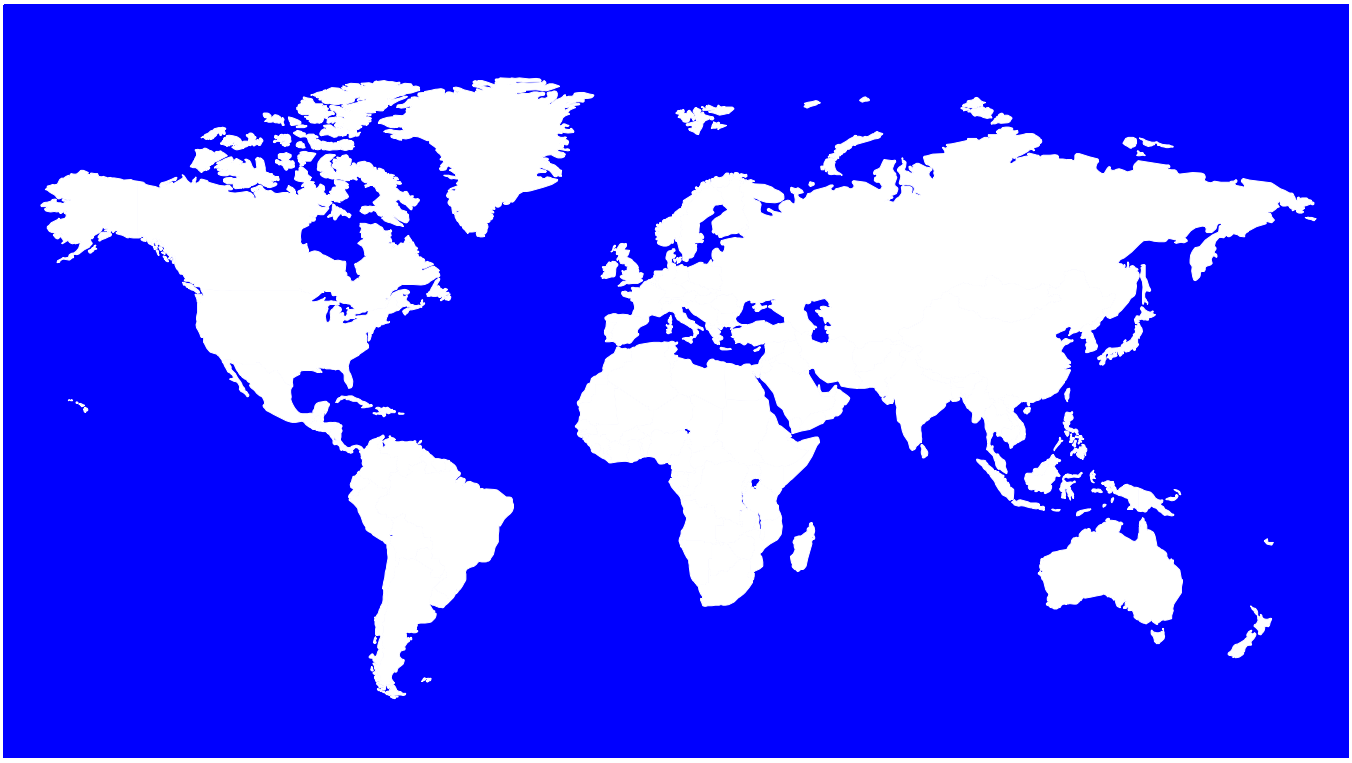
MOTOROLA

Cellular Subscriber Sector

ST7867
1900MHz CDMA/800MHz Amps



The World's Leading Cellular Telephone Manufacturer

Service Manual
Level III

MOTOROLA

Cellular Subscriber Sector

CONTENTS

ST7867
1900 MHz CDMA/800 MHz AMPS

ST7867/ST7860 vs. ST7760

Logic Changes

- The biggest change from the ST7760 is a new IC called Casper (U1100). Casper is the 338 CPU, DSP, and CRIB ASIC in one package. However, it is identical in architecture to the ST7760. Hence, any lines that interface those chips together on the ST7760 are all internal to the IC now. Obviously, any lines that interface with the rest of the board (CIA, GCAP, 3WB, Memory, and RF) are still external.
- Aux_Battery is eliminated, this has reduced the complexity of the battery circuitry. There are only two power sources now: 'BATT+" and 'EXT_B+'.
- The memory devices are larger. Consequently, the SRAM has an additional line running to it. The Flash's Chip Select scheme is slightly different than the ST7760 because of a new memory map.
    - Flash: 8Mb & 16 Mb on the ST7760 to 16 Mb and 32 Mb on the ST7860/ST7867
    - SRAM: 1Mb on the ST7760 to 2Mb on the ST7860/ST7867
    - EEPROM: 128 kb on the ST7760 to 256 kb on the ST7860/ST7867
- An External B+ Disconnect Circuit has been added (it is identical to AMPS V3620). If the voltage on Ext_B+ rises above 6.75V, a voltage detector disconnects Ext_B+ from the rest of the board. This is for over voltage protection.
- New 1.8V regulator. The ST7760 ran the 338 CPU, DSP, and CRIB at 2.75V. the ST7860/ST7867 uses Casper which is powered by 1.8V. There is a new IC called CCAP Lite (U2000 drop-in) that is almost identical to GCAP Lite. The main difference you need to be concerned with is that GCAP Lite had Pin 3 (V_{OUT1}) disabled. This pin is the 1.8V regulator on CCAP Lite. This is the supply that CASPER uses.
- A new headset jack is being used to commonize 800 CDMA with ST7762 and ST7867. However, the detection scheme is slightly different than the ST7760.
- The display is holographic films (similar to Iridium) and EL backlit displays.

RF Changes

- A CDMA intermediate frequency amplifier was added. This amplifier improves the receiver sensitivity in the low gain path in CDMA mode.
- An amplifier used to isolate the main VCO from the RX and TX was changed from a monolithic device to a discrete design.
- The control circuitry and DC levels to the switch used to match the antenna in both the up and down position was modified.
- Two VCO module
  (1) 1900 Mhz VCO module (1900 Rx-LO, 1900 Tx-LO), frequency range Rx/Tx 2039 Mhz to 2100 Mhz.
  (1) 800 Mhz VCO module (800 Rx-LO, 800 Tx-LO), frequency range Rx/Tx 979 Mhz to 1004 Mhz.
  - Tx IF frequency for CDMA is 379.6 Mhz, and for AMPS is 309.3 Mhz.
- Dual Band , Dual Mode Mixer/Exciter- MOON IC.
- MOON IC contains :
  - a) Two separate LO inputs
    b) Separate 800/1900 Mhz differential inputs.
    c) Differential IF input
    d) Three control pins for chip enable and 800/1900 select.
    e) Single AGC pin.
  - Different Transmit paths from the output of MOON IC- for PCS 1900 and 800 RF signals.
  - PCS 1900 TX path has 1900 TX split band filter.
  - Two separate PA, Isolator and Duplexer.
  - Receiver consists of two sepparate lines for PCS and AMPS.
  - Rx IF frequency for Amps is 109.65 Mhz and for PCS is 109.8 Mhz.
  - The second LO oscillates at 219.3 Mhz for AMPS and 219.6Mhz for PCS.

Mechanical Changes

- Since there will be no Aux_Batt support in the ST7860/ST7867, there is no need for external Aux. Batt. contacts on the rear housing. Hence, the ST7860/ST7867 will be shipping with the same front and rear housings as the ST7760 with the exception of the Aux. Batt. contacts. The rear housing will look similar to the AMPS StarTAC 3000. The top flip will be identical.
- The Antenna size is different (long) optimize to function in analog 800 Mhz and PCS (CDMA) 1900 Mhz band.

CDMA –PCS 1900 Mhz BAND

Performance specification:

General

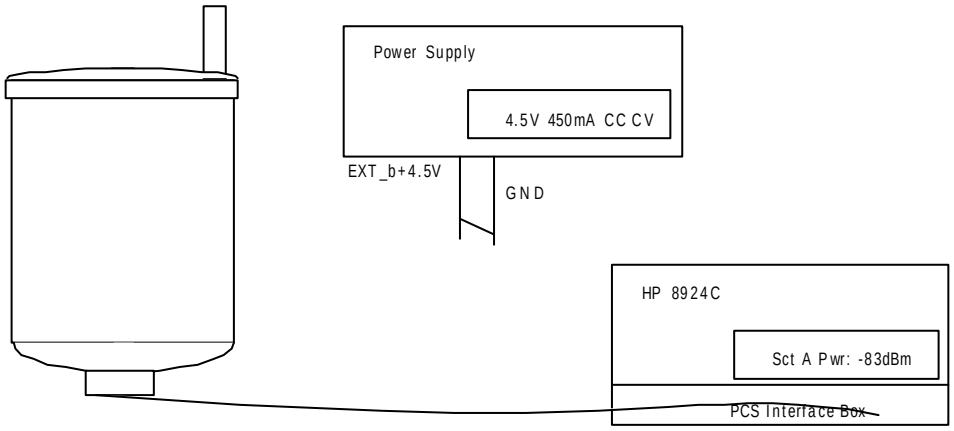
Frequency and channel information:

Channel	Tx Frequency (Mhz)	Rx Frequency(Mhz)
25	1851.25	1931.25
200	1860.00	1940.00
400	1870.00	1950.00
600	1880.00	1960.00
800	1890.00	1970.00
1000	1900.00	1980.00
1175	1908.50	1988.50

Performance Specifications General

Table 1:

Function	*Specification*
Frequency Range	1850 to 1910 MHz(tx), 1930 to 1990(RX)
RF Channel Bandwidth	1.25 MHz
Channels	1200(48 Channels-25 Calls on each channel)
Duplex Spacing	80 MHz
Frequency Stability	Center Frequency* + / - 8.5 $X10^{-8}$ + / - 150 Hz of incoming RX CDMA signal.
Operation Voltage	+3.6 V nominal (3.0 -4.2 V DC)
RF Power output	0.20 Watts - 23 dBm into 50 ohms (CDMA , nominal)
input/output impedence	50 ohms(nominal)
Spurious /Harmonic emissions	Complies with title 47, Part 22 of the code of federal regulations.
Vocoders	8kbps, 13kbps, EVRC
Transmit Time Error	+/- 1 US
Modulation Type	1M25D1W(1.25MHz bandwith), OQPSK, G7W(CDMA)
Transmit Duty Cycle	Variable- full, 1/2, 1/4, 1/8 rate(CDMA Mode)
CDMA Transmit Waveform Quality(rho)	0.94
Recieve Sensitivity	-104dBm(CDMA, 0.5% Static FER, 8kbps Vocoder)
Display	96 X 32 LCD



Specifications

Overall System

Table 2:

Function	*Specification*
Frequency Range	824.04 - 848.97 MHz Tx, Channels 1 to 799, $f_{Tx} = 0.03 * N + 825$ MHz Channels 990 to 1023, $f_{Tx} = 0.03(N—1023) + 825$ MHz 869.04 - 893.97 MHz Rx Channels 1 to 799 is $f_{Rx} = 0.03 * N + 870$ MHz Channels 990 to 1023, $f_{Rx} = 0.03(N—1023) + 870$ MHz
Channel Spacing	30 KHz
Channels	832
Duplex spacing	45 MHz(amps)
Frequency Stability	+/- 2.5 ppm (Amps)
Operating Voltage	3.6 - 4.8 VDC
Display	96 X 32 LCD
RF Power Output	0.6 watts - 28.0 dBM into 50 ohms (AMPS, nominal) 0.25 watts - 24.0 dBM into 50 ohms (CDMA, nominal)
Input/Output Impedence	50 ohms (nominal)
Spurious / Harmonic Emissions	Complies with Title 47, Part 22 of the code of Federal Regulations.
Audio Distortion	Less than 5% at
Hum and Noise(C-MSG)	32 dBm below +/- 8kHz deviation(transmit and recieve)
Modulation	F3: + 12 kHz for 100% at 1 kHz, AMPS (wide) 1M25D1W (1.25 MHz bandwidth) CDMA
Transmit Audio Response	6 dBm/octave pre-emphasis
Transmit Audio sensitivity	(AMPS) + 2.9 kHz deviation (nom.) @ 97 dBm SPL input @ 1 kHz
Transmit Duty Cycle	full, 1/2, 1/4, 1/8 rate (CDMA Mode)
CDMA Transmit Waveform Quality(Rho)	0.94
Reciever Sensitivity	-116 dBm (AMPS, SINAD, C-MSG weighted) -104 dBm (CDMA, 0.5% Static FER)

Table 2:

Function	*Specification*
Alternate Channel Desense Protection	-60 db@+/- 60kHz (Amps)

Table 3: Environmental

Function	*Specification*
Temprature Range	Operational -30 o C to +60 o C (-22 o F to +140 o F) Storage -55 o C to +85 o C (-67 o F to +185 o F) Thermal Shock -40 o C to +85 o C (-40 o F to +185 o F) meets Mil. Std. 810C
Shock	Exceeds EIA Standards RS152B (Section 15) and IS-19
Drop	Exceeds EIA Standards RS316B and IS-19
Humidity	95% Relative Humidity; meets EIA Standard IS-19
Vibration	Exceeds EIA Standards RS316B and IS-19
Salt Fog	Salt Solution fog at 35 o C (95 o F), tested for 48 hours
Dust	140 mesh blown silica flour test, tested for 5 hours
Notes:	• EIA (Electronic Industries Association) Standard RS152B states the minimum stan-dards for Land Mobile Communications, FM or PM transmitters 25-470 MHz. • EIA IS-19 states the recommended standards for 800 MHz cellular subscriber units. • EIA Standard RS316B states the standards for portable land mobile communications. • U.S. Military Standard 810D establishes uniform environmental test methods for deter-mining the resistance of equipment to the effects of natural and induced environments peculiar to military operations. • TIA / EIA / IS-98 Recommended Minimum Performance Standards for Dual-Mode Wide band Spread spectrum Cellular Mobile Stations.

Specifications subject to change without notice.

Foreword

Scope of Manual

This manual is intended for use by experienced technicians familiar with similar types of equipment. It is intended primarily to support basic servicing, which consists primarily of mechanical repairs and circuit board replacement.

Authorized distributors may opt to receive additional training to become authorized to perform limited component repairs. Contact your regional Customer Support Manager for details.

Model and Kit Identification

Motorola products are specifically identified by an overall model number on the product label. In most cases, assemblies and kits which make up the equipment also have kit numbers stamped on them.

Replacement Parts Ordering

Motorola maintains a parts office staffed to process parts orders, identify part numbers, and otherwise assist in the maintenance and repair of Motorola Cellular products. Orders for all parts should be sent to the Motorola International Logistics Department at the following address:

Attn.: Global Spare Parts Department
Motorola Cellular Subscriber Group
2001 N, Division St.
Harvard, IL 60033-3674
U. S. A.
FAX: 1-815-884-8354

When ordering replacement parts or equipment information, the complete identification number should be included. This applies to all components, kits, and chassis. If the component part number is not known, the order should include the number of the chassis or kit of which it is a part, and sufficient description of the desired component to identify it.

Service

Motorola's regional Cellular Subscriber Service Centers offer some of the finest repair capabilities available to Motorola Subscriber equipment users. The Cellular Subscriber Service Centers are able to perform computerized adjustments and repair most defective transceivers and boards. Contact your regional Customer Service Manager for more information about Motorola's repair capabilities and policy for in-warranty and out-of-warranty repairs in your region.

General Safety Information

CAUTION

Do not jump start vehicle or use an automotive battery charger while the vehicle adapter option and the portable radiotelephone are connected to the vehicle electrical system, as this may cause serious damage to the radio. Disconnect the radio by removing the cable kit fuses.

Portable Operation

DO NOT hold the radio so that the antenna is very close to, or touching, exposed parts of the body, especially the face or eyes, while transmitting. The radio will perform best if it is held in the same manner as you would hold a telephone handset, with the antenna angled up and over your shoulder. Speak directly into the mouthpiece.

DO NOT operate the telephone in an airplane.

DO NOT allow children to play with any radio equipment containing a transmitter.

Mobile Operation (Vehicle Adaptor)

As with other mobile radio transmitting equipment, users are advised that for satisfactory operation of the equipment and for the safety of personnel, it is recommended that no part of the human body shall be allowed to come within 20 centimeters of the antenna during operation of the equipment.

DO NOT operate this equipment near electrical blasting caps or in an explosive atmosphere. Mobile telephones are under certain conditions capable of interfering with blasting operations. When in the vicinity of construction work, look for and observe signs cautioning against mobile radio transmission. If transmission is prohibited, the cellular telephone **must be turned off** to prevent any transmission. *In standby mode, the mobile telephone will automatically transmit to acknowledge a call if it is not turned off.*

All equipment must be properly grounded according to installation instructions for safe operation.

DESCRIPTION

Table 4:

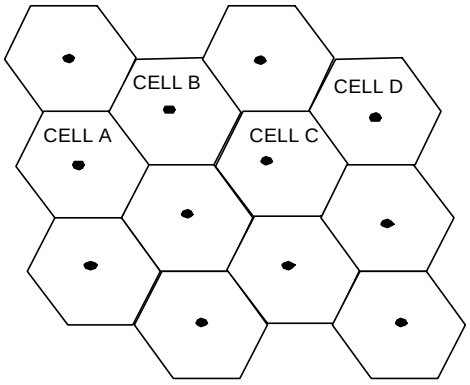
Note
The following description is intended only as a preliminary general introduction to cellular systems. This description is greatly simplified and does not illustrate the full operating capabilities, techniques, or technology involved in cellular systems.

Overall Concept

Cellular systems are used to provide radio-telephone
service in the frequency range of 824-894 MHz.

A cellular system provides higher call handling capacity and system availability than would be possible with conventional radio-telephone systems that require total system area coverage on every operating
channel. The cellular system divides the system coverage area into several adjoining sub-areas, or cells.

Each cell contains a base station (cell site) which provides transmitting and receiving facilities. CDMA is a “spread spectrum” technology, which means that it spreads the information contained in a particular signal of interest over a greater bandwidth than the original signal. With CDMA, unique digital codes, rather than separate RF frequencies or channels are
used to differentiate subscribers. The codes are shared by both the mobile station and base station and are called “pseudo-random code sequences”. Since CDMA is a spread



spectrum technology, all users share a range of the radio spectrum. CDMA cell coverage is dependent upon the way the network is designed. For each system 3 characteristics must be considered: coverage, quality, and capacity. These 3
must be balanced for desired lever of performance.

Some of the CDMA benefits are:

- Improved call quality with better and more consistent sound.
- Enhanced privacy.
- Variable rate vocoder.

Figure 1: Hypothetical Cell System

Operation

In Figure 1: “Hypothetical Cell System”, the area bounded by bold lines represents the total coverage area of a cellular system. This area is divided into several cells, each

switching system. Since there are no channels in CDMA, a user has a better chance of completing a call. Also, now there is no hard handoff between
cell sites since all sites operate on the same frequency. This is called soft handoffs. In this system, subscribers in cell A & D simultaneously operate in the same frequency. As a user moves from cell site to cell site, the base station monitors the signal strength of the user. Based on this signal strength, the base station decides which cell shall carry the call. When a radiotelephone is in use well within a cell, the signal strength received at the cell site base station will be high. As the phone is moved towards the edge of the cell, its received signal strength decreases. Signal strength information therefore provides an indication of the subscriber's distance from a cell's base station. This change is handled automatically, and is completely transparent to the user. For example, assume that a cellular tele-phone
initiates a call in cell A and then moves across the system area through cells B and C to cell D. As the phone moves into cell B, it is instructed to change to a different frequency that operates through the B cell
on that frequency. A similar change is performed when the phone moves from cell B to cell C and again
when the phone moves from cell C to cell D. In this example, the radiotelephone has operated in four cell sites, through four cell sites, and on the same spread spectrum without interruptions in voice communications. As the radiotelephone leaves a cell, the frequency on which the phone and base station were operating is made available to another subscriber in that cell. Since this radiotelephone is dual mode, the radiotelephone can operate in either a

Service Area

The area within which calls can be placed and received is defined by the system operator.
(Because this is a radio system, there is no exact boundary that can be drawn on a map.) If the portable is outside the radio service area, a No Svc (no service) message will appear on the phone's display, and calls cannot be placed or received. If this happens during a conversation, the call is lost. Places where the ability to place or receive calls would be lost are in totally enclosed areas, such as underground parking garages, in buildings without windows, and in elevators. This situation would be indicated either by the No Svc message illuminating, or by the sound of either a fast busy signal or a high-low siren signal when call placement is attempted. General usage in buildings having reason-able glass area is usually quite good. However, it may be necessary to move closer to a window to ensure reliable opera-tion.

Theory of Operation

AMPS

Reciever Circuitry

RF enters the phone via the internal antenna, A1, or via the accessory connector. RF switch U75 selects which antenna is used. The received RF signal is routed through monoblock duplex filter FL75. Then

the RF signal is routed through either a direct path through additional gain and filtering stages,Q100, , FL100, and Q150. The received signal then enters the Mixer Q101.

The local oscillator input to the Filter FL100 is a 978-1004 MHz VCO, U626 controlled by the IF/Synthesizer IC U700. The 109.65 MHz mixer output is routed through FL250 into the IFIC U700.

Transmitter Circuitry

The modulated TX Offset VCO signal is mixed with the 978-1004 MHz local oscillator signal in TX Mixer U400 to produce an 823-849 MHz transmit signal. This signal passes through filter FL402 and voltage control attenuator thru U400 which controls the TX output power. Then the TX signal is amplified by U450and passes through Tx isolator U475. The output passes through the mono-block duplex filter FL75 to RF switch U75 to either the internal antenna or the accessory connector.

CDMA

Reciever Circuitry

RF enters the phone via the internal antenna, A1, or via the accessory connector. RF switch U75 selects which antenna is used. The received RF signal is routed through monoblock duplex filter FL76. Then

the RF signal is routed through either a direct path through additional gain and filtering stages,Q175, FL190, FL191 and U150.. The received signal then enters the Mixer U200.

The local oscillator input to the mixer is double of 1019-1050 MHz VCO, U625 controlled by the IF/Synthesizer IC U700. The 109.8 MHz mixer output is routed through FL251 into the IFIC U700.

Transmitter Circuitry

The modulated TX Offset VCO signal is mixed with the 1019-1050 MHz local oscillator signal in TX Mixer U400 to produce an 1850-1910 MHz transmit signal. This signal passes through filter FL500. Then the TX signal is amplified by U550and passes

through Tx isolator U476. The output passes through the mono-block duplex filter FL76 to RF switch U75 to either the internal antenna or the accessory connector.

Frequency Synthesizer Circuitry

The phone contains three PLL frequency synthesizers in the IF/Synthesizer IC U700. One synthesizer controls the tunable 978-1004 MHz main local oscillator, U626 and the tunable 1019MHz - 1050MHz main local oscillator for PCS 1900 mode U625 followed by frequency doubler Q625. The second synthesizer controls the TX offset oscillator (internal to U700) which operates at a fixed frequency of 309.3 MHz for AMPS, and 309.6 MHz for CDMA. The TX offset signal is divided by 2 before going to the TX mixer. TX modulation occurs in the TX offset synthesizer in AMPS mode. The third synthesizer (also internal to U700) operates at a fixed frequency of 219.3 MHz for AMPS, 219.8 MHz for CDMA. This oscillator is divided by 2 and used to mix the received first IF signal down to baseband. All synthesizers obtain their frequency reference from the 16.8 MHz reference oscillator, U325.

Transmit Power Control Circuitry

The power control signal controls voltage controlled attenuator U400 which is the TX mixer. A detected sample of the TX output signal with a variable reference voltage. A closed loop adjusts the Power Control signal such that the sampled RF signal level matches the reference level. In AMPS mode, the RF power range is +8 dBm to +28 dBM. In CDMA mode the RF power range is -50 dBm to +24 dBm. In CDMA mode, the power control can operate in either open-loop or closed-loop modes. In open-loop mode, the power level is proportional to the received signal level. In closed loop mode, the power level is controlled by the CDMA cell, based on received signal strength at the cell site.

Receive Audio - AMPS Mode

AMPS discriminator audio is routed to U1900 to be digitized. All receive audio filtering and gain control is performed in the digital domain by DSP U1100. The processed RX
audio is converted back to analog by U1900 and amplified by the GCAP IC U2000. The received audio is then routed to either the boom speaker or internal earpiece speaker.

Receive Audio - CDMA Mode

Received CDMA OQPSK data (RX I, RX Q) is gain controlled and converted to digital by U1900. The 1.2288 Mb/sec. RX data stream is then decoded by the U1100 Modem IC to produce a signal containing only the desired data. The digital speech data is routed through the microprocessor U1100, decoded by the U1100 CELP Vocoder, and sent to U1900 to be converted into analog audio. The audio signal is then amplified by U2000 and sent to the earpiece speaker.

Transmit Audio - AMPS Mode

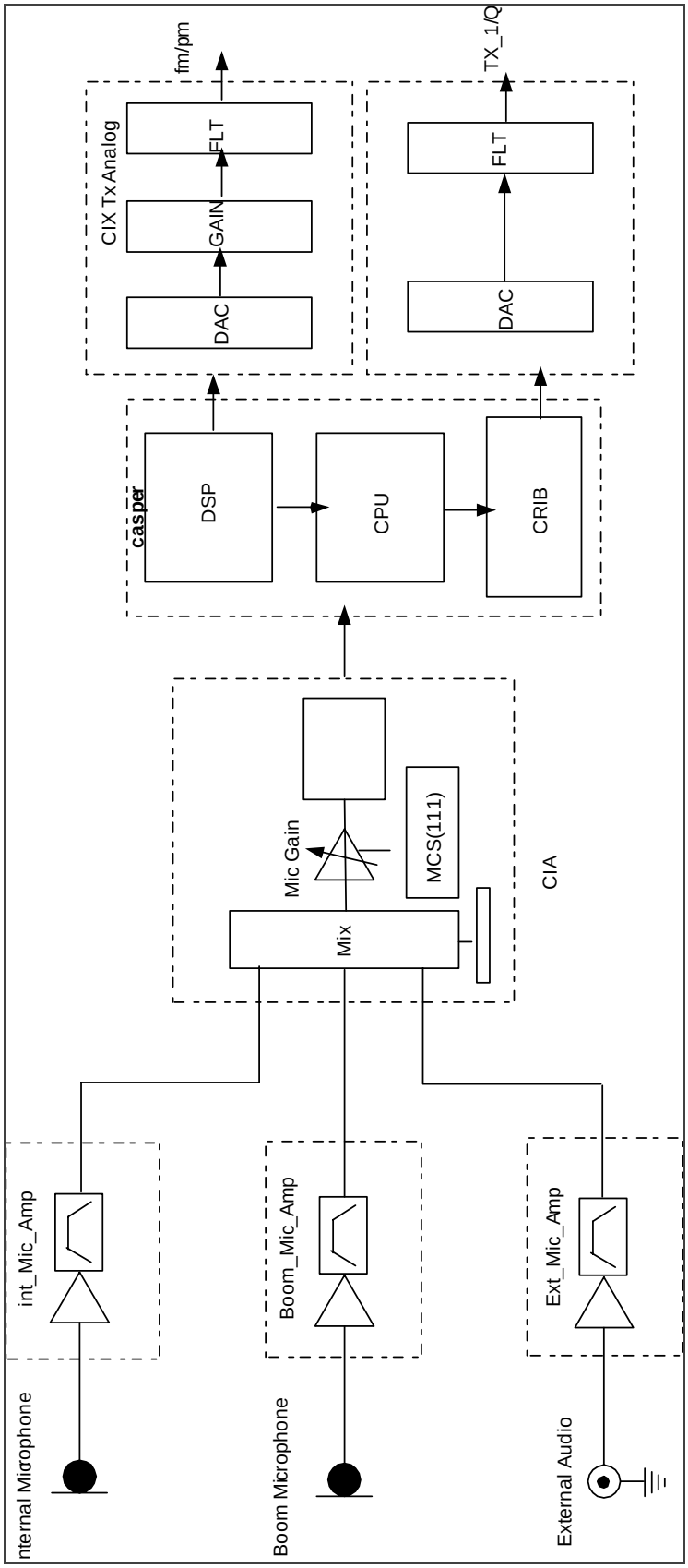
Audio from the internal microphone is ampli-fied
and converted to data by U1900. In AMPS mode, the digitized microphone audio is then sent to DSP U1100 which performs all compression, pre-emphasis, limiting, and band-pass filtering functions in the digital domain. All AMPS signalling (SAT, ST, DTMF) is

also generated in the digital domain by DSP U1100. The digitized AMPS TX audio signal is converted back to analog by the U1900 and sent to the 154.65 MHz TX Offset VCO to modulate the transmitter.

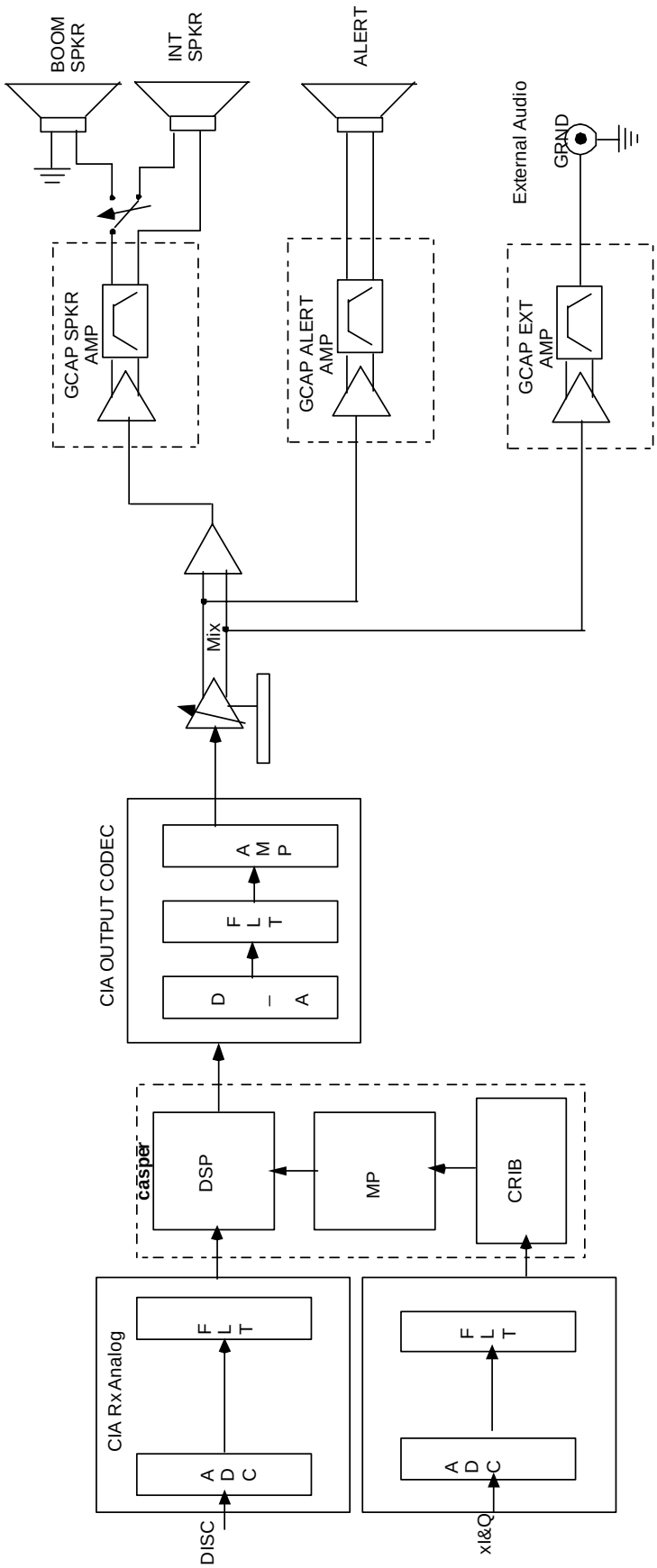
Transmit Audio - CDMA Mode

In CDMA mode, the digitized TX audio is processed by a CELP variable rate vocoder, U1100. The digital signal is then routed through microprocessor U1100 and processed by the CDMA Modem IC, U1100, which produces the 1.2288 Mb/sec. CDMA data
stream. This stream is then converted to analog OQPSK signals (TX I, TX Q) by D/A U1900. The TX I and TX Q signals are sent to the IF/Synthesizer IC U700 which modulates the 154.8 MHz TX offset VCO.

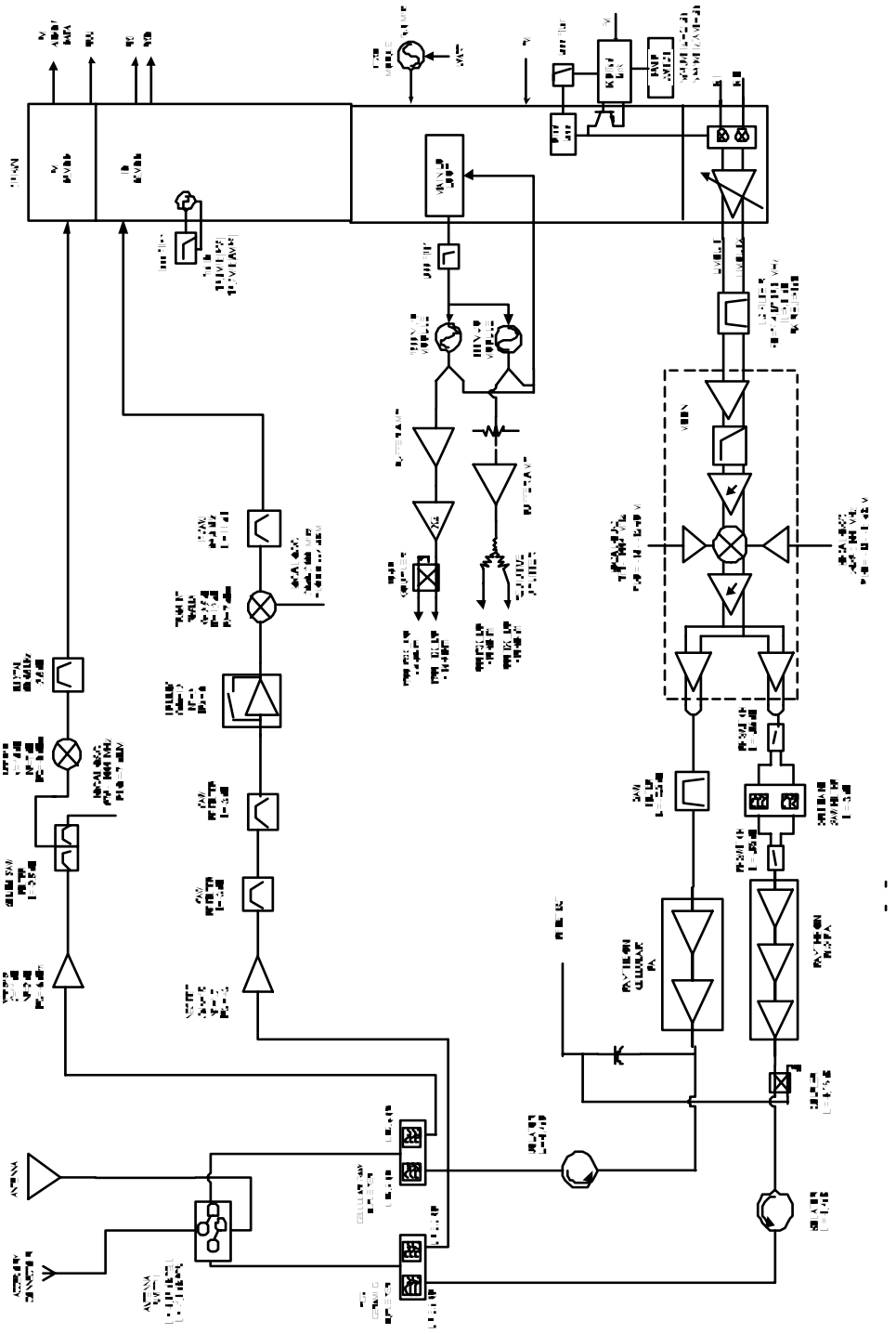
Reverse Audio Functionality:



Forward Audio Functionality:



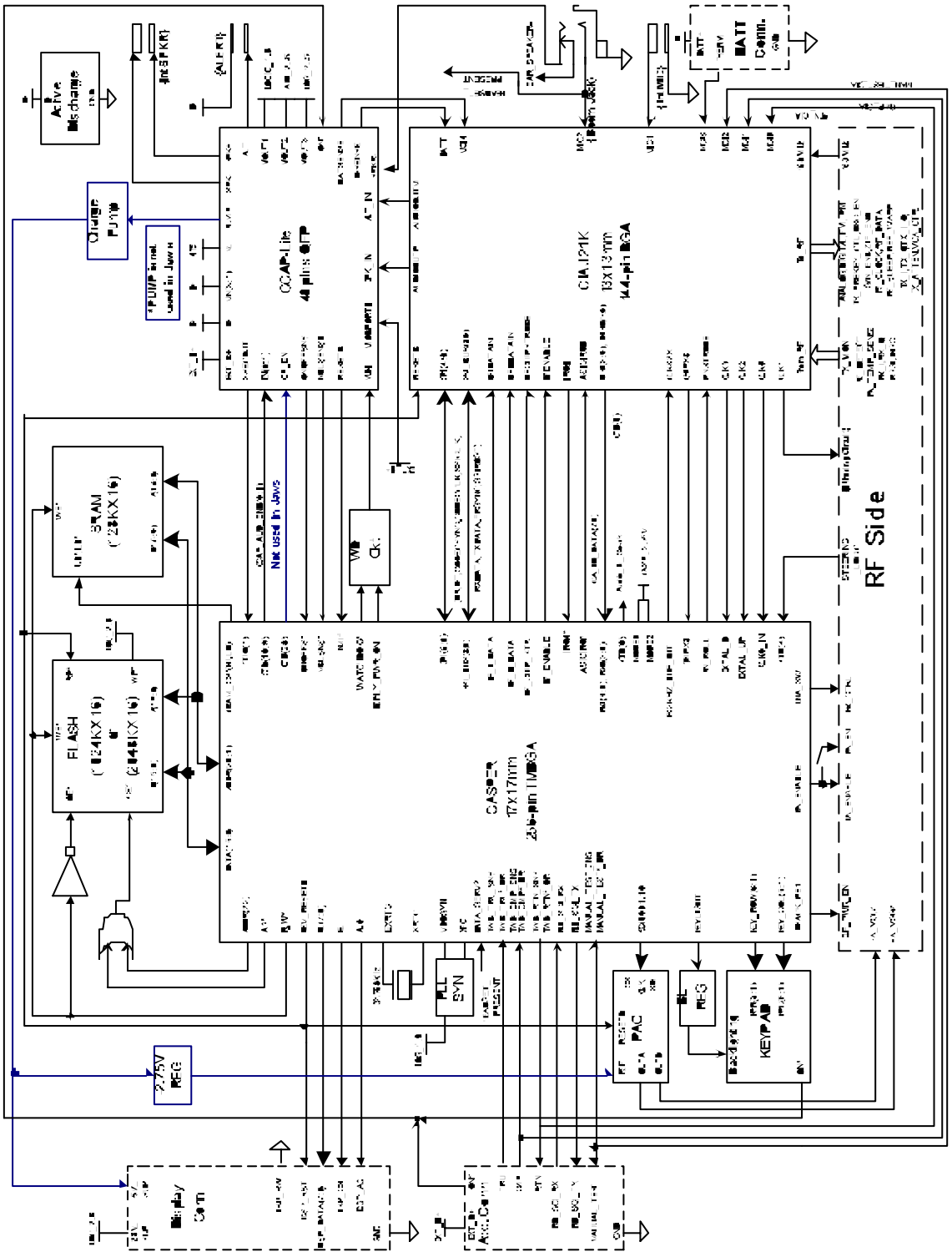
RF Block Diagram



ST7867 - CDMA StarTAC Refresh - Dual Band/Dual Mode

(CDMA 1900 Mhz, AMPS 800 Mhz)

Audio Logic Side Block Diagram



Test & Adjustments

Introduction

These phones allow keypad controlled cali-bration
(often referred to as “phasing”) of
various operating parameters, as follows:

- Transmit output power
- TX deviation (SAT, DATA, DTMF, microphone)
- RX discriminator output

These parameters are stored in memory on the Logic Board and affect the operation of the transceiver. All transceiver units and all replacement RF/AL boards are shipped from the factory with these adjustments already made. However, if components are replaced, checking and adjustment of the parameters may be necessary. Checking and adjusting parameters is also useful a trou-blshooting/
diagnostic tool to isolate defec-tive compo-nents.

The adjusting parameters accessible through keypad commands are a subset of the com-plete complement of adjustments, but are the key parameters necessary for basic opertion. Access to all adjustments requires a com-puter connected to the accessory connector (J3). In addition, the computer must be loaded with the proper diagnostic software.

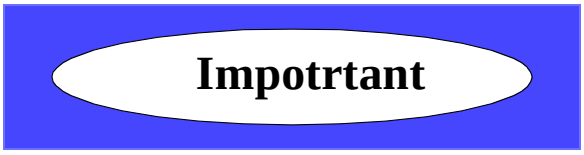
Consult with Motorola regarding specific hardware and software requirements for the diagnostic computer.

Test Interface

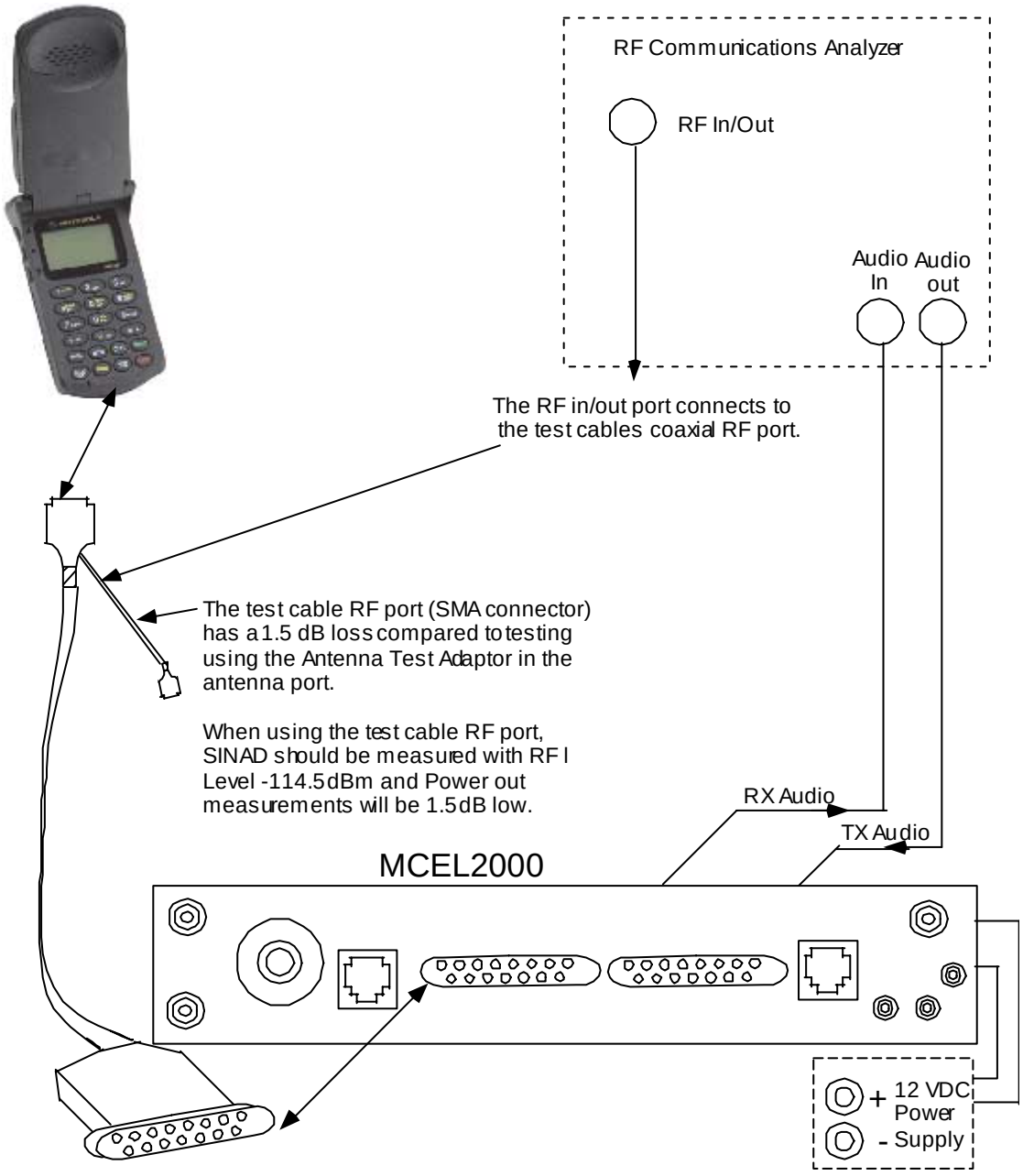
Figure 7: “Connections for Testing and Adjustments” on page 48 shows the audio and RF connections to a communications analyzer when using the MCEL 2000 test interface, and SKN4800A test cable.

Adjustments

To properly check and adjust the adjustment parameters using keypad commands, per-form the following procedures in sequence.



Only those memory locations referred to in the following proce-dure should be pro-grammed. Data in other memory locations which are “Stepped through” during the pro-cedure



Connections for Testing and Adjustments

15 Connector to test interface.

Table 5:

Table 5:

Pin	Function
1	RF Ground
2	RF Out
3	RF Ground
4	Battery Feedback
5	Manual Test
6	N/C
7	N/C
8	Audio In
9	Audio Out
10	Battery Ground
11	RTN
12	CMP
13	TRU
14	External B+
15	Analog Ground

Keypad Button Functions

Below is a description of the non-numeric keys used during the keypad calibration procedure:

Step 1. Connect the test cable RF to a servicing analyzer, using a coaxial cable. Enter Manual Test Mode.

Depress the # button. The display should show the ’ prompt.

Step 2. Enter 11434# via the keypad to program the synthesizer for channel 434.

Step 3. Enter 05# to key the transmitter.

TX Output Power Adjustment(Center of Band)

Step 4. Enter 73#. The portable display will show Step number “00” on the left and the corresponding hex value for the TX output power on the right.

Table 6:

Power Step	*Output Power (at antenna port, +/- 0.5 dBm)*
00	28dBm
01	28dBm
02	28dBm
03	24dBm
04	20dBm
05	16dBm
06	12dBm
07	8dBm
08	Do not adjust
09	Do not adjust
0A	Do not adjust
0B	Do not adjust

Step 5. Using the * button to advance through the power steps. Adjust each of the power steps listed in Table 6: “Output Power Levels” for the values shown as indicated on the servicing analyzer. Make adjustments as described in Step 6 and Step 7.

Step 6. Enter a 2-digit hexadecimal number via the keypad. This immediately updates the hex power level value, and the output power should change as indicated on the analyzer. If the new entry does not produce the desired analyzer reading (i.e. too high or too low),

a) depress the CLR button and enter another 2-digit number, or

b) use the VOL button to incrementally increase the hex value to obtain the desired reading on the analyzer. (The volume control may not be used to decrease the hex value.)

434

Table 7:

Note
In order to enter hex digits A thru F, depress the **SND** button followed by: 0 hex A 1 hex B 2 hex C 3 hex D 4 hex E 5 hex F

Step 7. With all necessary adjustments made and power Step “0B” showing in the display, depress * to enter all updated data and exit the 73# command.

Maximum Deviation Adjust

Table 8:

Note
Before SAT, DTMF, data, or microphone deviations can be adjusted, the maximum deviation must be checked (and adjusted, if necessary). Proceed as follows.

Step 8. Inject an unbalanced 1kHz 2.24V rms audio signal at J3 pin 8 (TX audio in). Connect the audio generator ground lead to J3 pin 6 (audio ground). The audio signal source must be low impedance (or the injection signal must be measured at pin 10 to ensure the proper level of 2.24 V rms).

Step 9. Enter the following commands:

58# to enable compandor
10# to unmute TX audio
356# to select external audio path
11434# to place the telephone on channel

Step 10. Enter 72#. Step 04 will be displayed on the left side of the display. Use the * button to toggle down to Step 0B (left side of display).

Step 11. Read the peak deviation on the analyzer. If it is not in the range of 11 to 12 kHz (preferably closer to 12kHz). Use the volume control or enter numbers via the keypad (as explained in Step 6) to adjust the maximum deviation to fall within the 11 to 12 kHz range. (Make adjustments so that the deviation remains as close to 12 kHz as possible, without exceeding 12 kHz.).

Step 12. Depress the * key to exit the 72# command. The display should show the ’ prompt.

Microphone Deviation Adjust

Step 13. Adjust audio generator signal level at J3 pin 8 (TX audio in) to 90 mV rms (still at 1 kHz).

Step 14. Enter 11434# to place the portable on channel 434. Enter 356# to select the external handset audio path.

Step 15. Read the average deviation on the analyzer. If reading is 2.05 kHz + 7% (corresponds to 2.9 kHz peak), proceed to Step 28. If it is not, enter 72#, use the * button to toggle down to Step 05 (left side of display), and use the volume control or enter numbers via the keypad (as explained in Step 6) to adjust for a microphone deviation of 2.05 kHz + 7%. After adjustment, note the hex value for Step 05 and exit the 72# command by repeatedly depressing the * button until the display shows the ’ prompt.

Step 16. Enter 72#, use the * button to toggle down to Step 06 (left side of display), and enter the Step 05 hex value noted in Step 26. Exit the 72# command by repeatedly depressing the * button until the display shows the ’ prompt. Remove the injection audio signal.

DTMF Adjust

Step 17. Enter the following commands:
09# to mute TX audio
59# to turn off compandor
473# to set receive audio volume to level 3 (disables DTMF boost)
335# to turn on DTMF tone “5”

Step 18. Read the peak deviation on the communications analyzer. If
reading is 9.0 rad + 10%, proceed to Step 30. If it is not, enter 72#, use the * button to toggle down to Step 07 (left side of display), and use the volume control or enter numbers via the keypad (as explained in Step 6) to adjust for a deviation of9.0 rad + 10%. After adjustment, exit the 72# command by repeatedly depressing the * button until the display shows the ’ prompt.

Step 19. Enter 34# to turn off the DTMF tone.

SAT Deviation Adjust

Step 20. Enter 251# to enable a 6000 Hz SAT tone.

Step 21. Read the average deviation on the communications analyzer. If the reading is 1.4 kHz + 10% (corresponds to 2.0 kHz peak), proceed to Step 33. If it is not, enter 72#, use the * button to toggle down to Step 09 (left side of display), and use the volume control or enter numbers via the keypad (as explained in Step 6) to adjust for a deviation of 1.4 kHz + 10%. After adjustment, exit the 72# command by repeatedly depressing the * button until the display shows the ’ prompt.

Step 22. Enter 26# to turn off the 6000 Hz SAT tone.

Data Deviation Adjust

Step 23. Enter 14# to turn on the 10 kHz signaling tone.

Step 24. Read the average deviation on the communications analyzer. If the reading is 5.7 kHz + 10% (corresponds to 8.0 kHz peak), proceed to Step 36.
If it is not, enter 72#, use the * button to toggle down to Step 08 (left side of display), and use the volume control or enter numbers via the keypad (as explained in Step 6) to adjust for a deviation of 5.7kHz + 10%. After adjustment, exit the 72# command by repeatedly depressing the * button until the display shows the ’ prompt.

Step 25. Enter 15# to turn off the 10 kHz signaling tone.RX Discriminator Adjust
Step 26. Inject a -50 dBm, 883.020 MHz

RX Discriminator Adjust
Step 26. Inject a -50 dBm, 883.020 MHz (channel 434) signal FM modulated with a 1 kHz tone at + 2.9 kHz deviation into the antenna port, using an SLN8576A antenna test adaptor.

Step 27. Enter the following commands:
08# to unmute the RX audio 474# to set the receive audio volume to level 4356# to select the external handset audio path
Step 28. Enter 72#, use the * button to toggle down to step 0A (left side of display), and

use the volume control or enter numbers via the keypad (as explained in Step 6) to obtain 100 mV rms +15% at pin 7 of J3 (RX audio out). After adjustment, exit the 72# command by repeatedly depressing the * button until the display shows the ’ prompt.

Step 29. Exit Manual Test Mode by depressing the PWR button. This completes the keypad adjustment procedure.

AMPS Call Processing

The transceiver is connected to an RF Communications Test System capable of AMPS and CDMA base station simulation and the test simulation and the test described below are performed. The external antenna on a Portable is RF coupled to the Test System. The phone is powered by a battery. All of these tests are performed on a pass/fail basis except where otherwise specified.

The following AMPS Call Processing tests must be done in a single test sequence.

Step 1. Initialize: Set the RF Communication Test System to provide an AMPS control channel at -50 dBm on channel 334.

Step 2. AMPS Registration: Turn the mobile transceiver on and force an AMPS Registration.

Step 3. AMPS Page: Page the mobile transceiver.

When the transceiver alert rings, answer the call using the FLIP for a Portable, the SEND key for a Mortable. Verify that the mobile has transferred to the traffic channel and is transponding SAT.

Step 4. AMPS Handoff: Initiate a handoff to another AMPS traffic channel. Verify that the mobile has handed off to the new traffic channel and is transponding SAT. Terminate the call using the FLIP for a Portable, the END key for a Mortable. Verify that the mobile has terminated the all and de-keyed the transmitter.

CDMA Call Processing

The following CDMA Call Processing test must be done in a single test sequence.

Step 1. Initialize: Configure the test system to the following set parameters:
a. A CDMA pilot on channel 777 with sector A power at -70 dBm and sector B power at -80 dBm.
b. An AMP traffic channel with a 6 kHz tone modulated at 2 kHz of deviation.

c. A CDMA traffic channel handoff message set to the corresponding AMPS traffic channel frequency with SATcolor code 1 and power attenuation code 3.
d. A CDMA System Parameters Message with the following threshold data: Pilot detection threshold
(T_Add) = 28 Pilot drop threshold (T_Drop) = 32
Comparison threshold (T_Comp) = 5
Drop timer value (T_Tdrop) = 3

Step 2. CDMA Slotted Mode Page: Turn the mobile transceiver on and force a CDMA Registration. Page the mobile with a Service Option 1 call. Verify that the mobile establishes and maintains a CDMA call by measuring Rho.

Step 3. CDMA Softer Handoff: Set sector B power to -75 dBm.
The mobile must report sector B as

included in the Candidate set. Increase sector B power to -65 dBm. The mobile must report sector B to be added to the Active set. Initiate a softer handoff and decrease sector B power to -80 dbm. The mobile must report sector B to be dropped from the Active set.

Step 4. CDMA Hard Handoff: Perform a CDM Hard handoff theo channel 691 while still in a Service Option 1 call.
Verify that the mobile hands off and maintains the call by measuring Rho.

Step 5. CDMA to AMPS Handoff: To perform a CDMA to AMPS handoff, send the CDMA traffic channel handoff message to the mobile transceiver and activate the AMPS traffic channel. Verify that the mobile hands off to the AMPS traffic channel and is transponding SAT.

Step 6. Exit.

Test Mode / Test Menu

Introduction

Manual Test Mode software allows service personnel to monitor the telephone status on the display, and manually control tele-phone functions via the keypad.
Manual Test Mode operates at two levels: - Status Display Level, which allows the phone to operate normally while providing status indications in the display. Servicing Level, which disables normal call-processing and allows commands to be entered through the keypad to manually control operation of the phone.

Status Display Level

Status Display Level is the power-up state in Manual Test Mode. Manual Test Mode is entered by momentarily shorting the test pin of the accessory connector J3 to ground, while turning the phone on. Use the MCEL 2000 (SLN6625A) and Test Cable (SKN4800A). See Figure 7: “Connections for Testing and Adjustments” on page 48 In this level of Manual Test Mode the phone will place and receive calls as normal, but the display shows status information. The first line of data indicates channel number, RSSI value, and call-processing mode. The second line of data indicates SAT frequency, carrier state, signaling tone state, power level, voice/data channel mode, Rx audio state, and Tx audio state. The format and explanation of this status information is given in Table 1 under “02# Radio Status Request.” When dialing a phone number, the status display ceases when the first digit of the phone number is entered. The telephone number is displayed in the normal manner as entered. When the Snd button (or End or Clr) is pressed, the status information display resumes.

Servicing Level

The servicing level allows service personnel to manually control operation of a phone by entering test commands through the tele-phone keypad. Parameters such as oper-ating channel, output power level, mut-ing, and data transmission can all be selected by entering the corresponding commands. To enter the Servicing Level, press the # button while in Status Display level (power-up state of Manual Test Mode). In the Servicing Level, automatic call processing functions are disabled, and the phone is instead con-trolled manually by keypad commands. Table 2: “Test Commands For Manual Test Mode” on page 14 shows the test commands and the corresponding results.

NOTE

There is no Status Display when the phone is in CDMA mode.

CDMA Specific Features

Test Menu

A Test Menu allows a user to initiate Markov calls, place Service Option 2 calls and set

Software Configuration Options. The Test Menu is intended to provide a simple mechanism to perform various test and S/W debugging functions. Items will be added to and deleted from the menu period-ically. When Test Menu is enabled, it is entered by pressing the FCN key twice. Refer to Step “09” on page 27 for information on how to enable/ disable the Test Menu during NAM programming. Almost every Test Menu command accepts a parameter or data in the scratchpad. The procedure for transferring the scratchpad data and executing the Test Menu command is as follows:

Step 1. Decide which Test Menu command is going to be executed.

Step 2. Enter the necessary user input into the scratchpad.

Step 3. Press the FCN key twice to acti-vate the Test Menu.

Step 4. Press the volume keys until the desired Test Menu command is indicated on the display.

Step 5. Press the SND key to activate the command.

While the Test Menu is displayed, any keypress that is not volume or SND will also cause the menu to be exited without executing the current option. The Test Menu will also be exited whenever an incoming call is detected.

Markov Calls

During a Markov call, the “(G)ood” rate will be on the top line, and the “(T)otal” on the bottom line of the display. The display will cycle through all rates: (F)ull, (1/2) Half, (1/4) Quarter, and (1/8) Eight.

- Mobile originated Markov calls are performed by entering a telephone number and selecting a Test Menu option. Refer to the “Test Menu” section for further information.

- Mobile terminated Markov calls (Land to Mobile) are currently NOT supported. Pressing the SND key initiates a Markov call with the number in the scratchpad. If scratchpad is empty, “1234567” is used. This feature has no value in AMPS mode.

Service Option 2

For Service Option 2 calls, the In Use indi-cator will come on, but the display will remain blank.

- - Mobile originated Service Option 2 calls are performed by entering a telephone number and selecting a Test Menu option. Refer to the “Test Menu” section for further information.
- - Mobile terminated Service Option 2 calls will be automatically answered. Pressing the SND key initiates a Service Option 2 call with the number in the scratchpad. This feature has no value in AMPS mode.

SW (Software) DIP

Pressing the SND key initiates a one or more SW DIP functions based on the number in the scratchpad. Possible SW DIP functions are:

1: Disables closed loop power control.

4: Forces vocoder to provide full rate voice (may be enabled at any time during a call).

128: Sets the conversation audio path to “audio out” and “audio in” on the external connector.

For example, to disable closed loop power control, the user enters the following key sequence:

1 + FCN + FCN + ^ + SND

Undo all SW DIP settings (default at power on) by pressing:

0 + FCN + FCN + ^ + SND

These may be combined to do more than one at a time. For example, 4 and 1 may be combined by entering 5 before entering

menu and selecting SW DIP.

Test Mode

Also included in the software is a Manual Test Mode, which allows viewing the ESN, software version number, and programming the phone number (NAM).

Handset Commands

To enter Manual Test Mode:

- 0 0 * * 83786633

(83786633 spells “TESTMODE” on the keypad).

Table 9:

Key	***Function***
*	Toggles the display to the next location (enters data displayed to buffer). When hit at last program step, the command is terminated (if required, information may also be programmed into the EEPROM). If the command relates to a test function with multiple data displays, the * key is used to pause scanning data or to step through sequential test func-tions. Entering the * key during a pause time resumes scanning.
CLR/END	Resets the location to presently programmed information (if the command allows user input).
#	Terminates command without changing any of the programmed informa-tion. Each command consists of at least two digits entered from the telephone keypad with the entry terminated using the # key. For commands that initiate an action that requires a response or that accu-mulates error counts, the # key terminates the test.
DIGIT	Enter digit value. If the value to be modified is filled or exceeded, the **CLR** must be pressed before more digit selections are allowed. This is valid only if the command allows user input.
	For The Gain and power Phasing handset test commands only
	translated into HEX A-F respectively.
Volume up/ down	Increments/decrements the current data value. If the maximum value for this data location is exceeded then it is set to zero.

Table 9:

Key	*Function*
STO	Shortcut to save values and quit test command.

This will cause the phone to enter the Test

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
#	Suspend		Terminate normal mode and enter Test Command Mode. This command is valid only when in normal mode. The # key must be held for 2 seconds to suspend with handset. Performs initialization as in the INIT test command.
01#	Restart		Equivalent to turning power off, then on again.
02#	Radio Start Request	AAAZBBBC-DEFGHI	Display the current radio status: **Handset Display Format:** AAA = Current channel (1000-1023 represented as A00-A23) Z = Blank - AMPS **Analog Mode:** BBB = RSSI reading (averaged) for this channel. C = Digital Color Code (data channel) 0-3 DCC, 4 invalid = SAT Frequency (voice channel) 0=5970 Hz; 1=6000 Hz; 2=6030 Hz; 3=No SAT Lock D = Carrier (0=OFF, 1=ON) E = Word sync status (data channel) and Signalling tone (voice channel) (0=OFF, 1=sync acquired/ON) F = RF Power Level (Steps 0-7) G = Reception Mode (0=voice channel, 1=data channel) H = Receive Audio (0=enabled, 1=muted) I = Transmit Audio (0=enabled, 1=muted) **CDMA Mode: (Not currently supported)** **Bit fields undefined**
03#	(not used)		

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
04#	Initialize Trans-ceiver		Initialize the current radio as follows: 1. Carrier = OFF 2. RF power attenuation set to level 2 3. Signaling Tone = OFF 4. SAT transponding = OFF 5. Audio Path = TO INTERNAL SPEAKER 6. DTMF & Audio Tones = OFF 7. Receive Audio & Transmit Audio = MUTED 8. AMPS Mode If the radio is a CDMA only model (not dual mode), it will default to CDMA mode instead.
05#	Carrier on		Turn on the carrier. **05#** turns the carrier on with a nominal value for the DAC for an output power level.
06#	Carrier Off		Turn off the carrier.
Note: Use the PATH command (**35A#**) to select the audio path to test before using commands **07#** through **10#**. (Default path is to internal speaker and microphone).			
07#	RXMUTE		Mute Recieve Audio
08#	RXUNMUTE		Unmute recieve audio
09#	TXMUTE		Mute Transmit audio.
10#	TXUNMUTE		Unmute transmit audio
11X#	Loadsynth		Load the specified channel into the radio synthesizer. X-Enter up to 4-digits for the channel number. Channel numbers must be in the range of 1 to 1024. Narrow mode channel numbers not currently supported.
12X#	Set-Attn		In AMPS mode: Set the AMPS RF power attenuation to the value specified (0-7). In CDMA mode: Set the TX gain adjust DAC to the value specified (0-255)
13#	(not used)		
14#	STON		Enables continuous signalling tone.
15#	STOFF		Disables signalling tone.
16#-18#	(Not Used)		

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
19#	Version		Displays version corresponding to the two digit option x. The following table show the valid options for x: Decimal 00 Call processor 01 CDMA test command document number 02 Date 03 Time 22 DSP mask version 23 DSP patch version - The call processor (factory version) number in the format: 00 XXXX - The CDMA test command document number: 01 XXXX - The date the build was created in the format: 01JAN96 - The time the build was created in the format: xxyyzz where xx is the hour, yy is the minute, and zz is the second. - The version of the DSP mask xxxxyyyyyyzzzz where xxxx is the version, yyyyyy is the date, and zzzz is the device. - The version of the DSP patch xxxxyyyyyyzzzz where xxxx is the version, yyyyyyis the date, and zzzz is the device. All data fields can be viewed by hitting the * key repeatedly. To exit hit the # key.
19X	Multi-Version		Displays version corresponding to the two digit option x. The following table show the valid options for x: Decimal 00 Call processor 01 CDMA test command document number 02 Date 03 Time 22 DSP mask version 23 DSP patch version - The call processor (factory version) number in the format: 00 XXXX - The CDMA test command document number: 01 XXXX - The date the build was created in the format: 01JAN96 - The time the build was created in the format: xxyyzz where xx is the hour, yy is the minute, and zz is the second. - The version of the DSP mask xxxxyyyyyyzzzz where xxxx is the version, yyyyyy is the date, and zzzz is the device.
20#-24#	(not -used)		

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
25X#	Sat/Dsat On		Enable SAT/DSAT transponding. For AMPS mode, the bye following the opcode is the color code of the SAT frequency that the radio may expect to receive. The command only uses the narrow phase lock loop mode and locks only to the frequency selected (+/- 15 Hz). Valid color codes for X: 0 = 5970 Hz 1 = 6000 Hz 2 = 6030 Hz
26#	Sat/Dsat Off		Disable the transponding of Sat/Dsat.
27X#	Cdata		AMPS: Continuous Transmit Data on the reverse Analog Control Channel. CDMA: Random Transmit Data (RTD) on the reverse CDMA channel. Input Action 0 Start (AMPS) / Variable Rate (CDMA) 1 Full Rate (CDMA) 2 Half Rate (CDMA) 4 Quarter Rate (CDMA) 8 Eighth Rate (CDMA) 9 Stop RTD (AMPS, CDMA)
28#	HITNON		Tuen on high tone (frequency 1150 Hz +/- 55Hz)
29#	HITNOFF		Turn off high tone.
30#	LOTNON		Turn on low tone (frequency 770 Hz +/- 40 Hz)
31#	LOTONFF		Turn off low tone.
32#	INVM		Initialize non-volatile memory to all zeros. This command should be reserved for special situations where reprogram-ming will be required (such as memory chip or circuit board replacement or when a radiotelephone is to be reissued to a new subscriber). This command may take a minute or more to complete; during which time the number 32 will be displayed. DO NOT turn off the radiotelephone until the normal servicing level display resumes.
33X#	DTMFON		Generates a continuous DTMF tone as specified by input X. Input X may be 0-9 for keypad DTMF, 10-18 for single low or high tone, and 20-25 for tripled low or high tone.
34#	DTMFOFF		Turn off DTMF tones.

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*

35X#	Path		Change the audio path to A, where A =:
			0 = Hands free (selects input signal AUDIO IN @ J3-pin 8 and outputs audio signal AUDIO OUT/ON-OFF @ J3-pin 7; internal speaker and microphone are muted.)
			1 = Speaker (normal audio path; selects internal mic and outputs audio @ AUDIO OUT/ON-OFF @ J3-pin 7; internal speaker is muted.)
			2 = Alert (activates the alert transducer for as long as the # key is pressed. To prevent overstressing the alert transducer., DO NOT hold the # key down for extended periods.)
			3 = Handset (selects the internal mic and speaker.)
			4 = Mute (all audio paths and supplies are off, DSP put to sleep.) This command must be followed by a different AUDIO-PATH command (not MUTE) in order to guar-antee proper DSP functionality. Failure to do so may result in a radio failure.
			5 = Internal MIC Test (routes the internal mic audio directly to AUDIO OUT/ON-OFF @ J3-pin 7, and routes audio input at AUDIO IN @ J3-pin 8 directly to the earpiece speaker.)
			6 = External Handset (selects input audio at AUDIO IN @ J3-pin 8, and outputs audio at AUDIO OUT/ON-OFF @ J3-pin 7; internal speaker and mic are muted, and sidetone is turned on.)
			7 = Reserved (not supported)
			8 = Reserved (not supported)
			9 = Boom MIC (selects input audio at AUDIO IN and outputs audio at AUDIO OUT/ON-OFF to headset connector; internal speaker and mic are muted, and sidetone is turned on.)
			This command enables all internal and external hardware controls necessary to route audio to/from the correct outputs/inputs.

36#	(not used)		
37#	(not used)		
38#	SND-SN	AABB	Returns serial number contents. If all bytes = 00, no serial number is programmed. Display four byte serial number in hexadecimal one byte at a time, along with a byte count. The * key causes the next byte/count to be displayed.
39#-44#	(not used)		
45#	READRSSI		Returns the RSSI reading taken on the current channel. The number is displayed as a three digit decimel number.
46#	(not used)		

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
47X#	set-aud		Sets the audio level to the value specified by X. Audio level X is represented as 0 = lowest, 15 = loudest. Range of 8-15 has DTMF Feedback boost bit enabled.
48#	SIDETN		Enable sidetone. (Command **05#** must also be executed).
49#	SIDETF		Disable sidetone. (Command 06# must also be executed)
50# -54#	not used		
55#	Prog-nam	nam	Programs the NAM through the handset. This version uses supports only currently required NAM fields and it supports programming of data logger bytes. At the last step, the user enters a 1 to begin programming the data logger bytes. Handset key entry is defined in Table 1: “Handset Command Key Entry” on page 13. Refer to “NAM Programming” on page 43 of this manual for programming details.
56#	Auto-Cycle		Puts the radio in autocycle mode (CDMA only). Exit this command with the # key. This command causes the radio to infinitely loop between 2 cycles. One cycle is the display/transmit and the other is standby. The display/transmit cycle has a duration of 90 seconds and the radio has the following setup: - Display has all 8’s showing. - Turn on variable rate random transmit data. - Carrier is enabled. The standby cycle has a duration of 4.5 minutes and the radio has the following setup: - Display is blank. - Turn off variable rate random transmit data - Carrier is disabled. This test command forces the radio into CDMA mode.

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
57X#	CP_Mode		Select radio call processing mode. This command will set up the radio to operate in the mode selected and will also perform initialization as specified by the INIT command. The synthesizer will be reprogrammed to setup parameters for the mode selected. 0 AMPS signalling (stop call processing test commands and PCM Loopback) 1 Not supported - NAMPS signalling 2 Not supported - Reserved for NAMPS expansion 3 Not supported - Reserved for NAMPS expansion 4 Not supported - Reserved for NAMPS expansion 5 CDMA signalling (stop call processing test commands and PCM Loopback) 6xy SIMVC test command From the handset, x is the maximum rate and y is the minimum rate. Valid rates for x and y are: 4 - Full rate 3 - Half rate 2 - Quarter rate 1 - Eighth rate From the Computer, no parameters are accepted and Full rate is forced. (This is not supported yet) 7 Start PCM Loopback 8 CDMA T-Tester mode (channel must be set by LOAD-SYTH. Handset only). 9 Not supported - CDMA force random data transmis-sion 12 Stop CPU - There is no way out of this except cycling power.
58#	COMPD-ON		Turns on the computer.
59#	COMPD-OFF		Turns off the computer.
60#-67#	not used		
68#	Read Model		MODEL Read radio model type. Displays three radio model bytes: hardware (model), flex (type), and factory.
69#-71#	not used		

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
72X	gain phase		Program AMPS (only) gain phasing values through the handset. Gain phasing depends on the call processing mode. It is the responsibility of the user to select the proper call processing mode before using this test command. This command reprograms the EEPROM phasing values for MOD, MIC, AUX, etc. The value in X selects which step to start on. If no value for X is entered, it will start at step 0. The command keys are defined in Table 1: “Handset Command Key Entry” on page 13. NOTE: If you power down the radio after changes are made, the power up sequence re-programs the hardware with the correct phasing values. Refer to the “Tests and Adjustments” on page 47 for instructions on entering parameters from the keypad. AMPS GAIN PHASING RANGE STEP # PARAMETER (HEX) 00-04 MOD 0- MOD 4 0-7 05 Aux. audio path deviation 0-1 06 MIC audio deviation 0-F 07 DTMF deviation 0-3 08 Data deviation 0-3 09 SAT deviation 0-3 0A Discriminator audio gain 0-7 0B AFC WARP Analog 0-FF

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
73#	PWR-Phase		Programs power phasing values through the handset. Power phasing depends on the call processing mode. It is the responsibility of the user to select the proper call processing mode before using this test command. This command reprograms the EEPROM phasing values for Max. Power Level, Attenuator Slope Adjust, etc. The value in X selects which step to start on. If no value for X is entered, it will start at step 0. The command keys are defined in Table 1: “Handset Command Key Entry” on page 13. NOTE: If you power down the radio after changes are made, the power up sequence re-programs the hardware with the correct phasing values. Refer to “Tests and Adjustments” on page 47 for instruc-tions on entering parameters from the keypad. Analog Power Level Parameters: RANGE STEP # POWER LEVEL (HEX) 00 Power Step 0 00-FF 01 Power Step 1 00-FF 02 Power Step 2 00-FF 03 Power Step 3 00-FF 04 Power Step 4 00-FF 05 Power Step 5 00-FF 06 Power Step 6 00-FF 07 Power Step 7 00-FF 08-0B Do Not Adjust CDMA Power Level Parameters: RANGE STEP # POWER LEVEL (HEX) 00 Attenuator Slope Adjust 00-FF 01 Attenuator Offset Adjust 00-FF 02 Clamp Adjust 00-FF 03 VCA Slope Adjust 00-FF 04 VCA Offset Adjust 00-FF 05 PMax 1 (Chan. 991-1023, 1-100) 00-FF 06 PMax 2 (Chan. 101-322) 00-FF 07 PMax 3 (Chan. 323-544) 00-FF 08 PMax 4 (Chan. 545-766) 00-FF 09 PMax 5 (Chan. 767-990) 00-FF

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
73#	PWR-Phase		STEP # POWER LEVEL (HEX) 0A Ch. Gain Adj. 1 (Chan. 991-1023, 1-100) 00-FF 0B Ch. Gain Adj. 2 (Chan. 101-322) 00-FF 0C Ch. Gain Adj. 3 (Chan. 323-544) 00-FF 0D Ch. Gain Adj. 4 (Chan. 545-766) 00-FF 0E Ch. Gain Adj. 5 (Chan. 767-990) 00-FF 0F TX Gain Adjust 1 00-FF 10 TX Gain Adjust 2 00-FF 11 TX Gain Adjust 3 00-FF 12 TX Gain Adjust 4 00-FF 13 TX Gain Adjust 5 00-FF 14 TX Gain Adjust 6 00-FF 15 TX Gain Adjust 7 00-FF 16 TX Gain Adjust 8 00-FF 17 VC Sense Slope Adjust 00-FF 18 VC Sense Offset Adjust 00-FF 19 VC Sense Zero Adjust 00-FF 1A Available 00-FF 1B Not Available 00-FF

NAM Programming

Introduction

The Number Assignment Module (NAM) is a section of memory that retains information about the phone's characteristics, such as the assigned telephone number, system iden-tifi-cation
number, and options information.
Two methods are available to program the NAM using the keypad: Test Mode and User Mode.
Regardless of the method used, the NAM must be programmed before the phone can be placed into service. This chapter covers the NAM Programming steps for Test Mode NAM Programming.

Test Mode Programming

Table 3: "Minimum Required Test Mode NAM Programming Steps" on page 25 shows
the minimum required Test Mode NAM programming steps. Table 4: "Test Mode NAM Programming Sequence" on page 26 lists all NAM programming steps, complete with parameters and definitions.

IMPORTANT

Consult with the System Operator regarding NAM information. Incorrect NAM entries can cause the phone to operate improperly or not at all.
.
For Test Mode NAM programming, the portable must be in the Servicing Level of Manual Test Mode (See "Test Mode/Test Menu" on page 11.) To enter test mode, the Manual Test pin (recessed center pin of the J6 battery connector) must be momentarily grounded while powering up the phone. This can be accomplished in a variety of ways, such as by using a 6.8 VDC power

supply and an MCEL 2000 test cable or test plug. After powering up in test mode, press the # button to enter Servicing Level. Once in Test Mode Servicing Level, enter 55# to place the phone in NAM programming mode. The display will show factory default NAM data or show new data as it is entered, scrolling from left to right. Sequentially step through the procedures shown in Table 4: “Test Mode NAM Programming Sequence” on page 26 using the * key. Enter new data as required, or skip past factory default values for parameters that do not need to be changed.

If a second phone number is to be programmed, step 11 bit 6 must be set to 1. This bit enables dual-NAM operation and will cause NAM programming steps 1-6 and 12 to be repeated for the second phone number.

Minimum Required Test Mode

NAM Programming Steps

Table 11:

Service Type	Minimum Required Programming Steps
Single NAM Dual NAM (part A) Dual NAM (part B)	1, 3, 4, 6, 8, 9 1, 3, 4, 6, 8, 9, 11 1, 3, 4, 6

Test Mode NAM Programming Sequence

Advances to the next programming step; also programs the NAMafter the last programming step is entered. A valid value must be entered. Otherwise the phone will not advance to the next NAM step.

Clears the entered information and displays previously entered data for the current programming step.

Exits the programming mode without programming the NAM.

Test Mode NAM Programming Sequence

Table 12:

Step	*Factory Default*	*Description*
01	00000	**Home System ID (SID) Number.** Number assigned by system operator for system identification.
02	00000100	**A OPTION BYTE.** The display for step 02 represents the status of eight options, A7 through A0. Bit A7 (msb) is programmed first, followed by A6-A0. Bits enter display on the right and scroll left.
	0	**Local Use (Bit A7).** If set to 1 phone will respond to local control orders in the home area or when the group ID is matched. Assigned by system operator.

Table 12:

Step	*Factory Default*	*Description*
	0	**Preferred System (Bit A6).** Applies to units capable of operating on two service systems (A or B). 0 = system B; 1 = system A.
	0	**End-to-End Signaling (Bit A5).** When enabled, the phone is equipped for DTMF signaling during a call. 1 = enabled, 0 = disabled.
	0	**Markov test override MSB (Bit A4).** Enter 0.
	0	**Markov test override (Bit A3).** Enter 0.
	1	**Bit not used (Bit A2).** Enter 1.
	0	**Markov test override LSB.** Enter 0
	0	**MIN Mark (Bit A0).** Supplied by system operator. When enabled the user's area code will be sent with each call initiated or answered. 1 = enabled, 0 = disabled.
03	1111110111	**User 10 digit radiotelephone phone number (MIN).** 10_digits including area code; changing this value sets default for AOC. Number is assigned by system operator.
04	010 042 074 160	**Station class mark (SCM).** A 2 digit number assigned by the system operator. Indicates maximum power step, VOX capability, and number of channels used. CDMA only & Non-Slotted mode configuration CDMA only & Slotted mode configuration Dual Mode & Non-Slotted mode configuration Dual Mode Single Band
05	Last digit of access over-load class	**Access overload class.** Specifies the level of priority assigned to the phone when accessing the system. Assigned by system operator.
06	000000	**Security code.** A 6-digit number supplied by the user. This number is used by the user to access or change "security" features such as the 3-digit unlock code or the service level.
07	123	**Unlock code.** A 3-digit number supplied by the user. If the lock feature is enabled by the user, the phone can be operated only by individuals who know the unlock code.
08	4	**Service level.** This 1-digit number supplied by the user allows various call placement restrictions if desired.

Table 12:

Step	*Factory Default*	*Description*
09	01100000 Test Menu enabled 00100000 Test Menu disabled 0	**B OPTION BYTE** The display for step 10 represents the status of eight options, B7 through B0. B7 (msb) is programmed first followed by B6-B0. Bits enter display on the right and scroll left. **Display Pilot Set Status/AMPS Status Mode (Bit B7).** CDMA: These statistics are useful for testing handoff parameters. When enabled, this feature displays the strongest pilot offset in the "Active Set" (only member during Idle) on the top line of the display, and the strongest pilot in the "Neighbor Set" on the bottom line. Each line has the same format. The left most 3-digit number is the pilot offset, and the right number is a relative signal strength. IDLE HANDOFF (handoffs on a paging channel) occurs when a Neighbor pilot is judged to be better. That neighbor pilot will be promoted to the active set, and thus move to the top line of the display. SOFT HANDOFF (handoff on a traffic channel) occurs when a Neighbor pilot fulfills requirements set by the network, and the network directs the mobile to add the new pilot to the Active Set. Pilot Set status is enabled by setting Step #9, bit #7 to 1. Channel Statistics is disabled by setting Step #9, bit #7 to 0. **WARNING: Turning on this option makes it difficult to see the Markov error rate statistics in a call.** AMPS: In AMPS mode, setting this bit to 1 causes status information similar to current Motorola AMPS products to be displayed. The contents of the display depends on the channel being monitored.
	0	**Test Menu (Bit B6).** This bit allows the user to enable or disable the FCN key Test Menu. Refer to "Test Menu" on page 12 for further information on Test Menu. 1 = enabled, 0 = disabled.
	1	**Paging Channel Message Filtering (Bit B5).** This bit limits the amount of paging channel messaging seen by the data logger debugging tool. A user not using this tool should see no noticeable difference in performance. 1 = enabled, 0 = disabled.
	0	**Portable Data Logging (Bit B4).** Enter 0.

Table 12:

Step	*Factory Default*	*Description*
	0	**Single Serving System Scan (Bit B3)**. This bit allows the user to enable or disable the serving system scanning on serving systems other than the phone's home serving system. If the phone has an odd Home System Identifier (Step 1), it's home serving system is A, otherwise it is B. If Single Serving System Scanning is enabled, only the home serving system will be scanned, otherwise both serving systems will be scanned. 1 = enabled, 0 = disabled.
	1	**Auto Recall (Bit B2).** When set to one, the user may access repertory by a one or two digit send sequence (speed dialing).
	0	**Disable Service Levels (Bit B1).** If set to 1, the service level (call restric-tions) cannot be changed by the user.
	0	0 **Lock Disable (Bit B0).** When set to 1, the user cannot lock and unlock the phone unit via the 3 digit lock code.
10	00000000	**C OPTION BYTE** The display for step 11 represents the status of eight options, C7 through C0. C7 (msb) is programmed first followed by C6-C0. Bits enter display on the right and scroll left.
	0	**User Mode NAM Programming Disable (Bit C7).** When set to 1, User Mode NAM programming cannot be accessed.
	0	**Dual NAM System Registration Enable (Bit C6).** Enter 1 if dual NAM operation is desired (for models capable of dual system operation). Enter 0 for single NAM operation
	0	**Test Mobile Enable/Auto Answer (Bit C5).** Enter 0.
	0	**Auto Redial Disable (Bit C4).** When set to 1, the user cannot access the 6-minute auto redial feature.
	0	**Three Wire Bus Speaker Disable (Bit C3).** This bit is used to disable internal handset speaker when adding V.S.P. option. 1 = handset speaker disabled, 0 = handset speaker enabled.
	0	**Bit not used (Bit C2).** Enter 0.
	0	**Selectable System Scan Disable (Bit C1).** When set to 1, the user cannot select the primary system.
	0	**Diversity Antenna (Bit C0).** (Extended systems only) 0 = Non-diversity, 1 = Diversity.
11	0334	**AMPS Initial paging channel.** There are 4 significant bits for the initial paging channel. For system A enter 0333 and system B enter 0334.
12	0333	**AMPS Initial A system channel.** To initialize system A enter 0333.

Table 12:

Step	*Factory Default*	*Description*
13	0334	**AMPS Initial B system channel.** To initialize system B enter 0334.
14	021	**AMPS Dedicated Paging Channels.** Number of dedicated paging chan-nels is 21. Enter 021.
15	00001000	**D OPTION BYTE**. The display for step 16 represents the status of eight options, D7 through D0. D7 (msb) is programmed first, followed by D6-D0. Bits enter display on the right and scroll to left.
	0	**Enhanced Scan (Bit D7)**. Enter 1.
	0	**Cellular Connection 1 (Bit E6)**. Normally set to 0.
	0	**Long Tone DTMF Enable (Bit E5)**. Normally set to 1.
	0	**Transportable Transducer Disable (Bit E4)**. Enter 0.
	1	**Bit not used (Bit E3)**. Normally set to 0.
	0	**Handset Test Mode Disable (Bit E2)**. Enter 0.
	0	**Failed Page Indication Disable (Bit E1)**.
	0	**Word Sync Scan Disable (Bit E0)**. Set to 1.
16	00100111	**E OPTION BYTE**. The display for step 16 represents the status of eight options, E7 through E0. E7 (msb) is programmed first, followed by E6-E0. Bits enter display on the right and scroll to left.
	0	**Bit not used (Bit E7)**. Enter 0.
	0	* **Preferred mode (Bit E6)**. Normally set to 0. Bit 6 - 1 and Bit 5 - 1 = Analog preferred Bit 6 - 1 and Bit 5 - 0 = Analog only
	1	**Preferred mode (Bit E5)**. Normally set to 1. Bit 5 - 1 and Bit 6 - 1 = CDMA preferred Bit 5 - 1 and Bit 6 - 0 = CDMA only
	0	**Extended Address Method (Bit E4)**. Enter 0.
	0	**Preferred Analog Serving System (Bit E3)**. Normally set to 0.
	1	**Config. for mob term using home SID, NID pair (Bit E2)**. Enter 1. 1 = Allow mobile terminated call while using a home (SID, NID) pair. 0 = Disallow mobile terminated call while using a home (SID, NID) pair.
	1	**Config. for mob term while SID roamer (Bit E1)** Enter 1. 1 = Allow mobile terminated call while a SID roamer. 0 = Disallow mobile terminated call while a SID roamer.

Table 12:

Step	*Factory Default*	*Description*
	1	† **Config. for mob term while NID roamer (Bit E0)**. Enter 1. 1 = Allow mobile terminated call while a NID roamer. 0 = Disallow mobile terminated call while a NID roamer.
17	0	**CDMA: Slot Cycle Index.** TBD
18	Entry Required	**CDMA: SID (SID_NIDp).** Up to 5-digits.
19	00000	**CDMA: Network ID Number (NID of SID_NIDp).** Up to 5-digits.
20	111111	**Mobile Country Code (first 3-digits), IMSI 11 (1-digit), IMSI 12 (1-digit).**
21	Entry Required	**CDMA: Primary Channel.** System A up to 4 decimal digits.
22	Entry Required	**CDMA: Primary Channel.** System B up to 4 decimal digits.
23	Entry Required	**CDMA: Secondary Channel.** System A up to 4 decimal digits.
24	Entry Required	**Secondary Channel.** System B up to 4 decimal digits.
25	0	**Data Logger Switch.** Enter 0. 1 = enabled, 0 = disabled.

* These bits will determine which modes of operation the radio will attempt when seeking communication with a Base Station. Care should be taken when either the CDMA only or the Analog only modes of operation are selected, because this configuration will cause a dual mode phone to operate as a single mode phone. Another issue to be aware of is that whenever Bit 5 is set to 0, no handoffs between Analog and CDMA mode can take place. No examination of the RF environment is performed when setting these fields.

† Setting these bits also effects the registrations that are transmitted by the Mobile Station. If bits are set such that the Mobile cannot receive any incoming calls (in CDMA mode), it is not necessary to send out any Registration mes-sages. It should be noted that if all Mobile Terminated Call Preference bits are set to zero, that there would (in a spec compliant system) be no way for the

Mobile Station to receive incoming calls.

DISASSEMBLY

Introduction

Before disassembly is started, the antenna connector cap at the top of the phone has to be removed to allow full separation. Reasonable care should be taken during the disassembly and reassembly of the unit in order to avoid damaging or stressing the housing and internal components. Ensure that a properly grounded high impedance conductive wrist strap is used while
performing these procedures on electronic units.

Recommended Tools

The following tools are recommended for use during the disassembly and reassembly of the phone.
- Anti-Static Mat Kit (0180386A82); includes:

CAUTION

Many of the integrated circuit devices used in this equipment are vulnerable to damage from static charges. An anti-static wrist band, connected to an anti-static (conductive) work surface, must be worn during all phases of disassembly, repair, and reassembly.
— Anti-Static Mat 6680387A95
— Ground Cord 6680334B36
— Wrist Band 4280385A59
- Plastic Prying Tool SLN7223A
- Antenna Tool SYN5233A
- Rear Housing Removal Tool SYN5367A
- Dental Pick
- Tweezers

Disassembly Procedure

Refer to the disassembly instructions and photo sequence on the following pages.

Assembly Procedure

Once the unit is disassembled and the repair is carried out it then becomes obvious that to assemble the unit, the procedure is the reverse of that previously completed for disassembly.

NOTE

Refer to Figure 6: “ST7760K Mechanical Explosion” on page 76, as necessary, while performing the disassembly/assembly procedures.

Step 1. Turn off the telephone.
Step 2. Press down on the battery's tab and remove the battery from the housing.

Step 3. Use the antenna tool to remove the antenna. Place the wide tip of the antenna in the large opening of the antenna tool. Put the bottom of the tool on the grooves in the base of the antenna. Turn counterclockwise until the antenna is free from the phone housing.

Opening Housing

Step 1. With flat surface of tool facing up, insert housing opener at a 45º angle. Make

Step 2. Press and push corner outwards with left thumb while right hand twists phone like a rag.

Step 3. After phone has started to open, lift antenna well to release entire side.

Step 4. Using a small blade screwdriver, slide under housing all the way to corner and lift housing off corner.

Step 5. With flat surface of tool facing up, insert housing opener at a 45º angle. Makesure you can see top of tool in seam.

Step 6. Using index finger, pull housing off going straight across phone.

Step 1. Open the flex connector and pull out the flex.

Step 2. With your thumbs, pry the side tabs away from the board assembly to allow it to be easily removed. Starting at the top of the board, lift the board assembly out of the front

Step 3. Pull the tape off of the microphone connector and pull the connector out. Remove antenna tube.

Step 4. Lift the white display clip off the transceiver board.

Step 5. Lift and separate the display and audio-logic board assembly from thetrans-ceiver board. To disconnect display board from audio-logic board, open flex connector and remove flex. The keypad easily lifts out

Flip Removal

Step 1. Using a dental pick, remove the adhesive strip off the base of the flip.

Step 2. Using tweezers, press the hinge pin button in and over toward the middle of the flip. Also, move the hinge pin section above the button toward the middle of the flip. Note: When reassembling the flip, the button will click back into place. Remove the flip by pulling up on the hinge pin side and out on the other side. The hinge shaft may come

Speaker/Vibrator Removal

Step 1. Rest flip housing on a flat surface. Slip a dental pick between front housing and battery contacts. Pry up to unsnap front housing and battery contacts. The speaker, vibrator, and flex should be exposed.

Troubleshooting

Introduction

Known good replacement parts and assemblies should be available to be used for troubleshooting by substitution, and for replacement of defective parts / assemblies. Defective circuit boards should be forwarded to the appropriate Motorola service facility for repair. Refer to the "Replacement Parts" section of this manual for a list of replacement part descriptions and part numbers.

CAUTION

Many of the integrated circuit devices used in this equipment are vulnerable to damage from static charges. An ESD-safe workstation should be used when-ever a transceiver is opened.

Troubleshooting and Repair

The troubleshooting chart in Table 7, "Assembly Replacement Level Troubleshooting and Repair Chart," on page 56 shows some typical malfunction symptoms and the corresponding verification and repair procedures. Refer to the disassembly instructions located in the "Disassembly" section of this manual for instructions on removing parts / assemblies.

GSM Testing after Repair

After any repair work has been carried out, the unit should be thoroughly tested to ensure that it operates correctly. This is especially important if the Logic / RF assembly is replaced.

For general repairs which do not include replacing the Logic/RF assembly, simply placing a call and checking signal strength, and transmit and recieve audio quality is normally sufficient.

When the Logic/RF assembly is replaced, the unit must have a comprehensive test on a GSM/ DCS compatible communications analyzers. See "Testing" for further details. Placing a call on air is usually carried out at this stage to complete the testing procedure.

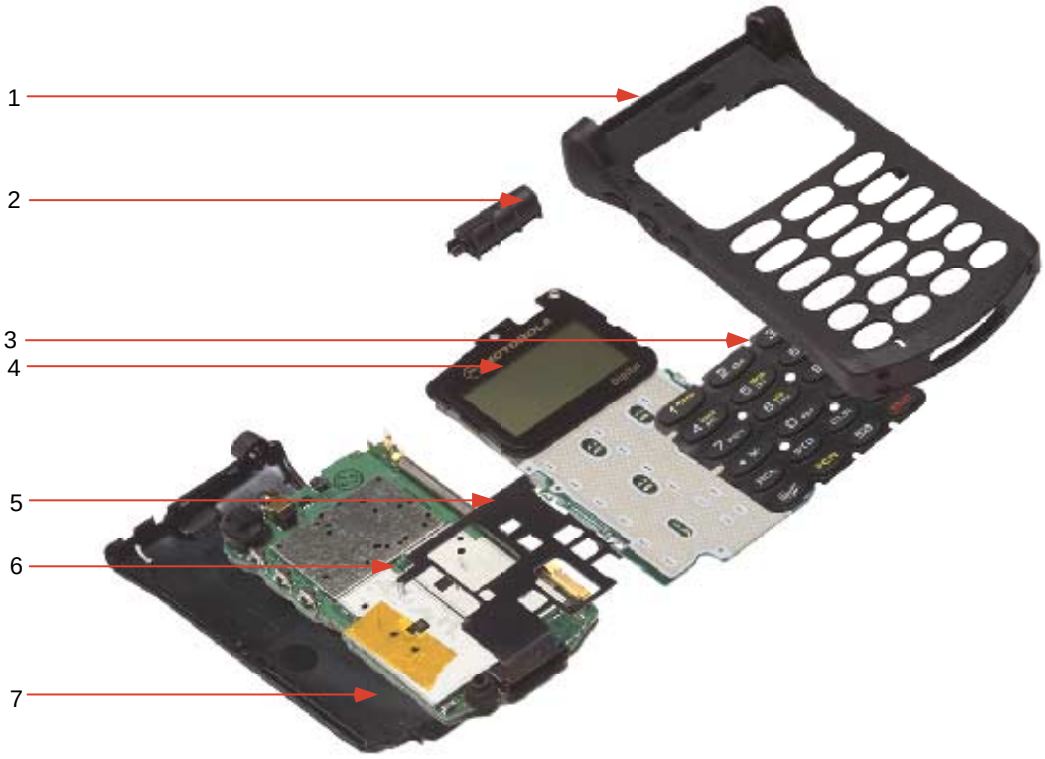
Table 13:

Symptom	*Probable Cause*	*Verification and Remedy*
1. Phone will not turn on or stay on.	a) Battery either discharged or defective.	1. Measure battery voltage across a 50 ohm (>1 Watt) load. 2. If the battery voltage is <3.4 V DC, recharge the battery using the appropriate battery charger. 3. If the battery will not recharge, replace the battery.
	b) Battery connector open or misaligned.	1. Visually inspect the battery connectors on both the battery pack and the transceiver, including the solder connections from the battery connector to the main PC board. 2. Realign the contacts or, if necessary, replace either the battery or battery connector.
	c) Switch inside option connector is open.	1. Measure resistance across the two option connector solder connections on the RF side of the RF/Audio-Logic board. 2. If the switch measures open, replace the option connector.
	d) Keypad membrane defective.	1. Replace the keypad membrane with a known good part. 2. Temporarily connect +6 V DC to the battery contacts. 3. Depress the **PWR** button; if unit turns on and stays on, disconnect the power source and reassemble the phone with the new keypad membrane.
	e) Keypad board defective.	1. Replace keypad board assembly with a known good assembly. 2. Temporarily connect +6 V DC to the battery contacts. Depress the **PWR** button. 3. If the units turns on and stays on, discon-nect the power source and reassemble the phone with the new keypad board assembly.
	f) RF/Audio-Logic Board defective.	1. Remove the RF/Audio-Logic Board. Substitute a known good board. 2. Temporarily connect +6 V DC to the battery contacts. 3. Depress the **PWR** button; if unit turns on and stays on, disconnect the power source and reassemble the phone with the new RF/Audio-Logic board and re-test phone.

Table 13:

Symptom	*Probable Cause*	*Verification and Remedy*
2. Phone exhibits poor reception and/or erratic operation (such as calls frequently dropping, weak and/or distorted audio, etc.)	a) Defective antenna or damaged antenna connector.	1. Make sure the antenna shaft ferrule is screwed into the antenna socket. 2. Make sure pin on antenna coil is seated in antenna connector socket. 3. Replace the antenna with a known good antenna.
	b) Defective RF/ Audio-Logic Board.	Replace the transceiver board (refer to symptom 1c Verification and Re edy.)
3. Display is erratic, or provides partial or nodisplay.	a) Defectivedisplay module.	1. Gain access to RF/Audio-Logic board or keypad board as described in the “Disassembly” section of this manual. 2. Check connection. If connection not at fault, proceed to b.
	b) RF/Audio-Logic board defective.	Replace the RF/Audio-Logic Board (refer to symptom 1f Verification and Remedy).
4. Alert ringer volume is distorted or too low.	a) Alert ringer defective.	Replace the defective speaker or alert ringer with a known good speaker or alert ringer.
	b) RF/Audio-Logic board defective.	Replace the RF/Audio-Logic Board (refer to symptom 1f Verification and Remedy).
5. Transmit audio is weak, distorted, or dead.	a) Microphonedefective.	Replace defective microphone.
	b) RF/Audio-Logic board defective.	Replace the RF/Audio-Logic Board (refer to symptom 1f Verification and Remedy).
6. Receive audio is weak and/or distorted.	a) Speaker defective.	Replace defective speaker.
	b) RF/Audio-Logic board defective.	Replace the RF/Audio-Logic Board (refer to symptom 1f Verification and Remedy).
7. StarTAC 800 (CDMA) model does not sense when flip is opened and closed.	a) Defective reed switch or magnet on keypad board	Replace keypad board assembly or magnet/flip assembly.

Replacement Parts



1.Front Housing

2. Flip Hinge

3.Keypad

4. Keyboard

5. Mylar

6. Transceiver Board

7. Rear Housing

0185688G04	ASSY FRONT FLIP
0185798G04	REAR ASSEMBLY
0185904K01	ASSY ANT DUAL BAND CDMA
0187394K01	ASSY EL DISPLAY KEYBOARD JAW
0503856K01	GROMMET MIC DIGITAL RAE
0509472U01	ALERT GROMMET DIGITAL RAE
2609475U01	SHIELD REFUSE CDMA
2685608G01	SHIELD G CAP/CIA
2685609G01	SHIELD CRIB/DSP
2685753K01	SHIELD DB 1900 PA CDMA
2685754K01	SHIELD DB 800 PA CDMA
2685755K01	SHIELD DB MOON CDMA
2685756K01	SHIELD DB RX-FE CDMA
2685757K01	SHIELD DB RX-IF CDMA
2685758K01	SHIELD DB ZIF-SYN CDMA
2685947K01	SHIELD CIA
2685961K01	SHIELD GCAP/CIA
2687796K01	SHIELD COIL KEYBOARD
2809454C02	PLUG LO PROFILE SMD 32 POS
3704947Z02	TUBE ANTENNA
3809423U12	KYPD SPRINT BROWSER
3909101E01	CNTCT ANT UPPER RAE
4009060E01	SW TACTILE SMD
4209038E01	CLIP GRND/SIGNAL
4209480E01	CLIP ANTENNA
5009186K01	MIC ASSY ELCTRT OMNT-DIR PHS
5009365S01	ALERT 3V SMD RAE
5402393T01	LABEL STARTAC SMARTFLEX
8485912J01	PCB MAIN PORTABLE
2685753K01	SHIELD DB 1900 PA CDMA
2685754K01	SHIELD DB 800 PA CDMA
2685755K01	SHIELD DB MOON CDMA

	2685756K01	SHIELD DB RX-FE CDMA
	2685757K01	SHIELD DB RX-IF CDMA
	2685758K01	SHIELD DB ZIF-SYN CDMA
	5885811G05	CPLR CER MLTLYR 836MHZ 20166
C00050	2113743N40	CAP CHIP 39.0 PF 5% COG
C00073	2113740F10	CAP CHIP REEL CL1 +/-30 2.0
C00074	2113740F12	CAP CHIP REEL CL1 +/-30 2.4
C00075	2113740F01	CAP CHIP REEL CL1 +/-30 .50
C00076	2113743L17	CAP CHIP 1000 PF 10% X7R
C00077	2113740F37	CAP CHIP REEL CL1 +/-30 27
C00078	2113740F19	CAP CHIP REEL CL1 +/-30 4.7
C00080	2113743L17	CAP CHIP 1000 PF 10% X7R
C00100	2113743N10	CAP CHIP 2.2 PF +-.25PF COG
C00101	2113743L17	CAP CHIP 1000 PF 10% X7R
C00103	2113743N14	CAP CHIP 3.3 PF +-.25PF COG
C00104	2113743N40	CAP CHIP 39.0 PF 5% COG
C00105	2113743N40	CAP CHIP 39.0 PF 5% COG
C00106	2113743N40	CAP CHIP 39.0 PF 5% COG
C00107	2113743N50	CAP CHIP 100 PF 5% COG
C00108	2113743L17	CAP CHIP 1000 PF 10% X7R
C00109	2113743N30	CAP CHIP 15.0 PF 5% COG
C00151	2113743N26	CAP CHIP 10.0 PF 5% COG
C00154	2113743N26	CAP CHIP 10.0 PF 5% COG
C00156	2113743N26	CAP CHIP 10.0 PF 5% COG
C00165	2113743N26	CAP CHIP 10.0 PF 5% COG
C00174	2113743N40	CAP CHIP 39.0 PF 5% COG
C00175	2113743L17	CAP CHIP 1000 PF 10% X7R
C00177	2113743N14	CAP CHIP 3.3 PF +-.25PF COG
C00183	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00190	2113743N21	CAP CHIP 6.2 PF + -.5PF COG
C00201	2113743N28	CAP CHIP 12.0 PF 5% COG
C00202	2113743N26	CAP CHIP 10.0 PF 5% COG
C00203	2113743N54	CAP CHIP 150 PF 5% COG
C00205	2113743L17	CAP CHIP 1000 PF 10% X7R
C00207	2113743L17	CAP CHIP 1000 PF 10% X7R
C00208	2113743N38	CAP CHIP 33.0 PF 5% COG
C00209	2113743N40	CAP CHIP 39.0 PF 5% COG
C00252	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C00253	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C00254	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00255	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C00256	2113743N19	CAP CHIP 5.1 PF + -.5PF COG
C00257	2113743N22	CAP CHIP 6.8 PF + -.5PF COG
C00258	2113743N14	CAP CHIP 3.3 PF +-.25PF COG
C00264	2113743N10	CAP CHIP 2.2 PF +-.25PF COG
C00300	2113743E20	CAP CHIP .10 UF 10%
C00301	2113743L41	CAP CHIP 10000 PF 10% X7R
C00302	2113743N42	CAP CHIP 47.0 PF 5% COG
C00303	2113743N40	CAP CHIP 39.0 PF 5% COG
C00304	2113743N24	CAP CHIP 8.2 PF + -.5PF COG

C00305	2113743N14	CAP CHIP 3.3 PF +-.25PF COG
C00328	2113743N46	CAP CHIP 68.0 PF 5% COG
C00400	2113743N40	CAP CHIP 39.0 PF 5% COG
C00401	2113743N28	CAP CHIP 12.0 PF 5% COG
C00402	2113743N28	CAP CHIP 12.0 PF 5% COG
C00403	2113743N40	CAP CHIP 39.0 PF 5% COG
C00404	2113743N50	CAP CHIP 100 PF 5% COG
C00405	2113743N38	CAP CHIP 33.0 PF 5% COG
C00406	2113743N40	CAP CHIP 39.0 PF 5% COG
C00407	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C00408	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C00409	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
C00410	2113743N09	CAP CHIP 2.0 PF +-.25PF COG
C00411	2113743N13	CAP CHIP 3.0 PF +-.25PF COG
C00412	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C00413	2113743N07	CAP CHIP 1.5 PF +-.25PF COG
C00414	2113743L41	CAP CHIP 10000 PF 10% X7R
C00415	2113743L41	CAP CHIP 10000 PF 10% X7R
C00416	2113743N28	CAP CHIP 12.0 PF 5% COG
C00417	2113743N05	CAP CHIP 1.2 PF +-.25PF COG
C00418	2113743N05	CAP CHIP 1.2 PF +-.25PF COG
C00425	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00426	2113743N26	CAP CHIP 10.0 PF 5% COG
C00427	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00428	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00450	2113743N40	CAP CHIP 39.0 PF 5% COG
C00451	2113743N21	CAP CHIP 6.2 PF + -.5PF COG
C00452	2113743L17	CAP CHIP 1000 PF 10% X7R
C00453	2113743L17	CAP CHIP 1000 PF 10% X7R
C00454	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00455	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00456	2113743N42	CAP CHIP 47.0 PF 5% COG
C00457	2113743L17	CAP CHIP 1000 PF 10% X7R
C00458	2113743G26	CAP CHIP 4.7 UF 16V +80-20%
C00460	2113740L20	CAP 12.0 PF 50V 2.0 %
C00461	2113743N40	CAP CHIP 39.0 PF 5% COG
C00462	2113740F15	CAP CHIP REEL CL1 +/-30 3.3
C00480	2113743L17	CAP CHIP 1000 PF 10% X7R
C00482	2113743N40	CAP CHIP 39.0 PF 5% COG
C00483	2113743N40	CAP CHIP 39.0 PF 5% COG
C00484	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00485	2113743N28	CAP CHIP 12.0 PF 5% COG
C00490	2113740F43	CAP CHIP REEL CL1 +/-30 47
C00510	2104801Z13	CAP CER NPO 2.0PF 16V 1005 SMD
C00514	2113743L41	CAP CHIP 10000 PF 10% X7R
C00516	2113743L17	CAP CHIP 1000 PF 10% X7R
C00518	2113743N13	CAP CHIP 3.0 PF +-.25PF COG
C00552	2104801Z21	CAP CER NPO 4.3PF 16V 1005 SMD
C00554	2113743L21	CAP CHIP 1500 PF 10% X7R
C00556	2113743L21	CAP CHIP 1500 PF 10% X7R

C00557	2113743L21	CAP CHIP 1500 PF 10% X7R
C00561	2113740F23	CAP CHIP REEL CL1 +/-30 6.8
C00563	2113743H14	CAP CHIP 10.0 UF 16V +80-20%
C00565	2113743L21	CAP CHIP 1500 PF 10% X7R
C00566	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00567	2113743L21	CAP CHIP 1500 PF 10% X7R
C00570	2113743N50	CAP CHIP 100 PF 5% COG
C00571	2113743N50	CAP CHIP 100 PF 5% COG
C00573	2113743N26	CAP CHIP 10.0 PF 5% COG
C00574	2113743N28	CAP CHIP 12.0 PF 5% COG
C00600	2113743B29	CAP CHIP 1.00 UF 10% 16V
C00601	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C00602	2113743L41	CAP CHIP 10000 PF 10% X7R
C00618	2113743N40	CAP CHIP 39.0 PF 5% COG
C00619	2113743N40	CAP CHIP 39.0 PF 5% COG
C00623	2104801Z08	CAP CER NPO 1.2PF 16V 1005 SMD
C00625	2113743L41	CAP CHIP 10000 PF 10% X7R
C00626	2113743N40	CAP CHIP 39.0 PF 5% COG
C00627	2311049A56	CAP TAN CHIP A/P 4.7 20 10
C00629	2113743N69	CAP CHIP 1.8PF 16V +/-.25PF
C00630	2104801Z08	CAP CER NPO 1.2PF 16V 1005 SMD
C00631	2113743N28	CAP CHIP 12.0 PF 5% COG
C00632	2113743N28	CAP CHIP 12.0 PF 5% COG
C00633	2113743N40	CAP CHIP 39.0 PF 5% COG
C00635	2113743N18	CAP CHIP 4.7 PF +-.25PF COG
C00636	2113743N03	CAP CHIP 1.0 PF +-.25PF COG
C00637	2113743N40	CAP CHIP 39.0 PF 5% COG
C00638	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00639	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C00640	2113743N40	CAP CHIP 39.0 PF 5% COG
C00650	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00651	2113743N24	CAP CHIP 8.2 PF + -.5PF COG
C00652	2113743N26	CAP CHIP 10.0 PF 5% COG
C00653	2113743N26	CAP CHIP 10.0 PF 5% COG
C00654	2113743N06	CAP CHIP 1.3 PF +-.25PF COG
C00655	2113743E12	CAP CHIP .047 UF 10% X7R
C00656	2311049A07	CAP TANT CHIP 1 10 16 A/P
C00657	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00658	2113928C03	CAP CER CHIP 1.0 UF 6.3V 10%
C00659	2113743N50	CAP CHIP 100 PF 5% COG
C00660	2113743L41	CAP CHIP 10000 PF 10% X7R
C00676	2113743L17	CAP CHIP 1000 PF 10% X7R
C00677	2113743N12	CAP CHIP 2.7 PF +-.25PF COG
C00678	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00679	2113743L17	CAP CHIP 1000 PF 10% X7R
C00700	2113743E20	CAP CHIP .10 UF 10%
C00701	2113743N40	CAP CHIP 39.0 PF 5% COG
C00703	2113743N40	CAP CHIP 39.0 PF 5% COG
C00704	2113743E20	CAP CHIP .10 UF 10%
C00705	2113743N40	CAP CHIP 39.0 PF 5% COG

C00706	2113743E20	CAP CHIP .10 UF 10%
C00707	2113743N40	CAP CHIP 39.0 PF 5% COG
C00708	2311049A07	CAP TANT CHIP 1 10 16 A/P
C00709	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00720	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C00721	2113743L41	CAP CHIP 10000 PF 10% X7R
C00723	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00724	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00730	2113743L01	CAP CHIP 220 PF 10% X7R
C00731	2113743L01	CAP CHIP 220 PF 10% X7R
C00732	2113743L41	CAP CHIP 10000 PF 10% X7R
C00740	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00741	2113743N16	CAP CHIP 3.9 PF +-.25PF COG
C00750	2113743L41	CAP CHIP 10000 PF 10% X7R
C00751	2113743L41	CAP CHIP 10000 PF 10% X7R
C00752	2113743L41	CAP CHIP 10000 PF 10% X7R
C00753	2113743L41	CAP CHIP 10000 PF 10% X7R
C00754	2113743L21	CAP CHIP 1500 PF 10% X7R
C00755	2113743L41	CAP CHIP 10000 PF 10% X7R
C00756	2113743L41	CAP CHIP 10000 PF 10% X7R
C00775	2113743L17	CAP CHIP 1000 PF 10% X7R
C00776	2113928H02	CAP CER CHIP .22 UF 10V 10%
C00777	2113743L41	CAP CHIP 10000 PF 10% X7R
C00778	2113743L41	CAP CHIP 10000 PF 10% X7R
C00779	2113743L41	CAP CHIP 10000 PF 10% X7R
C00780	2113743F18	CAP CHIP 2.2 UF 16V +80-20%
C00781	2113743F18	CAP CHIP 2.2 UF 16V +80-20%
C00782	2113743F18	CAP CHIP 2.2 UF 16V +80-20%
C00783	2113743F18	CAP CHIP 2.2 UF 16V +80-20%
C00784	2113743E20	CAP CHIP .10 UF 10%
C00785	2113743L41	CAP CHIP 10000 PF 10% X7R
C00786	2113741F49	CAP CHIP CL2 X7R REEL 10000
C00787	2113743N40	CAP CHIP 39.0 PF 5% COG
C00789	2113743F16	CAP CHIP 1.0 UF 16V +80-20%
C00790	2113743N36	CAP CHIP 27.0 PF 5% COG
C01000	2113743N40	CAP CHIP 39.0 PF 5% COG
C01712	2113743N40	CAP CHIP 39.0 PF 5% COG
C02500	2113743N40	CAP CHIP 39.0 PF 5% COG
C02501	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C02503	2113743L09	CAP CHIP 470 PF 10% X7R
C02504	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C02505	2113743L25	CAP CHIP 2200 PF 10% X7R
CPL570	5885811G04	ISLTR CER MLTLYR 1800MHZ 2016
CPL626	5804632Z01	CPLR CER 4 POST 7020MHZ 2012
CR0300	4862824C01	DIODE VARACTOR
CR0480	4809606E05	DIODE DUAL SCHOTTKEY SOT-143
CR0650	4809877C17	DIODE VARACTOR MA4ST340 SOD323
CR0651	4862824C01	DIODE VARACTOR
CR0652	4809948D10	DIODE PIN BAR63-03

CR0700	4809606E03	DIODE DUAL ARRAY DAP222
CR1150	4809118D02	LED BICOLOR LNJ115W8POMT
CR1960	4809606E08	DIODE DUAL SCHOTTKEY RB715F
CR2222	4813832P70	TRANS SUP 5.6V QUAD
FL0075	9109361K03	FLTR SAW DUPLEX 850MHZ SMD
FL0100	9109062K03	FLTR SAW RX/LO.8-1.1GHZ SMD
FL0190	9109239M06	FLTR SAW TX BP 1960MHZ 3MM SMD
FL0191	9109239M01	FLTR SAW 1960MHZ SMD
FL0250	9109142L03	FLTR XTAL 109.65MHZ 5X7MM SMD
FL0251	9103786K02	FLTR SAW IF 109.8MHZ 7X5.5MM
FL0402	9103913K01	FLTR SAW TX 836MHZ SMD
FL0500	9185623G01	FLTR CER BP 1880MHZ SMD
FL0502	9185623G01	FLTR CER BP 1880MHZ SMD
J01000	0909059E01	RECPT ZIF 16 POS SMD
J05000	0909195E01	SKT BOT ENTRY 2 POS
L00075	2409414M02	IND CHIP WW 3.9NH 10% 2012
L00076	2409414M08	IND CHIP WW 15 NH 5 % 2012
L00077	2409414M06	IND CHIP WW 10 NH 5 % 2012
L00078	2409414M01	IND CHIP WW 1.8NH 10% 2012
L00079	2409414M06	IND CHIP WW 10 NH 5 % 2012
L00100	2409646M06	IND CER MULTILYR 10NH 1608
L00101	2409646M05	IND CER MULTILYR 8.2NH 1608
L00103	2409646M04	IND CER MULTILYR 6.8NH 1608
L00104	2409646M08	IND CER MULTILYR 15NH 1608
L00105	2409646M09	IND CER MULTILYR 18NH 1608
L00106	2462587V36	CHIP IND 150 NH 5% 0805
L00150	2409154M15	IND CER MLTILYR 15.0NH 1005
L00150	2409154M67	IND CER MTLILYR 22.0NH 1005
L00151	2409154M83	IND CER MLTILYR 3.9 NH 1005
L00177	2409154M08	IND CER MLTILYR 3.9NH 1005
L00182	0662057M01	RES. CHIP 0 5% 20X40
L00190	2409154M08	IND CER MLTILYR 3.9NH 1005
L00200	2409154M02	IND CER MLTILYR 1.2NH 1005
L00201	2409646M71	IND CER MULTILYR 68NH 1608
L00201	2409646M73	IND CER MULTILYR 100NH 1608
L00250	2413926D29	IND CER CHIP 330.0 NH 10%
L00251	2413926D28	IND CER CHIP 270.0 NH 10%
L00252	2462587V34	CHIP IND 100 NH 5% 0805
L00253	2462587V37	CHIP IND 180 NH 5% 0805
L00300	2409414M11	IND CHIP WW 27 NH 5 % 2012
L00400	2409646M96	IN CER MULTILYR
L00401	2409154M16	IND CER MLTILYR 18.0NH 1005
L00402	2409154M02	IND CER MLTILYR 1.2NH 1005
L00403	2409154M13	IND CER MLTILYR 10.0NH 1005
L00404	2409154M13	IND CER MLTILYR 10.0NH 1005
L00405	2409154M16	IND CER MLTILYR 18.0NH 1005
L00406	2409154M16	IND CER MLTILYR 18.0NH 1005
L00407	2409646M96	IN CER MULTILYR
L00408	2409646M96	IN CER MULTILYR

L00409	2409646M96	IN CER MULTILYR
L00410	2409154M18	IND CER MLTILYR 33.0NH 1005
L00411	2409154M09	IND CER MLTILYR 4.7NH 1005
L00412	2409646M85	IN CER MULTILYR 22 NH 1608
L00413	2409646M85	IN CER MULTILYR 22 NH 1608
L00414	2409154M10	IND CER MLTILYR 5.6NH 1005
L00415	2409154M10	IND CER MLTILYR 5.6NH 1005
L00416	2409154M05	IND CER MLTILYR 2.2NH 1005
L00425	2462587V38	CHIP IND 220 NH 5% 0805
L00426	2462587V38	CHIP IND 220 NH 5% 0805
L00450	2409646M02	IND CER MULTILYR 4.7NH 1608
L00451	2409646M10	IND CER MULTILYR 22NH 1608
L00452	2409594M07	IND CHIP 6.5NH .5NH ACCU-L
L00453	2409257L03	IND CHIP MLTLYR 1.8NH 1608
L00454	0660076S01	RES CHIP O OHM
L00504	2409646M27	IND CER MULTILYR 4.7NH 1608
L00505	2409154M13	IND CER MLTILYR 10.0NH 1005
L00506	2409646M43	IND CER MULTILYR 3.3NH 1608
L00550	2409414M05	IND CHIP WW 8.2NH 10% 2012
L00551	2409257L09	IND CHIP MLTLYR 5.6NH 1608
L00552	2409257L09	IND CHIP MLTLYR 5.6NH 1608
L00625	2409646M98	IN CER MULTILYR
L00626	2409646M05	IND CER MULTILYR 8.2NH 1608
L00628	2409167T11	IND CER MULTLYR 10 NH 1608
L00631	2409167T11	IND CER MULTLYR 10 NH 1608
L00650	2462587V25	CHIP IND 18 NH 5% 0805
L00651	2413926D29	IND CER CHIP 330.0 NH 10%
L00652	2462587V30	CHIP IND 47 NH 5% 0805
L00676	2409646M11	IND CER MULTILYR 27NH 1608
L00677	2409646M60	IN CER MULTILYR 22 NH 1608
L00728	2409646M73	IND CER MULTILYR 100NH 1608
L00729	2409646M73	IND CER MULTILYR 100NH 1608
L00777	2462587Q44	IND CHIP 560 NH 10%
Q00050	4809939C03	TSTR DUAL NPN/PNP UMH3
Q00051	4809608E03	TSTR DIG PNP DTA114YE
Q00100	4809527E24	TSTR NPN RF MRF949LT1 SC-90
Q00101	4809527E24	TSTR NPN RF MRF949LT1 SC-90
Q00175	4809579E41	TSTR LNA HJ-FET NE38018 SOT343
Q00176	4809608E03	TSTR DIG PNP DTA114YE
Q00400	4809940E07	TSTR DIG PNP DTA114TE
Q00450	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q00452	4809940E03	TSTR DIG NPN DTC114TE
Q00500	4809527E22	TSTR NPN RF BFP450 SOT343
Q00550	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q00551	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q00552	4809940E03	TSTR DIG NPN DTC114TE
Q00625	4809527E18	TSTR NPN RF BFP420
Q00626	4809579E18	TSTR MOSFET P-CHAN TP0101T
Q00627	4809579E18	TSTR MOSFET P-CHAN TP0101T
Q00650	4809579E02	TSTR MOSFET N-CHAN 25K1830

Q00651	4809579E18	TSTR MOSFET P-CHAN TP0101T
Q00660	4809608E03	TSTR DIG PNP DTA114YE
Q00750	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q00751	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q01008	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q02500	5109781E39	IC LIN REG TK11227M SOT 23
Q02501	5109781E39	IC LIN REG TK11227M SOT 23
Q02511	4809939C04	TSTR DUAL PNP/NPN UMC3
Q02512	4809939C25	TSTR DUAL PNP/PNP UM6
Q02513	4809939C03	TSTR DUAL NPN/PNP UMH3
Q02516	4809579E18	TSTR MOSFET P-CHAN TP0101T
R00052	0662057M98	RES. CHIP 10K 5% 20X40
R00053	0662057M98	RES. CHIP 10K 5% 20X40
R00054	0662057M98	RES. CHIP 10K 5% 20X40
R00055	0662057M98	RES. CHIP 10K 5% 20X40
R00072	0662057M98	RES. CHIP 10K 5% 20X40
R00101	0662057M62	RES. CHIP 330 5% 20X40
R00102	0662057M56	RES. CHIP 180 5% 20X40
R00103	0662057N13	RES. CHIP 39K 5% 20X40
R00106	0662057M56	RES. CHIP 180 5% 20X40
R00107	0662057N03	RES. CHIP 15K 5% 20X40
R00108	0662057N01	RES CHIP 12K 5% 20X40
R00109	0662057M74	RES. CHIP 1000 5% 20X40
R00150	0662057M98	RES. CHIP 10K 5% 20X40
R00158	0662057M01	RES. CHIP 0 5% 20X40
R00159	0662057M28	RES. CHIP 12 5% 20X40
R00173	0662057M01	RES. CHIP 0 5% 20X40
R00174	2113743N40	CAP CHIP 39.0 PF 5% COG
R00175	0662057M74	RES. CHIP 1000 5% 20X40
R00176	0662057M92	RES. CHIP 5600 5% 20X40
R00177	0662057M92	RES. CHIP 5600 5% 20X40
R00178	0662057M39	RES. CHIP 36 5% 20X40
R00179	0662057M01	RES. CHIP 0 5% 20X40
R00180	2409154M02	IND CER MLTILYR 1.2NH 1005
R00182	0662057M60	RES. CHIP 270 5% 20X40
R00200	0662057M28	RES. CHIP 12 5% 20X40
R00201	0662057M46	RES. CHIP 68 5% 20X40
R00202	0662057M01	RES. CHIP 0 5% 20X40
R00203	0662057M01	RES. CHIP 0 5% 20X40
R00300	0662057M86	RES. CHIP 3300 5% 20X40
R00301	0662057M98	RES. CHIP 10K 5% 20X40
R00400	0662057M66	RES. CHIP 470 5% 20X40
R00401	0662057M01	RES. CHIP 0 5% 20X40
R00402	0662057M01	RES. CHIP 0 5% 20X40
R00404	0662057N23	RES. CHIP 100K 5% 20X40
R00407	0662057M01	RES. CHIP 0 5% 20X40
R00410	0662057M01	RES. CHIP 0 5% 20X40
R00414	0662057M66	RES. CHIP 470 5% 20X40
R00415	0662057N05	RES. CHIP 18K 5% 20X40
R00416	0662057N06	RES. CHIP 20K 5% 20X40

R00417	0662057M60	RES. CHIP 270 5% 20X40
R00418	0662057M60	RES. CHIP 270 5% 20X40
R00450	0662057M26	RES. CHIP 10 5% 20X40
R00451	0662057M92	RES. CHIP 5600 5% 20X40
R00480	0662057N09	RES. CHIP 27K 5% 20X40
R00481	0662057N15	RES. CHIP 47K 5% 20X40
R00482	0662057M90	RES. CHIP 4700 5% 20X40
R00483	0662057M95	RES. CHIP 7500 5% 20X40
R00484	0662057M43	RES. CHIP 51 5% 20X40
R00512	0662057M42	RES. CHIP 47 5% 20X40
R00513	0662057M50	RES. CHIP 100 5% 20X40
R00514	0662057M90	RES. CHIP 4700 5% 20X40
R00515	0662057M54	RES. CHIP 150 5% 20X40
R00550	0662057M01	RES. CHIP 0 5% 20X40
R00552	0662057M32	RES. CHIP 18 5% 20X40
R00553	0662057M68	RES. CHIP 560 5% 20X40
R00555	0662057M92	RES. CHIP 5600 5% 20X40
R00556	0662057M26	RES. CHIP 10 5% 20X40
R00558	0662057M01	RES. CHIP 0 5% 20X40
R00560	0662057M92	RES. CHIP 5600 5% 20X40
R00562	0662057M98	RES. CHIP 10K 5% 20X40
R00563	0660076S01	RES CHIP O OHM
R00573	0662057M33	RES. CHIP 20 5% 20X40
R00574	0662057M43	RES. CHIP 51 5% 20X40
R00600	0662057M74	RES. CHIP 1000 5% 20X40
R00601	0662057M46	RES. CHIP 68 5% 20X40
R00602	0662057M60	RES. CHIP 270 5% 20X40
R00610	0662057M52	RES. CHIP 120 5% 20X40
R00611	0662057M43	RES. CHIP 51 5% 20X40
R00612	0662057M52	RES. CHIP 120 5% 20X40
R00613	0662057M52	RES. CHIP 120 5% 20X40
R00614	0662057M43	RES. CHIP 51 5% 20X40
R00615	0662057M52	RES. CHIP 120 5% 20X40
R00620	0662057M34	RES. CHIP 22 5% 20X40
R00621	0662057M34	RES. CHIP 22 5% 20X40
R00622	0662057M34	RES. CHIP 22 5% 20X40
R00625	0662057M52	RES. CHIP 120 5% 20X40
R00626	0662057M43	RES. CHIP 51 5% 20X40
R00627	0662057M52	RES. CHIP 120 5% 20X40
R00629	0662057M43	RES. CHIP 51 5% 20X40
R00631	0662057M01	RES. CHIP 0 5% 20X40
R00633	0662057M57	RES. CHIP 200 5% 20X40
R00634	0662057M90	RES. CHIP 4700 5% 20X40
R00636	0662057M86	RES. CHIP 3300 5% 20X40
R00640	0662057M58	RES. CHIP 220 5% 20X40
R00650	0662057M71	RES. CHIP 750 5% 20X40
R00651	0662057M95	RES. CHIP 7500 5% 20X40
R00652	0662057M78	RES. CHIP 1500 5% 20X40
R00653	0662057M92	RES. CHIP 5600 5% 20X40
R00654	0662057N11	RES. CHIP 33K 5% 20X40

R00655	0662057M84	RES. CHIP 2700 5% 20X40
R00656	0662057N15	RES. CHIP 47K 5% 20X40
R00660	0662057N23	RES. CHIP 100K 5% 20X40
R00700	0662057M26	RES. CHIP 10 5% 20X40
R00703	0662057M26	RES. CHIP 10 5% 20X40
R00709	0662057M26	RES. CHIP 10 5% 20X40
R00720	0662057M98	RES. CHIP 10K 5% 20X40
R00725	0662057N19	RES. CHIP 68K 5% 20X40
R00726	0662057M98	RES. CHIP 10K 5% 20X40
R00727	0662057M98	RES. CHIP 10K 5% 20X40
R00728	0662057M50	RES. CHIP 100 5% 20X40
R00729	0662057M26	RES. CHIP 10 5% 20X40
R00730	0662057M76	RES. CHIP 1200 5% 20X40
R00731	0662057M76	RES. CHIP 1200 5% 20X40
R00732	0662057M26	RES. CHIP 10 5% 20X40
R00752	0662057M50	RES. CHIP 100 5% 20X40
R01960	0662057M90	RES. CHIP 4700 5% 20X40
R01961	0662057N23	RES. CHIP 100K 5% 20X40
R01964	0662057M01	RES. CHIP 0 5% 20X40
R02501	0662057N37	RES. CHIP 390K 5% 20X40
R02505	0662057N37	RES. CHIP 390K 5% 20X40
R02510	0662057N15	RES. CHIP 47K 5% 20X40
R02511	0662057N23	RES. CHIP 100K 5% 20X40
R02512	0662057N23	RES. CHIP 100K 5% 20X40
R02513	0662057N23	RES. CHIP 100K 5% 20X40
R11640	0662057M64	RES. CHIP 390 5% 20X40
R11641	0662057M52	RES. CHIP 120 5% 20X40
S00001	5109572E30	IC GAAAS RF SW DPDT AS-152-73
U00050	5109522E05	IC SINGLE XOR TC4530F SSOP5
U00150	5109940K31	IC MMIC GAAS LNA MGA-72543
U00175	5109781E91	IC LV BIAS STAB/ENN MDC5001T1
U00200	5109940K28	IC MMIC GAAS MXR W/IF TQ5M31
U00400	5109923D40	IC CUST MXR/XCRT DB MOON-M 28Q
U00450	5109730C05	IC INT PA GAAS 1.4W RMPA0913
U00451	5109768D06	IC TEMP SNSR LM60CIM3X SOT23
U00476	5804997Z01	ISLTR CER 1880MHZ 5MM SMD
U00550	5109730C14	IC INT PA GAAS 3.4W RMPA1902
U00576	5804997Z02	ISLTR CER 1880MHZ 5MM SMD
U00625	4809283D42	OSC MOD VCO 1035MHZ 6X6MHZ SMD
U00626	4809283D41	OSC MOD VCO 991MHZ 6X6MM SMD
U00627	5109940K32	IC MMIC SI BUFF AMPL UPC8151TB
U00628	5109940K32	IC MMIC SI BUFF AMPL UPC8151TB
U00700	5109879E19	IC BICMOS ZIF/SYNTH SC79836GC
U01000	5109817F17	IC VOLT DECT 2.7V ILC5061 SOT
VR1960	4813830A73	DIODE 2.7V 5% 225MW
A00001	3909101E01	CNTCT ANT UPPER RAE
A00002	4209480E01	CLIP ANTENNA

A00003	4209480E01	CLIP ANTENNA
A00004	4209038E01	CLIP GRND/SIGNAL
C00325	2113743L41	CAP CHIP 10000 PF 10% X7R
C00326	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00327	2113928C03	CAP CER CHIP 1.0 UF 6.3V 10%
C00329	2113743L25	CAP CHIP 2200 PF 10% X7R
C00330	2113928G01	CAP CER CHIP .22 UF 6.3V 10%
C00331	2113928G01	CAP CER CHIP .22 UF 6.3V 10%
C00332	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C00722	2113743N40	CAP CHIP 39.0 PF 5% COG
C00725	2113743N40	CAP CHIP 39.0 PF 5% COG
C00726	2113743N40	CAP CHIP 39.0 PF 5% COG
C00727	2113743N40	CAP CHIP 39.0 PF 5% COG
C00728	2113743N40	CAP CHIP 39.0 PF 5% COG
C00729	2113743N40	CAP CHIP 39.0 PF 5% COG
C00733	2113743N40	CAP CHIP 39.0 PF 5% COG
C00734	2113743N40	CAP CHIP 39.0 PF 5% COG
C00735	2113743N40	CAP CHIP 39.0 PF 5% COG
C00736	2113743N40	CAP CHIP 39.0 PF 5% COG
C01006	2185736G01	CAP CER Y5V 22UF 10V 3225 SMD
C01060	2113743G26	CAP CHIP 4.7 UF 16V +80-20%
C01061	2113743L41	CAP CHIP 10000 PF 10% X7R
C01100	2113743E20	CAP CHIP .10 UF 10%
C01102	2113743E20	CAP CHIP .10 UF 10%
C01105	2113743E20	CAP CHIP .10 UF 10%
C01111	2113743E20	CAP CHIP .10 UF 10%
C01113	2113743E20	CAP CHIP .10 UF 10%
C01119	2113743E20	CAP CHIP .10 UF 10%
C01120	2113743E20	CAP CHIP .10 UF 10%
C01121	2113743E20	CAP CHIP .10 UF 10%
C01130	2311049C18	CAP TANT CHIP 4.7UF 6V 10%
C01131	2113743E20	CAP CHIP .10 UF 10%
C01132	2113743L41	CAP CHIP 10000 PF 10% X7R
C01152	2113743L41	CAP CHIP 10000 PF 10% X7R
C01153	2113743E20	CAP CHIP .10 UF 10%
C01154	2113741F37	CAP CHIP CL2 X7R REEL 3300
C01171	2113743N26	CAP CHIP 10.0 PF 5% COG
C01172	2113743N26	CAP CHIP 10.0 PF 5% COG
C01200	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01201	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01300	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01400	2113743L41	CAP CHIP 10000 PF 10% X7R
C01401	2113743L41	CAP CHIP 10000 PF 10% X7R
C01703	2113743N40	CAP CHIP 39.0 PF 5% COG
C01704	2113743N40	CAP CHIP 39.0 PF 5% COG
C01705	2113743N40	CAP CHIP 39.0 PF 5% COG
C01706	2113743N40	CAP CHIP 39.0 PF 5% COG
C01707	2113743N40	CAP CHIP 39.0 PF 5% COG
C01708	2113743N40	CAP CHIP 39.0 PF 5% COG
C01709	2113743N40	CAP CHIP 39.0 PF 5% COG

C01710	2113743N40	CAP CHIP 39.0 PF 5% COG
C01711	2113743N40	CAP CHIP 39.0 PF 5% COG
C01714	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01730	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C01901	2113743M08	CAP CHIP 22000 PF +80-20% Y5V
C01903	2113743E20	CAP CHIP .10 UF 10%
C01907	2113743L41	CAP CHIP 10000 PF 10% X7R
C01908	2113741F12	CAP CHIP CL2 X7R REEL 300
C01909	2113741F12	CAP CHIP CL2 X7R REEL 300
C01910	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01912	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01913	2109622N06	CAP CER CHIP NPO CLASS I
C01914	2113743E20	CAP CHIP .10 UF 10%
C01915	2113741F33	CAP CHIP CL2 X7R REEL 2200
C01916	2113743E20	CAP CHIP .10 UF 10%
C01917	2113743N40	CAP CHIP 39.0 PF 5% COG
C01919	2113743E20	CAP CHIP .10 UF 10%
C01920	2113743E10	CAP CHIP .033 UF 10% X7R
C01921	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01922	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01923	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01924	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C01930	2113743E20	CAP CHIP .10 UF 10%
C01933	2113743L41	CAP CHIP 10000 PF 10% X7R
C01934	2113743L41	CAP CHIP 10000 PF 10% X7R
C02003	2309121D19	CAP CHIP TANT 10 UF 10% 10 V
C02006	2113743E20	CAP CHIP .10 UF 10%
C02007	2113743E20	CAP CHIP .10 UF 10%
C02008	2113743E03	CER CHIP CAP .015UF
C02011	2113743F18	CAP CHIP 2.2 UF 16V +80-20%
C02012	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C02014	2113743L21	CAP CHIP 1500 PF 10% X7R
C02019	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02020	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02021	2113743N26	CAP CHIP 10.0 PF 5% COG
C02022	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02023	2113743M08	CAP CHIP 22000 PF +80-20% Y5V
C02024	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02025	2113743G26	CAP CHIP 4.7 UF 16V +80-20%
C02027	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02030	2113928N01	CAP CER CHIP 0.1UF 10% 6.3
C02031	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02032	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C02033	2113928A01	CAP CER CHIP 1.0 UF 10V
C02099	2113743E20	CAP CHIP .10 UF 10%
C02100	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C02101	2113928P04	CAP CER CHIP 1.0UF 20% 6.3V
C02102	2311049B08	CAP TANT CHIP 1.0 UF 10V 10%
C02300	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C02301	2113743M24	CAP CHIP 100000 PF +80-20% Y5V

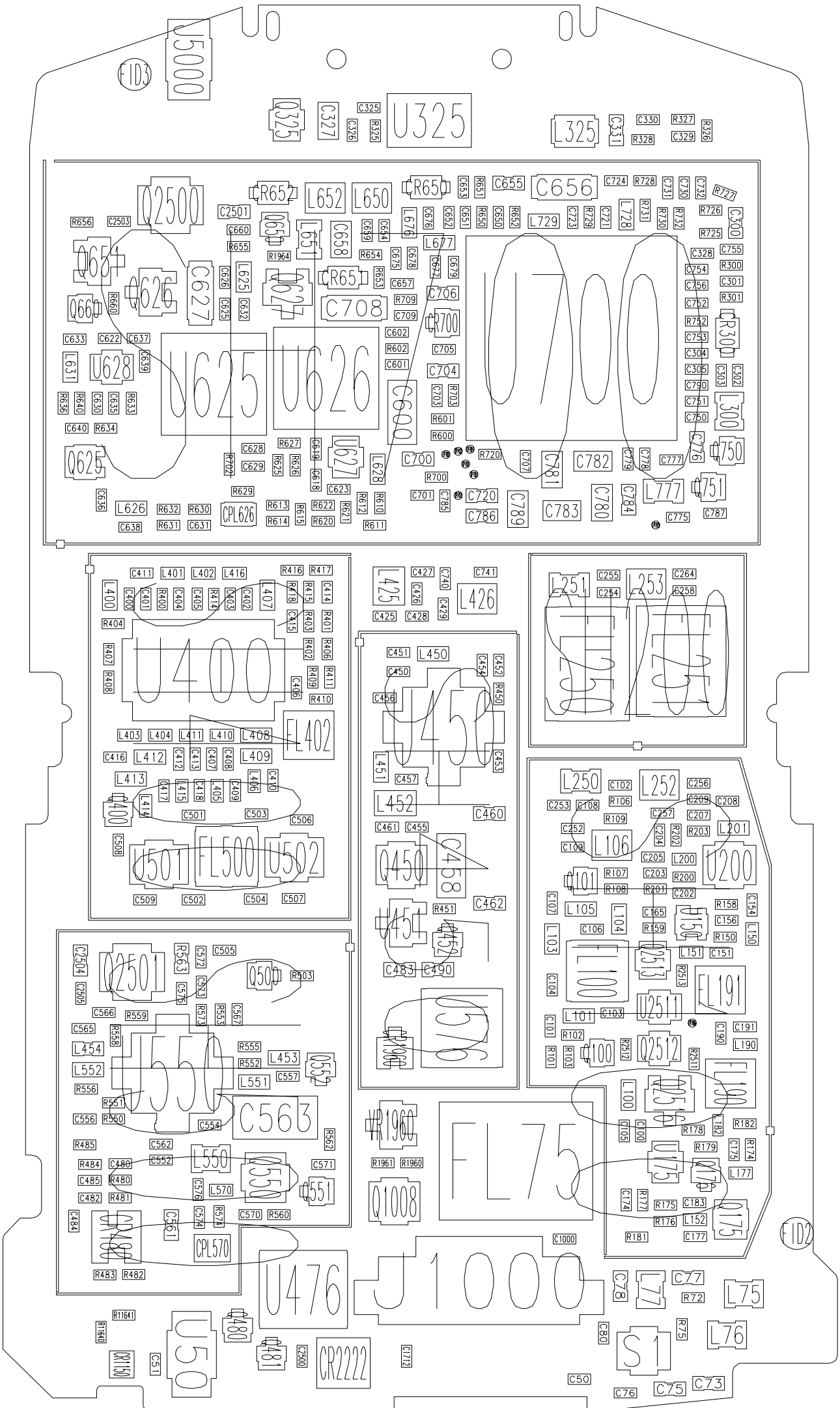
C02302	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
C02400	2185736G01	CAP CER Y5V 22UF 10V 3225 SMD
C02402	2113928C04	CAP CER CHIP 4.7UF 6.3V10%0805
C03000	2113743M24	CAP CHIP 100000 PF +80-20% Y5V
CR1000	4809653F02	RECT SCHOTTKY 1.0A UPS5817
CR1060	4809606E02	DIODE DUAL ARRAY DAN222
CR1700	4809606E02	DIODE DUAL ARRAY DAN222
CR1701	4813830A70	DIODE DL 5.6V COM ANODE
CR2002	4809653F02	RECT SCHOTTKY 1.0A UPS5817
CR2003	4809606E01	DIODE ULTRA HIGH SPEED UMT PKG
CR2100	4809924D09	DIODE SCHTTKY DUAL MA742 SS
FL0076	9185783G03	FLTR CER DP 1880/1960 7X24MM
J00001	0909449B04	RECEPT MOD 15PIN INSMLD
J00101	2809454C02	PLUG LO PROFILE SMD 32 POS
J02000	0909399T06	JACK MOD 2.5MM SMD
L02000	2409092R09	IND CHIP PWR 1008 15 UH SMD
LS0001	5009365S01	ALERT 3V SMD RAE
Q00325	4809939C04	TSTR DUAL PNP/NPN UMC3
Q01000	4809579E39	TSTR FET DUAL FDG6323L SC70-6
Q01001	4809939C02	TSTR DUAL NPN/NPN UMH9
Q01002	4809579E29	TSTR FET P-CHAN SI3443DV 6TSOP
Q01004	4809523E02	TSTR FET/SCHTKY DIODE 8SOIC
Q01060	4809579E40	TSTR FET DUAL N/P FDG6320C SC7
Q01150	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q01151	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q01701	4809607E04	TSTR SIG PNP 2SB1132 SOT89
Q01702	4809940E03	TSTR DIG NPN DTC114TE
Q01703	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q01704	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q01705	4809579E02	TSTR MOSFET N-CHAN 25K1830
Q01731	4809579E40	TSTR FET DUAL N/P FDG6320C SC7
Q02000	4809608E03	TSTR DIG PNP DTA114YE
Q02519	4809608E03	TSTR DIG PNP DTA114YE
R00325	0662057M74	RES. CHIP 1000 5% 20X40
R00326	0662057M84	RES. CHIP 2700 5% 20X40
R00327	0662057N03	RES. CHIP 15K 5% 20X40
R00328	0662057M98	RES. CHIP 10K 5% 20X40
R01000	0609591M37	RES CHIP DUAL 10K 5% 0.63W
R01001	0662057N03	RES. CHIP 15K 5% 20X40
R01002	0662057M98	RES. CHIP 10K 5% 20X40
R01003	0662057M98	RES. CHIP 10K 5% 20X40
R01004	0680195M64	RES 0.24 OHM 1/2W
R01005	0662057M98	RES. CHIP 10K 5% 20X40
R01006	0662057M98	RES. CHIP 10K 5% 20X40
R01007	0662057M98	RES. CHIP 10K 5% 20X40
R01008	0662057M82	RES. CHIP 2200 5% 20X40
R01009	0662057M98	RES. CHIP 10K 5% 20X40
R01010	0662057N23	RES. CHIP 100K 5% 20X40
R01011	0662057N23	RES. CHIP 100K 5% 20X40

R01060	0660076N25	RES CHIP 100 OHM 1/16 W
R01061	0662057N47	RES. CHIP 1.0 MEG 5% 20X40
R01100	0662057B47	CHIP RES 0 OHMS +-.050 OHMS
R01101	0662057M01	RES. CHIP 0 5% 20X40
R01106	0662057M98	RES. CHIP 10K 5% 20X40
R01107	0662057M98	RES. CHIP 10K 5% 20X40
R01108	0662057M01	RES. CHIP 0 5% 20X40
R01116	0662057N15	RES. CHIP 47K 5% 20X40
R01117	0662057M01	RES. CHIP 0 5% 20X40
R01119	0662057M01	RES. CHIP 0 5% 20X40
R01120	0662057M01	RES. CHIP 0 5% 20X40
R01121	0662057N15	RES. CHIP 47K 5% 20X40
R01130	0662057M26	RES. CHIP 10 5% 20X40
R01151	0662057N05	RES. CHIP 18K 5% 20X40
R01171	0662057N31	RES. CHIP 220K 5% 20X40
R01172	0662057B46	CHIP RES 10.0 MEG OHMS 5%
R01203	0662057M01	RES. CHIP 0 5% 20X40
R01204	0662057M01	RES. CHIP 0 5% 20X40
R01207	0662057M01	RES. CHIP 0 5% 20X40
R01300	0662057M01	RES. CHIP 0 5% 20X40
R01400	0662057M01	RES. CHIP 0 5% 20X40
R01401	0662057M01	RES. CHIP 0 5% 20X40
R01700	0662057M98	RES. CHIP 10K 5% 20X40
R01702	0662057M98	RES. CHIP 10K 5% 20X40
R01703	0662057M98	RES. CHIP 10K 5% 20X40
R01704	0662057N15	RES. CHIP 47K 5% 20X40
R01705	0662057M98	RES. CHIP 10K 5% 20X40
R01706	0662057N10	RES. CHIP 30K 5% 20X40
R01707	0662057M54	RES. CHIP 150 5% 20X40
R01716	0662057M98	RES. CHIP 10K 5% 20X40
R01720	0662057N23	RES. CHIP 100K 5% 20X40
R01721	0662057N01	RES CHIP 12K 5% 20X40
R01722	0662057N11	RES. CHIP 33K 5% 20X40
R01723	0662057M98	RES. CHIP 10K 5% 20X40
R01730	0662057M98	RES. CHIP 10K 5% 20X40
R01731	0662057N34	RES. CHIP 300K 5% 20X40
R01802	0662057M85	RES. CHIP 3000 5% 20X40
R01902	0662057M90	RES. CHIP 4700 5% 20X40
R01904	0662057N13	RES. CHIP 39K 5% 20X40
R01906	0662057M98	RES. CHIP 10K 5% 20X40
R01907	0662057N27	RES. CHIP 150K 5% 20X40
R01909	0662057M94	RES. CHIP 6800 5% 20X40
R01910	0662057N27	RES. CHIP 150K 5% 20X40
R01911	0662057N15	RES. CHIP 47K 5% 20X40
R01912	0662057N20	RES. CHIP 75K 5% 20X40
R01913	0662057N03	RES. CHIP 15K 5% 20X40
R01914	0662057M01	RES. CHIP 0 5% 20X40
R01915	0662057M01	RES. CHIP 0 5% 20X40
R01916	0662057M98	RES. CHIP 10K 5% 20X40
R01917	0662057M98	RES. CHIP 10K 5% 20X40

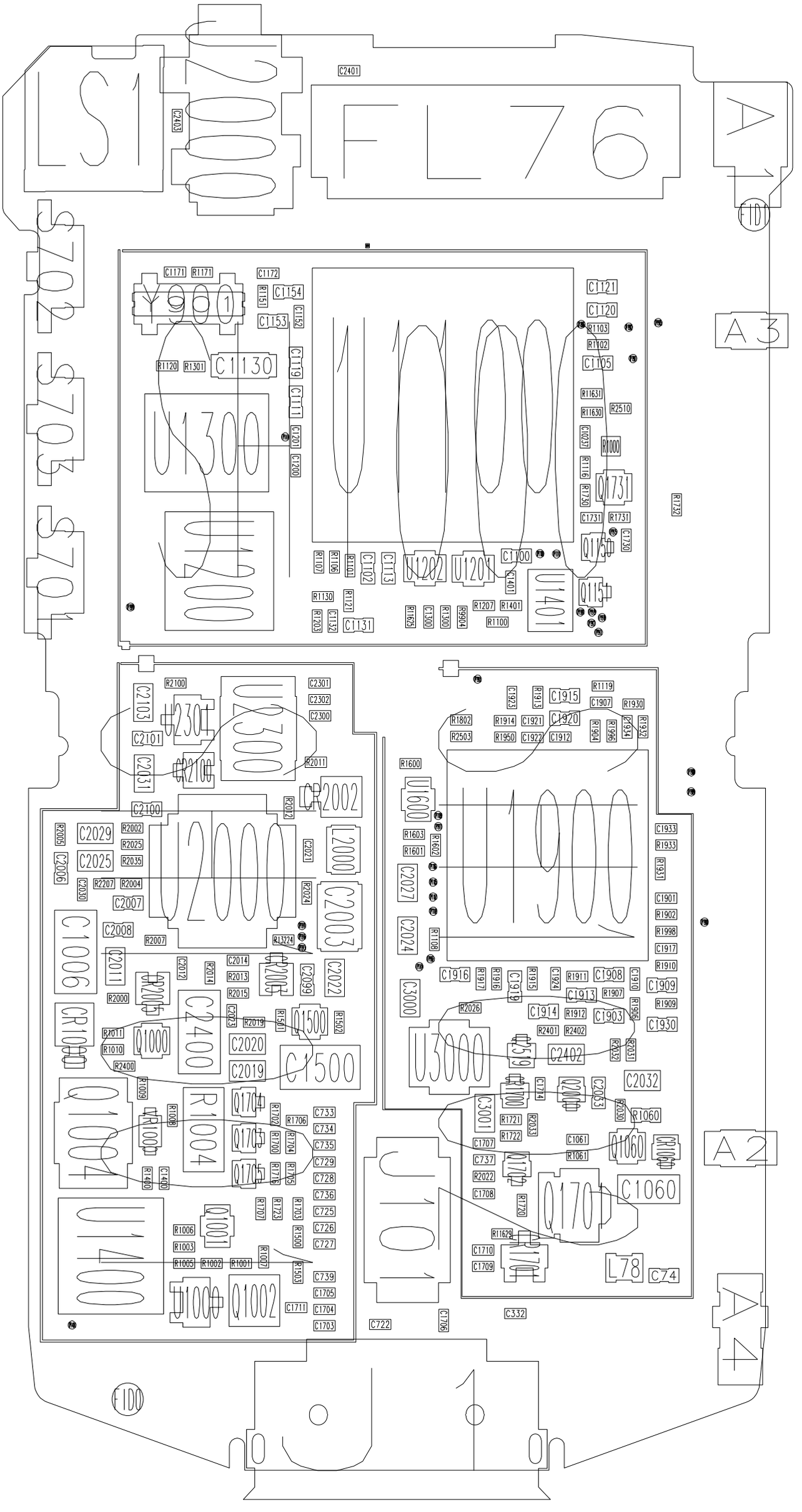
R01930	0662057V07	RES CHIP 15K 1% 1/16W
R01931	0662057V07	RES CHIP 15K 1% 1/16W
R01932	0662057M95	RES. CHIP 7500 5% 20X40
R01933	0662057M95	RES. CHIP 7500 5% 20X40
R01962	0662057M01	RES. CHIP 0 5% 20X40
R01996	0662057M74	RES. CHIP 1000 5% 20X40
R01998	0662057M74	RES. CHIP 1000 5% 20X40
R02000	0662057M58	RES. CHIP 220 5% 20X40
R02002	0662057M02	RES. CHIP 1.0 5% 20X40
R02004	0662057N37	RES. CHIP 390K 5% 20X40
R02005	0662057N19	RES. CHIP 68K 5% 20X40
R02007	0662057M66	RES. CHIP 470 5% 20X40
R02011	0662057M01	RES. CHIP 0 5% 20X40
R02012	0662057M01	RES. CHIP 0 5% 20X40
R02013	0662057M92	RES. CHIP 5600 5% 20X40
R02014	0662057N09	RES. CHIP 27K 5% 20X40
R02015	0662057N09	RES. CHIP 27K 5% 20X40
R02016	0662057N15	RES. CHIP 47K 5% 20X40
R02017	0662057M01	RES. CHIP 0 5% 20X40
R02019	0662057M01	RES. CHIP 0 5% 20X40
R02022	0662057M01	RES. CHIP 0 5% 20X40
R02024	0662057M01	RES. CHIP 0 5% 20X40
R02025	0662057M01	RES. CHIP 0 5% 20X40
R02026	0662057M01	RES. CHIP 0 5% 20X40
R02030	0662057M74	RES. CHIP 1000 5% 20X40
R02031	0662057M94	RES. CHIP 6800 5% 20X40
R02032	0662057N07	RES. CHIP 22K 5% 20X40
R02033	0662057N27	RES. CHIP 150K 5% 20X40
R02035	0662057M26	RES. CHIP 10 5% 20X40
R02207	0662057N16	RES. CHIP 51K 5% 20X40
R02400	0662057M32	RES. CHIP 18 5% 20X40
R02401	0662057M74	RES. CHIP 1000 5% 20X40
R02402	0662057M88	RES. CHIP 3900 5% 20X40
R02503	0662057M50	RES. CHIP 100 5% 20X40
R11625	0662057M90	RES. CHIP 4700 5% 20X40
R11629	0662057M90	RES. CHIP 4700 5% 20X40
R11630	0662057N01	RES CHIP 12K 5% 20X40
R11631	0662057M01	RES. CHIP 0 5% 20X40
SH1000	2609475U01	SHIELD REFUSE CDMA
SH1001	2685608G01	SHIELD G CAP/CIA
SH1002	2685609G01	SHIELD CRIB/DSP
U00325	4809863M15	OSC MOD REF TCXO 16.8MHZ 5032
U01000	5109817F17	IC VOLT DECT 2.7V ILC5061 SOT
U01100	5109773F08	IC CUSTOM CASPER PC29004VHR2
U01200	5199383C01	IC FLASH ROM 512KX8 GT28F800B3
U01201	5109522E14	IC 2-INPUT OR GATE TC7S32FU
U01202	5109522E15	IC SNGL INV TC7S04FU
U01206	5109522E22	IC SNGL AND GATE TC7S08FU
U01300	5109509A25	IC SRAM 128KX16 KM616FU20AZI-1
U01401	5199353A01	IC EEPROM 16KX8 25128T2 20TSOP

U01900	5109923D36	IC CUST CIA SC29100GRC2 J21K
U02000	5109923D39	IC CUST BICMOS GCAP 1.8V 48QFP
U02300	5109632D99	IC CUST PAC MAX511EEE 16QSOP
U02301	5109781E78	IC NEG LDO REG ILC7362 23SOT
U03000	5109781E93	IC VOLT REG 2.8V TK11228BVCB
VR1000	4809788E08	DIODE ZENER 8.2V UDZTE178.2B

CDMA ST7867 : TOP SIDE BOARD OVERLAY



CDMA ST7867 : BOTTOM SIDE BOARD OVERLAY



CDMA ST7867 : RF SCHEMATICS SIDE 1 OF 3

AMPS 800 FRONT END

REF NUMBERS: 100 to 149

RX 1900 FRONT END - HIGH GAIN PATH

REF NUMBERS: 150-174

RX 1900 1st LNA

REF NUMBERS: 175-199

RX 1900 MIXER

REF NUMBERS: 200-249

DITHER CIRCUIT

REFERENCE OSCILLATOR AND CONTROL

Rx 2nd LO

ANALOG IF

DIGITAL IF

REF NUMBERS: 250 to 299

TX OFFSET OSC

REF NUMBERS: 650 to 674 Kermit offset VCO band switch

98ASH70694A

U700

MAIN VCO LOOP

MAIN VCO, BUFFER AMP AND COUPLER

REF NOs: 625 to 650

HIGH GAIN / LOW GAIN PATH SWITCH CONTROL

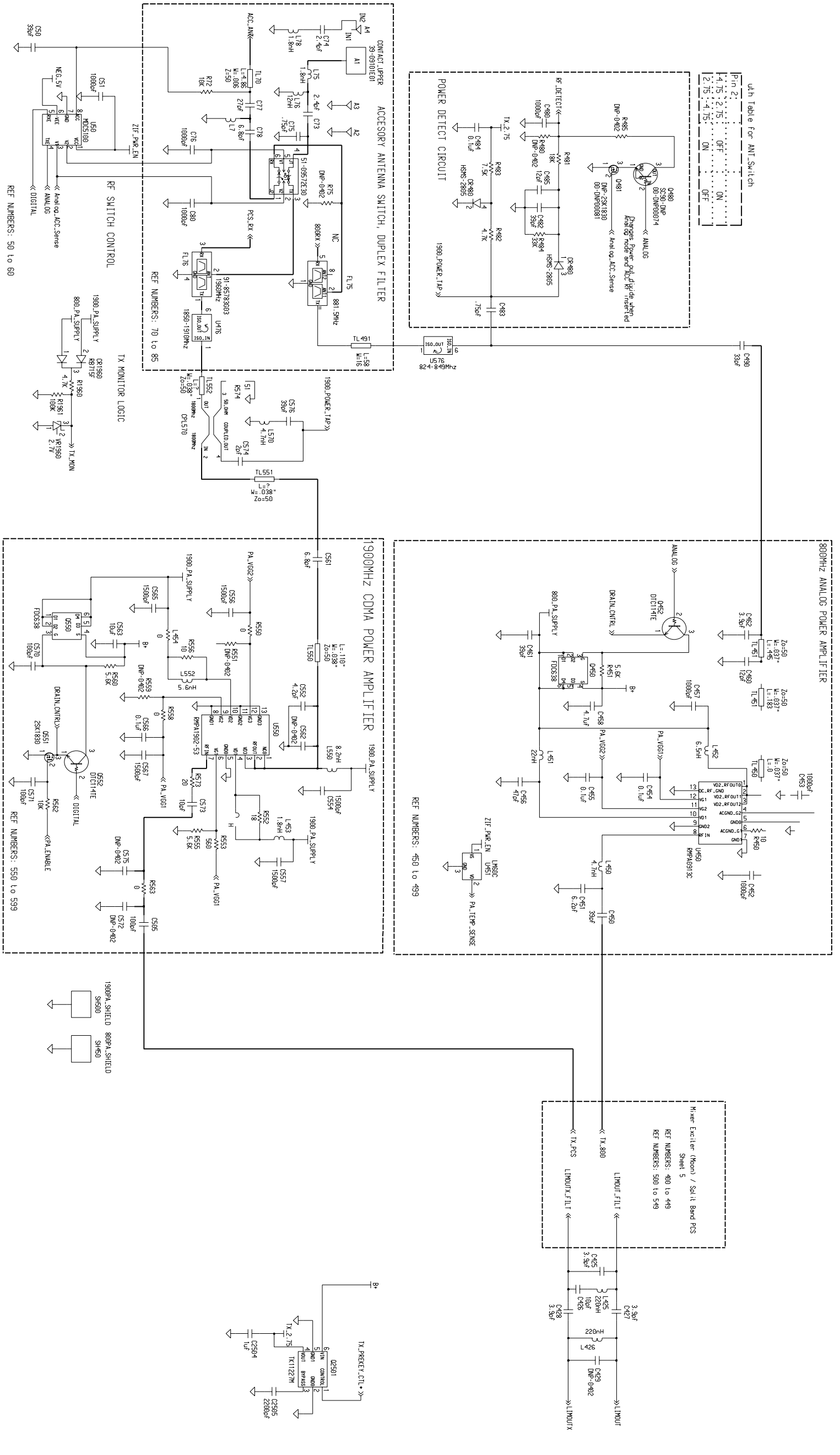
RX_CTL = 1 ==> Low Gain Enabled

REF NUMBERS: 350 to 399

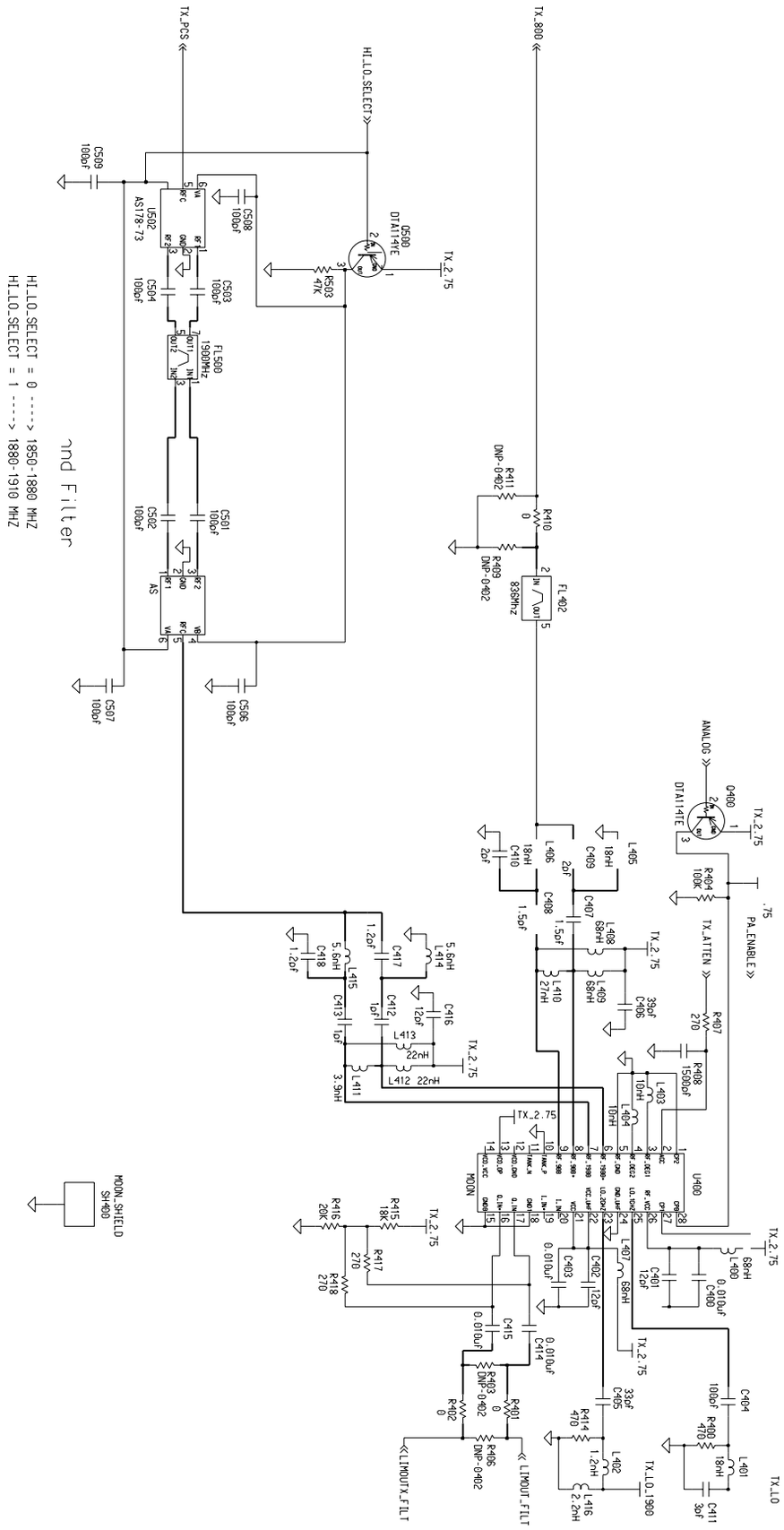
DIGITAL = 1 ==> 1900 ENABLED,800 DISABLED

ANALOG = 1 ==> 800 ENABLED, 1900 DISABLED

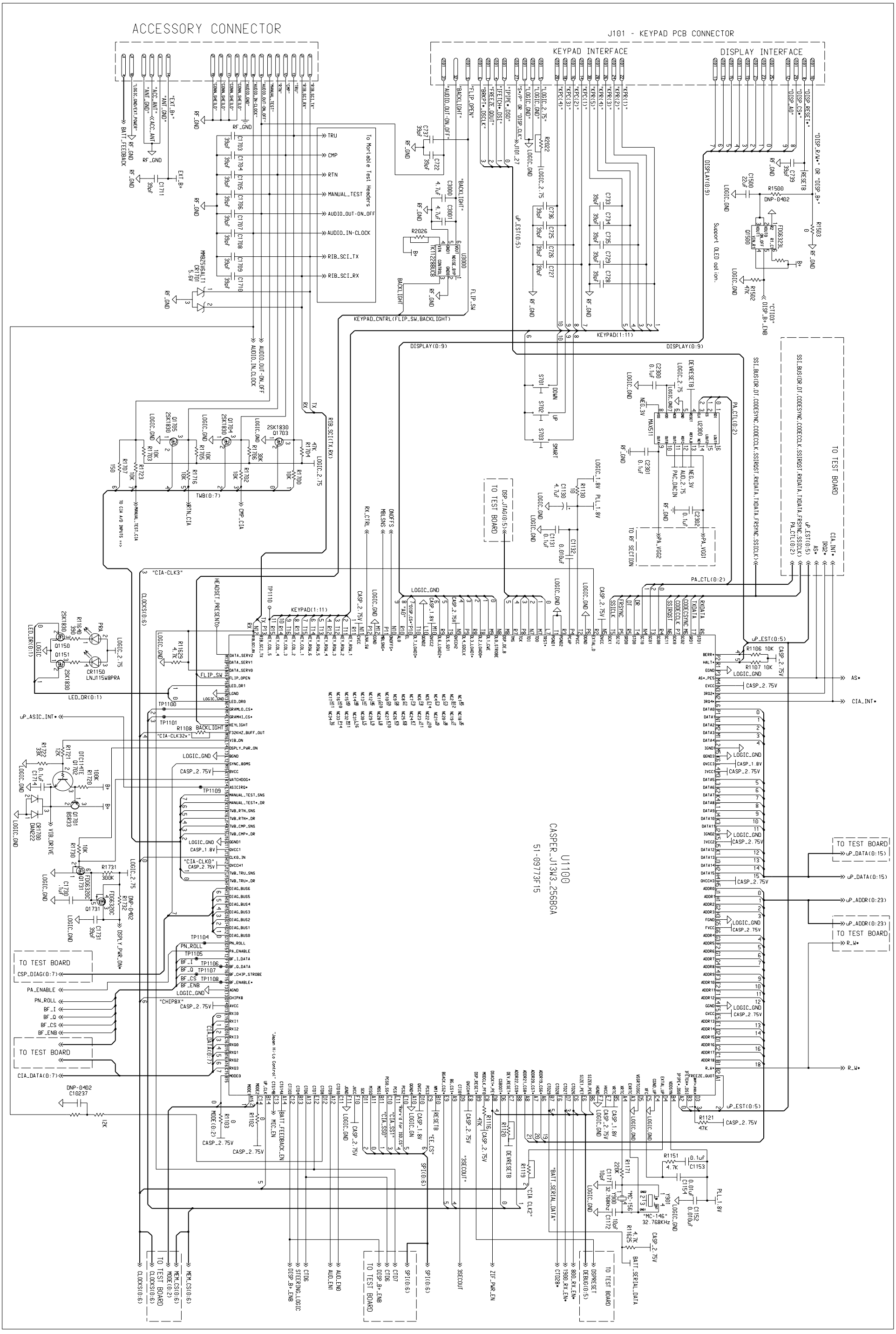
CDMA ST7867 : RF SCHEMATIC SIDE 2 OF 3



CDMA ST7867 : RF SCHEMATICS SIDE 3 OF 3



CDMA ST7867 : AL SCHEMATICS SIDE 1 OF 2



CDMA ST7867 : AL SCHEMATICS SIDE 2 OF 2