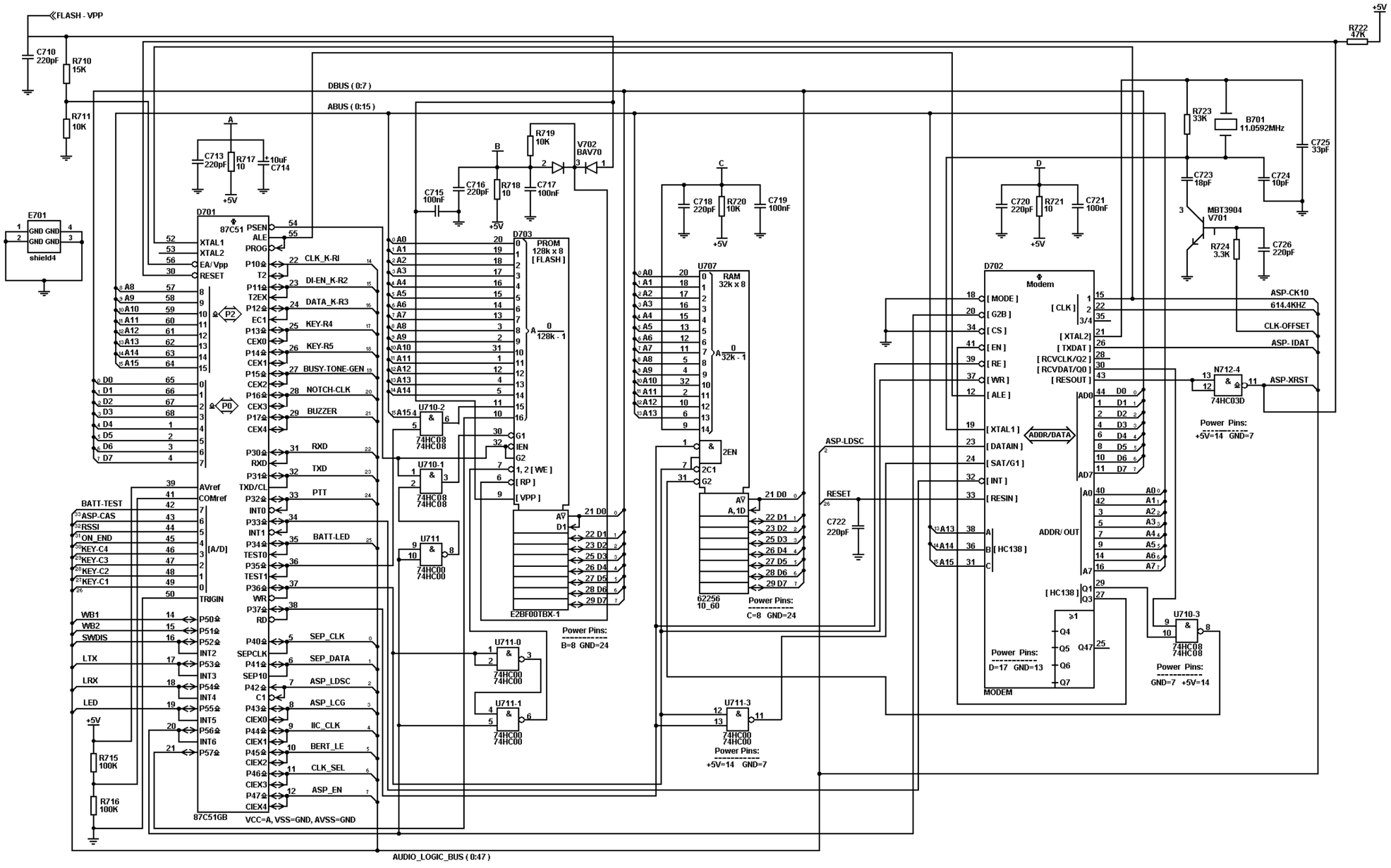
LOGIC BOARD ASSEMBLY

1078 ROA 117 2224

LOGIC BOARD ROA 117 2224

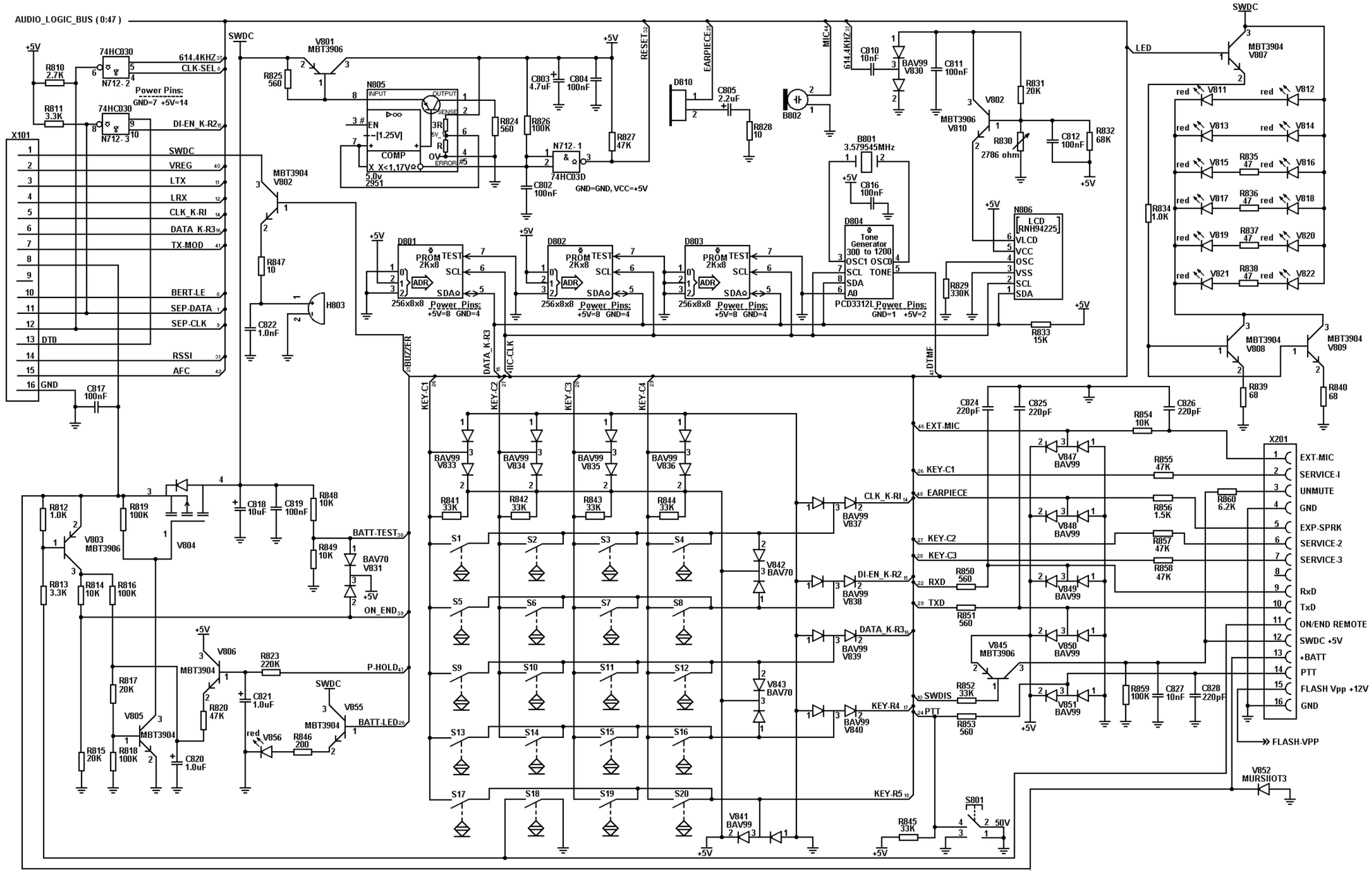
(1911-ROA 117 2224 Sh. 1, Rev. B)





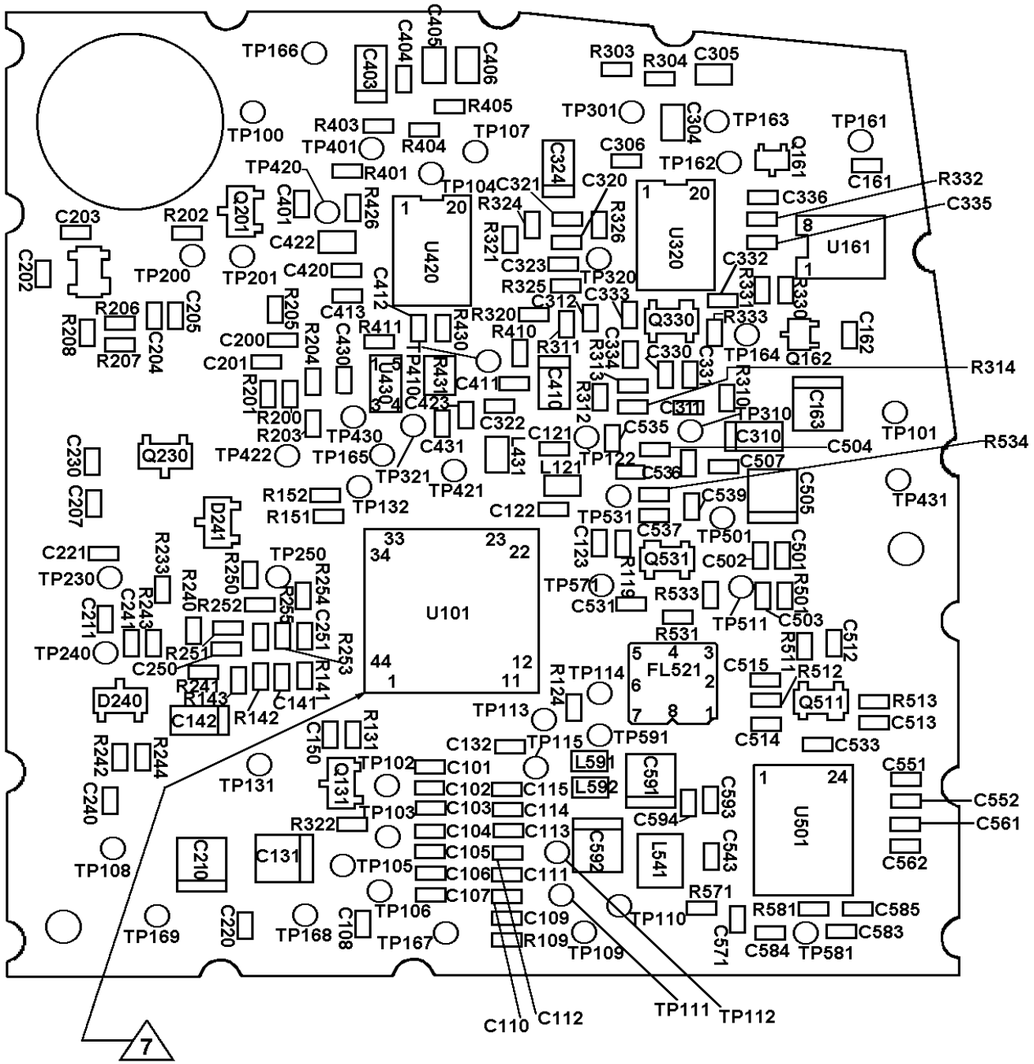
LOGIC BOARD
ROA 117 2224

(1911-ROA 117 2224 Sh. 2, Rev. B)

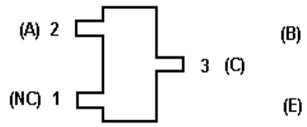


LOGIC BOARD
ROA 117 2224

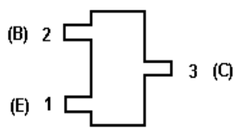
(1911-ROA 117 2224 Sh. 3, Rev. B)



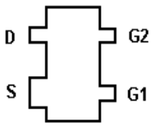
LEAD IDENTIFICATION FOR D100, D240, D241 (SOT) DIODES (TOP VIEW)



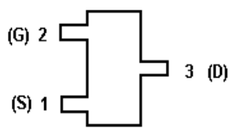
LEAD IDENTIFICATION FOR Q131, Q132, Q161, Q162 (SOT) TRANSISTORS (TOP VIEW)

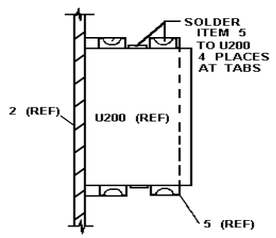


LEAD IDENTIFICATION FOR Q511, Q531 (SOT) TRANSISTORS (TOP VIEW)



LEAD IDENTIFICATION FOR Q201, Q230 (SOT) TRANSISTORS (TOP VIEW)



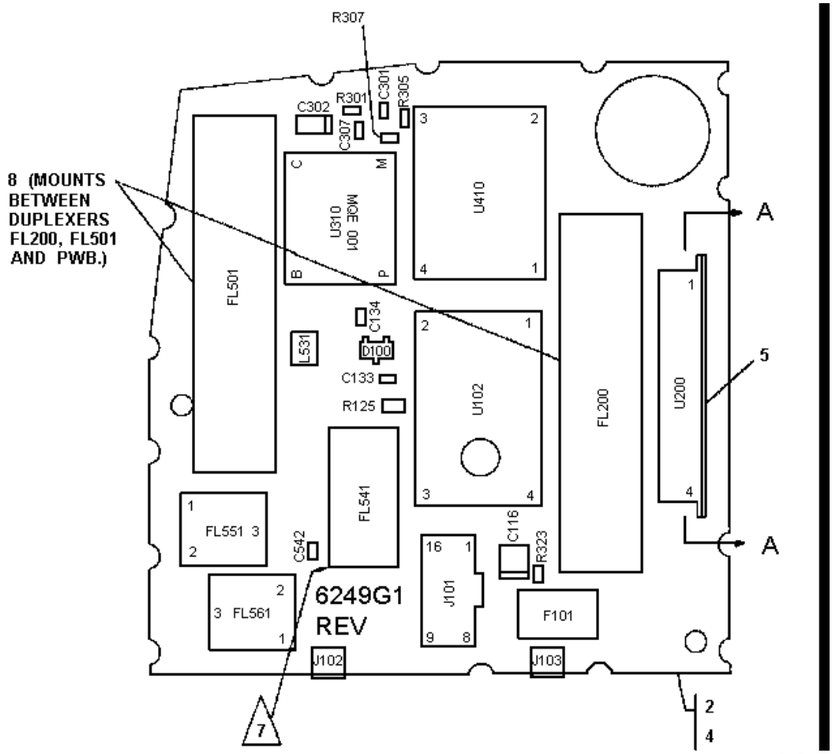


SECTION A - A

1 NOTES:

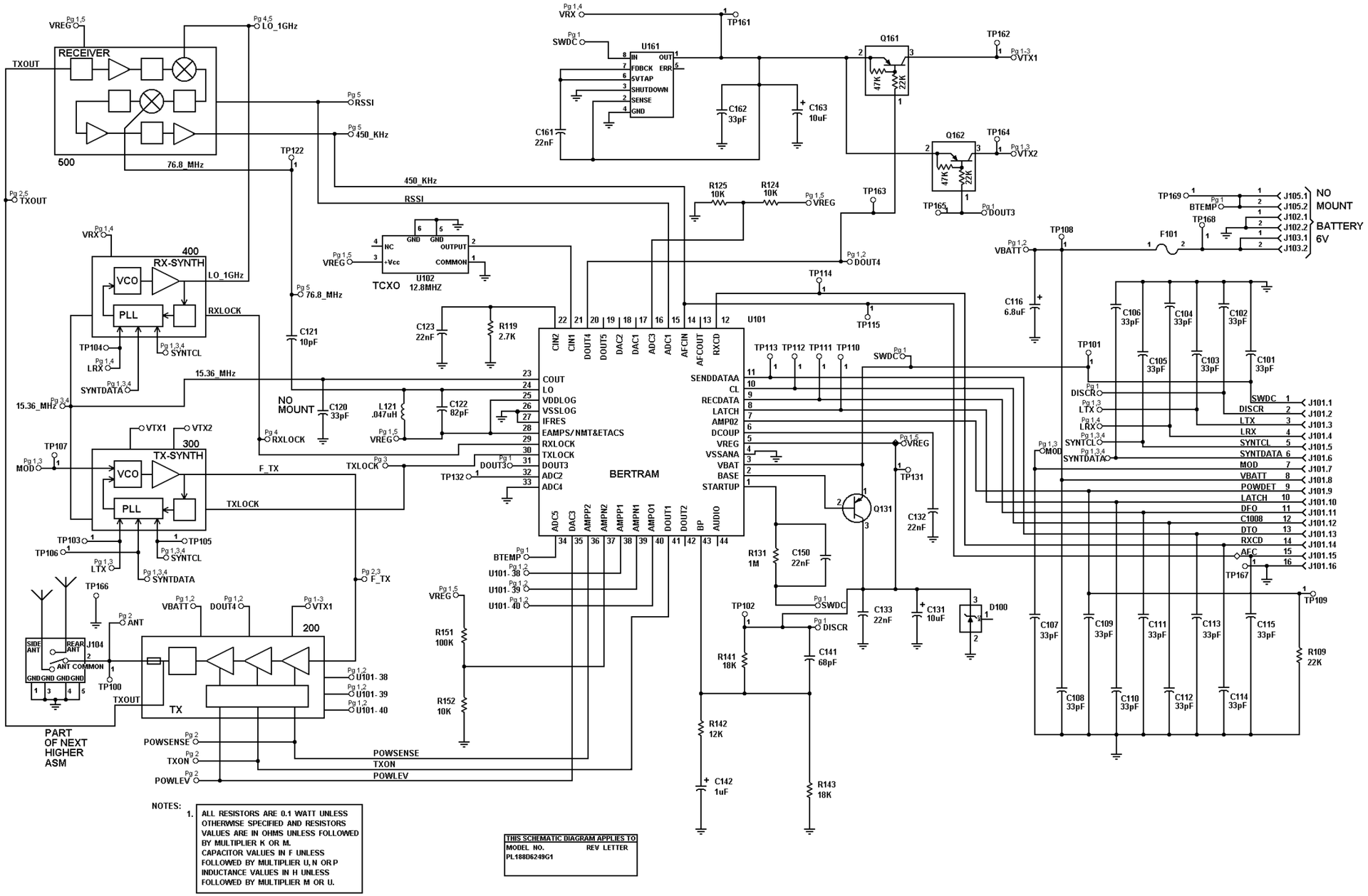
5. THE FOLLOWING DEVICES ARE MOS DEVICES REQUIRING SPECIAL CARE: Q201, Q230, Q330, Q511, Q531, U101, U200, U320, U420.

7. FL541 CAN BE ORIENTED IN EITHER DIRECTION.



RF BOARD ASSEMBLY
ROA 117 2224

(188D6249 Sh. 1, Rev. 2)



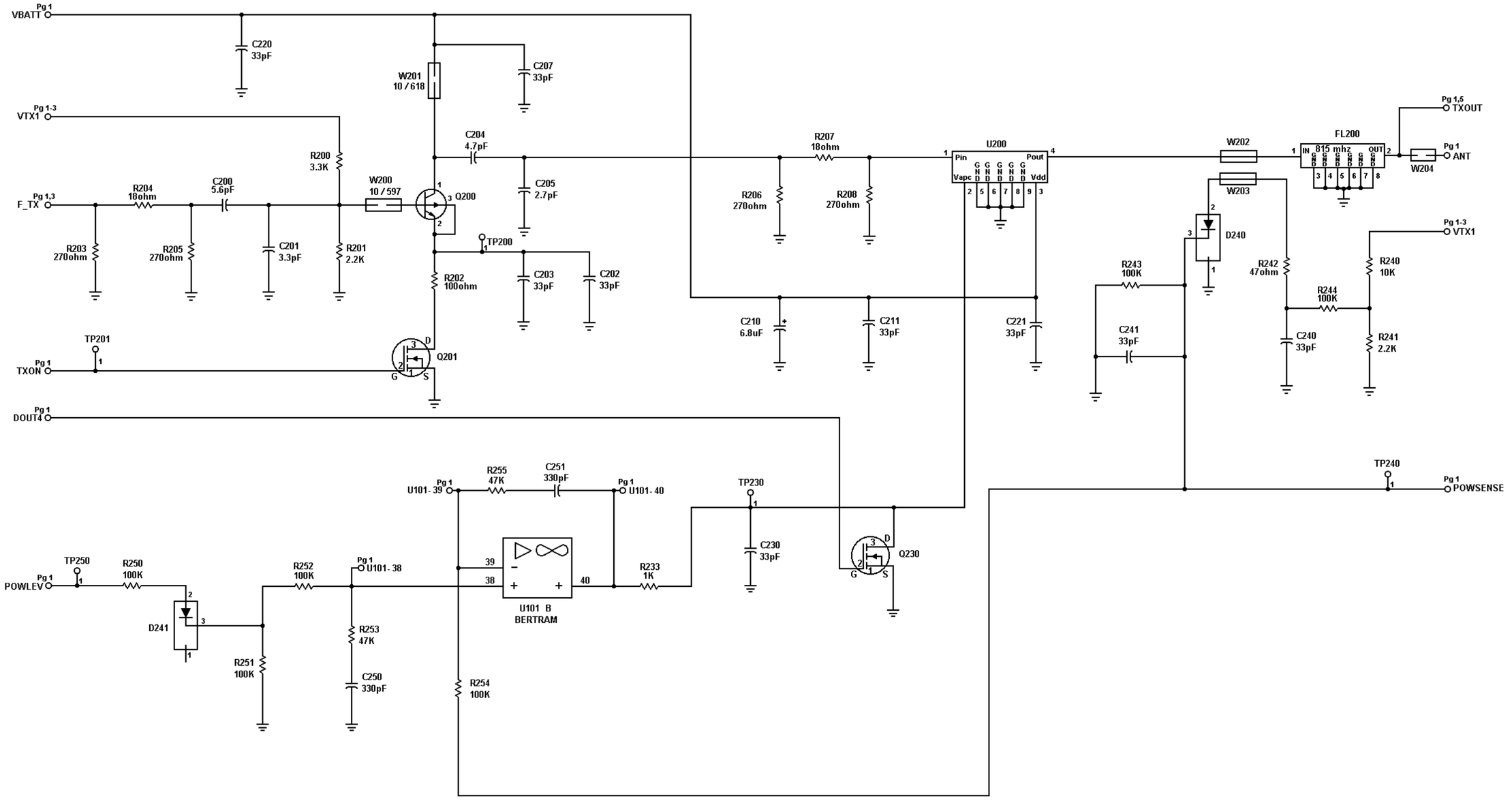
NOTES:

1. ALL RESISTORS ARE 0.1 WATT UNLESS OTHERWISE SPECIFIED AND RESISTORS VALUES ARE IN OHMS UNLESS FOLLOWED BY MULTIPLIER K OR M. CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER U, N OR P. INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER M OR U.

THIS SCHEMATIC DIAGRAM APPLIES TO	
MODEL NO.	REV LETTER
PL188D6249G1	

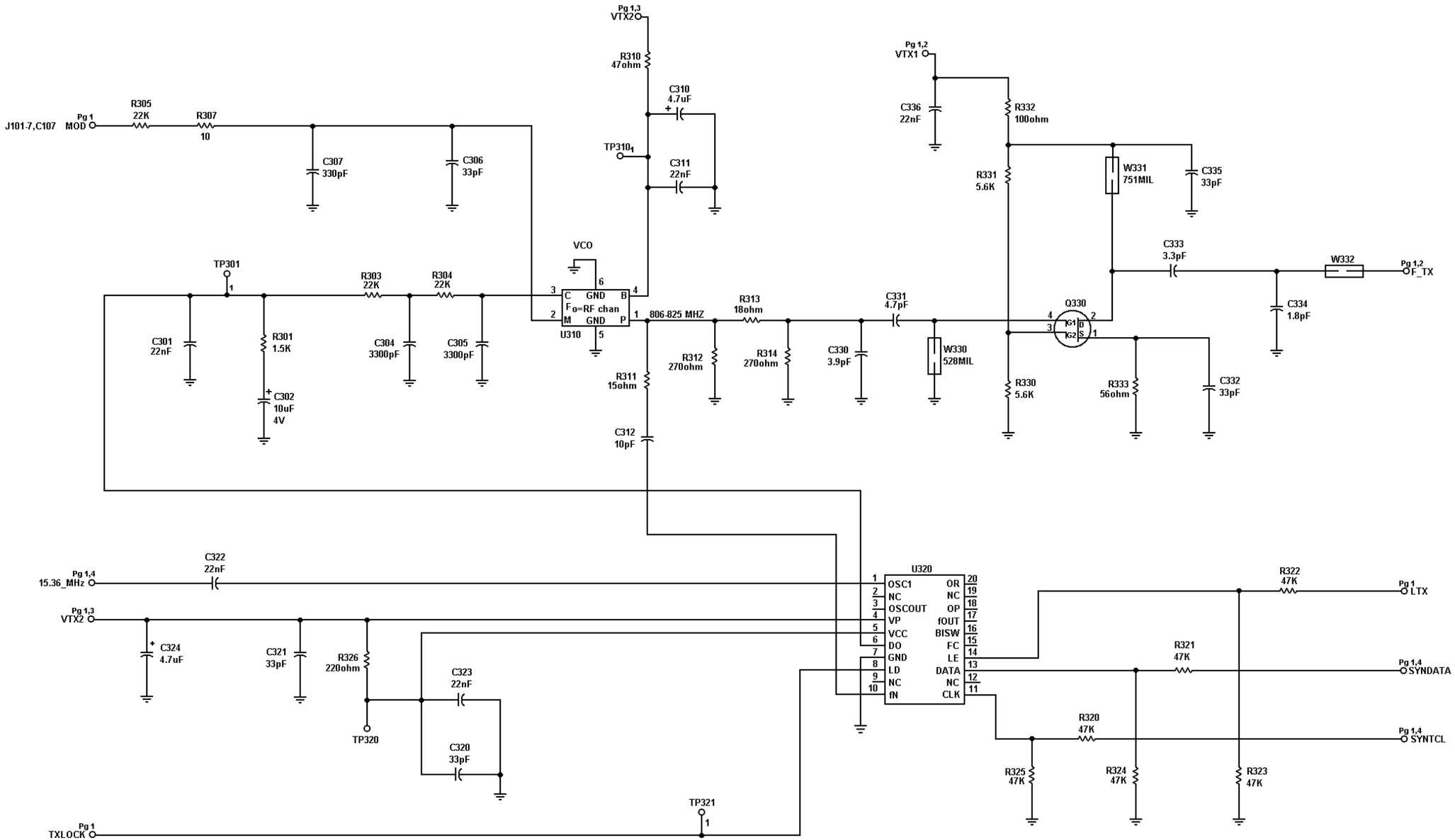
RF BOARD
ROA 117 2229

(188D6251 Sh.1, Rev. 0)



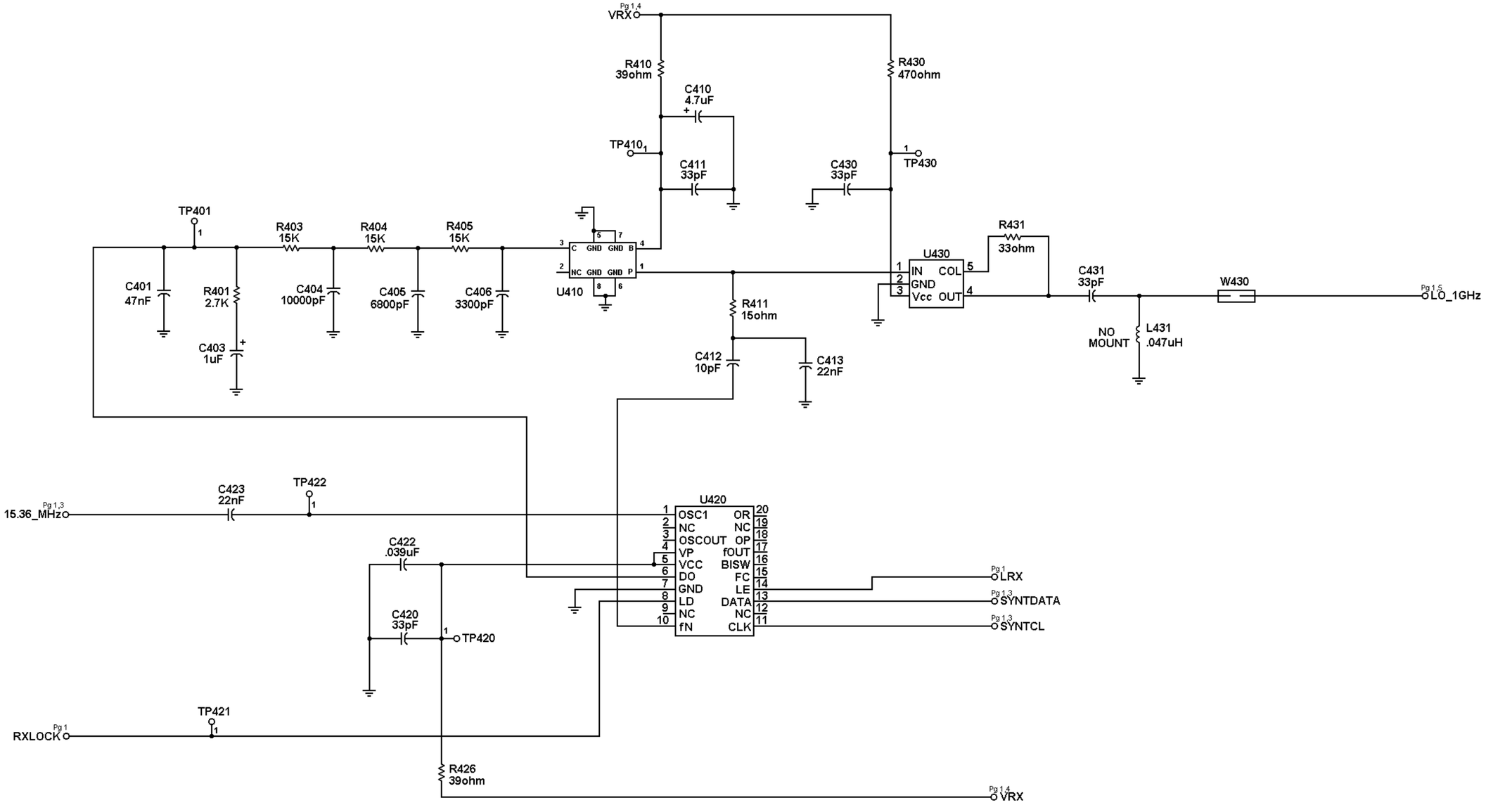
RF BOARD
ROA 117 2229

(188D6251 Sh.2, Rev. 0)



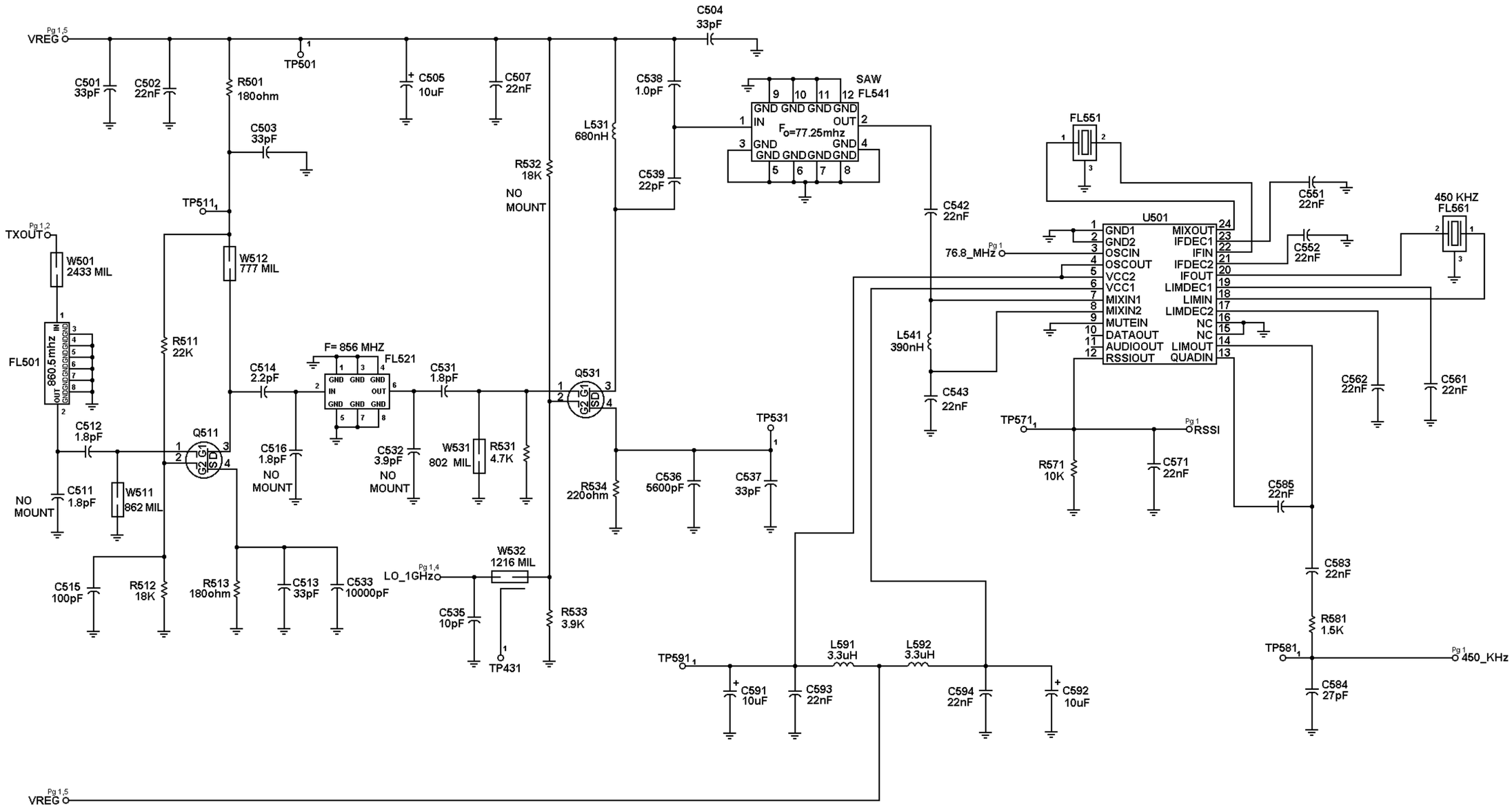
RF BOARD
ROA 117 2229

(188D6251 Sh.3, Rev. 0)



RF BOARD
ROA 117 2229

(188D6251 Sh.4, Rev. 0)



RF BOARD
ROA 117 2229

(188D6251 Sh.5, Rev. 0)

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