CDMA Dual Band

Tri Mode-1900/800MHz CDMA/800MHz Amps

Personal Communication Sector

Service Manual
Level III
ST7868W / P8767 / T8367

MOTOROLA

COMPUTER SOFTWARE COPYRIGHTS

Contents

CDMA ST7868W Dual Band/

Persnal Communication Sector

Tri Mode-1900/800MHz CDMA/800MHz Amps

ST7868 vs. ST7760

Logic Changes

- The biggest change from 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 ST7760. Hence, any lines that interface those chips together on 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 ST7760 because of a new memory map.
    - Flash: 8Mb & 16 Mb on ST7760 to 16 Mb and 32 Mb on ST7868
    - SRAM: 1Mb on the ST7760 to 2Mb on ST7868
    - EEPROM: 128 kb on ST7760 to 256 kb on ST7868
- An External B+ Disconnect Circuit has been added (it is identical to AMPS Vader). 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.
- ST7760 runs the 338 CPU, DSP, and CRIB at 2.75V. ST7868 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 T8160. However, the detection scheme is slightly different than 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.
- Dual Band VCO
  (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 ST7868, there is no need for external Aux. Batt. contacts on the rear housing. Hence, ST7868 will be shipping with the same front and rear housings as 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

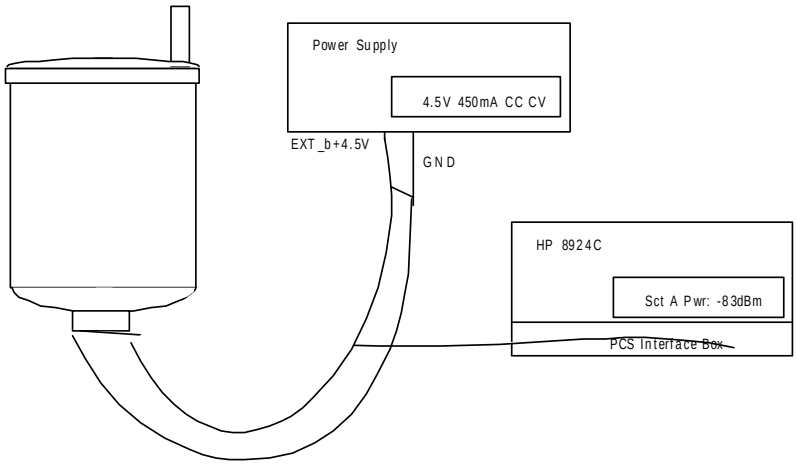
Frequency and channel information:

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	48 channels spaced in increments of 25 channels
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 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:

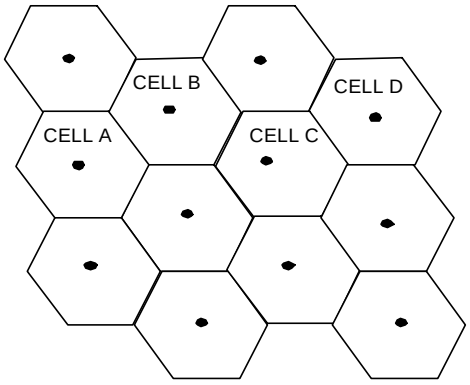
Note
The following description is intended only as a preliminary general introduction to cellular systems. This description is greatly simplified and does not illustrate the full operating capabilities, techniques, or technology involved in cellular systems.

Overall Concept

Cellular systems are used to provide radiotelephone
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 radiotelephone 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 containing a cell site base station which

nels 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 CDMA system or Analog system.

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/CDMA 800MHz

Reciever Circuitry

RF enters the phone via the internal antenna, A1, or via the accessory connector. RF switch S1 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,U100, , FL100, and U101. The received signal then enters the Mixer U102.

The local oscillator input to the Filter FL110 is a 978-1004 MHz VCO, U680 controlled by the IF/Synthesizer IC U700. The 109.65 MHz mixer output is routed through U250 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 . The output passes through the mono-block duplex filter FL75 to RF switch S1 to either the internal antenna or the accessory connector.

CDMA 1900MHz

Reciever Circuitry

RF enters the phone via the internal antenna, A1, or via the accessory connector. RF switch S1 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,Q208, FL200, FL281 and U201. The received signal then enters the Mixer U202.

The local oscillator input to the mixer is double of 1019-1050 MHz VCO, U680 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 . The output passes through the mono-block duplex filter FL76 to RF switch S1 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 2038MHz - 2100MHz main local oscillator for PCS 1900 mode through U680 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 CCAP 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

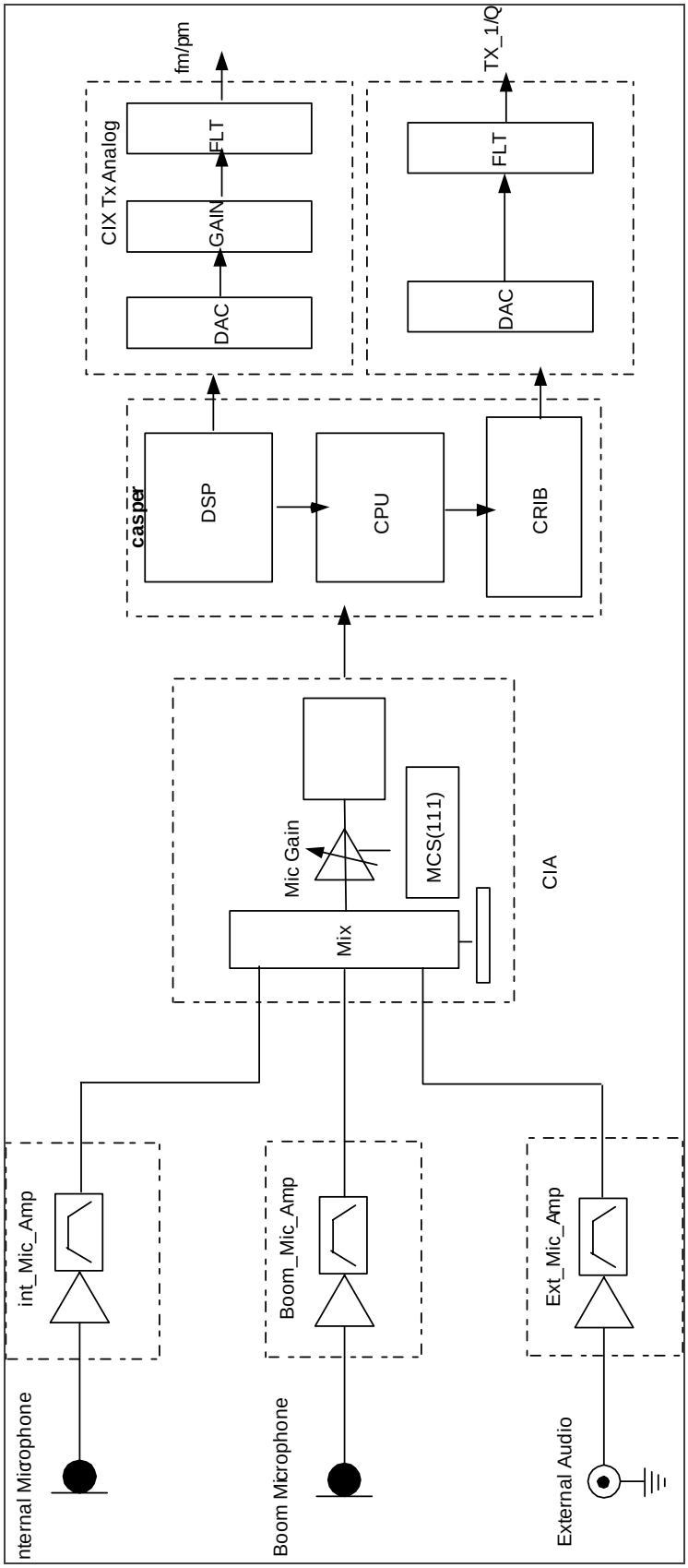
Audio from the internal microphone is ampli-fied
and converted to data by U1900. In AMPS mode, the digitized microphone audio is then sent to DSP U1100 which performs all compression, pre-emphasis, limiting, and band-

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.

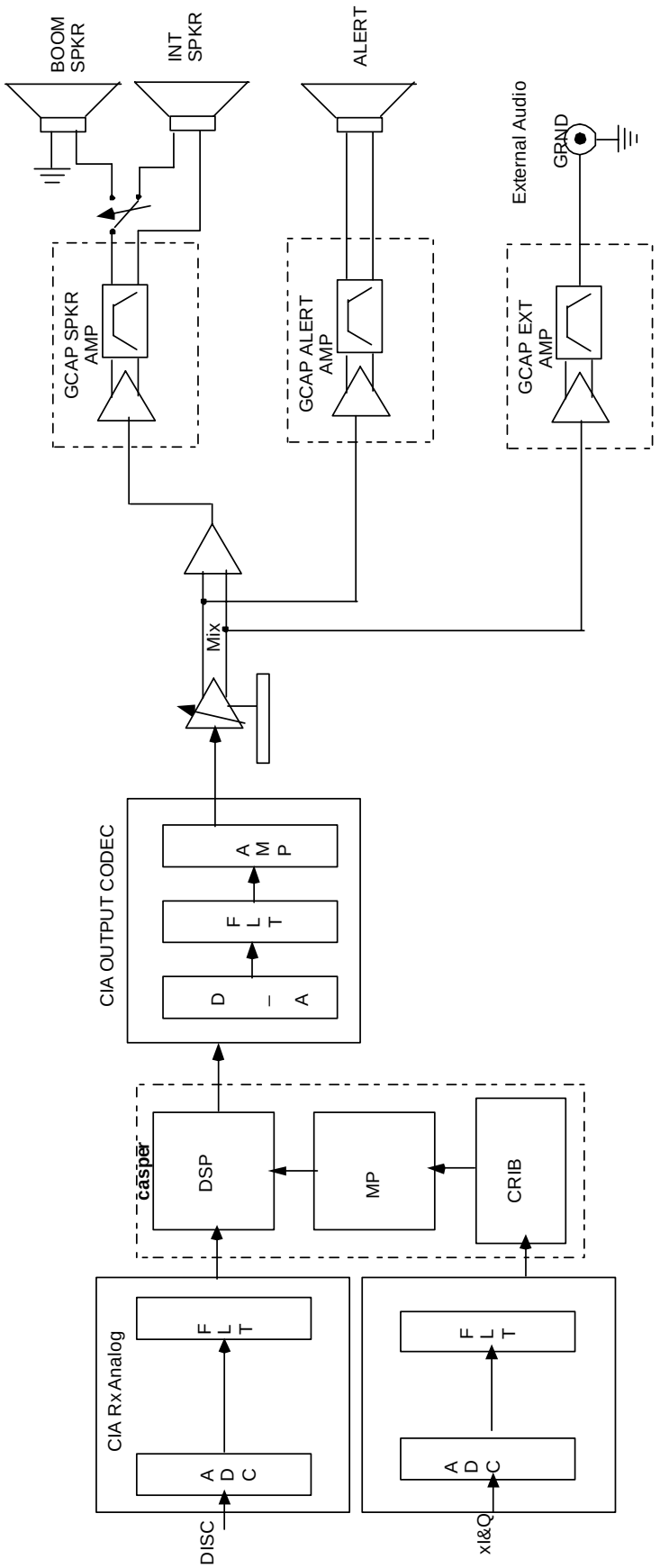
Transmit Audio - CDMA Mode

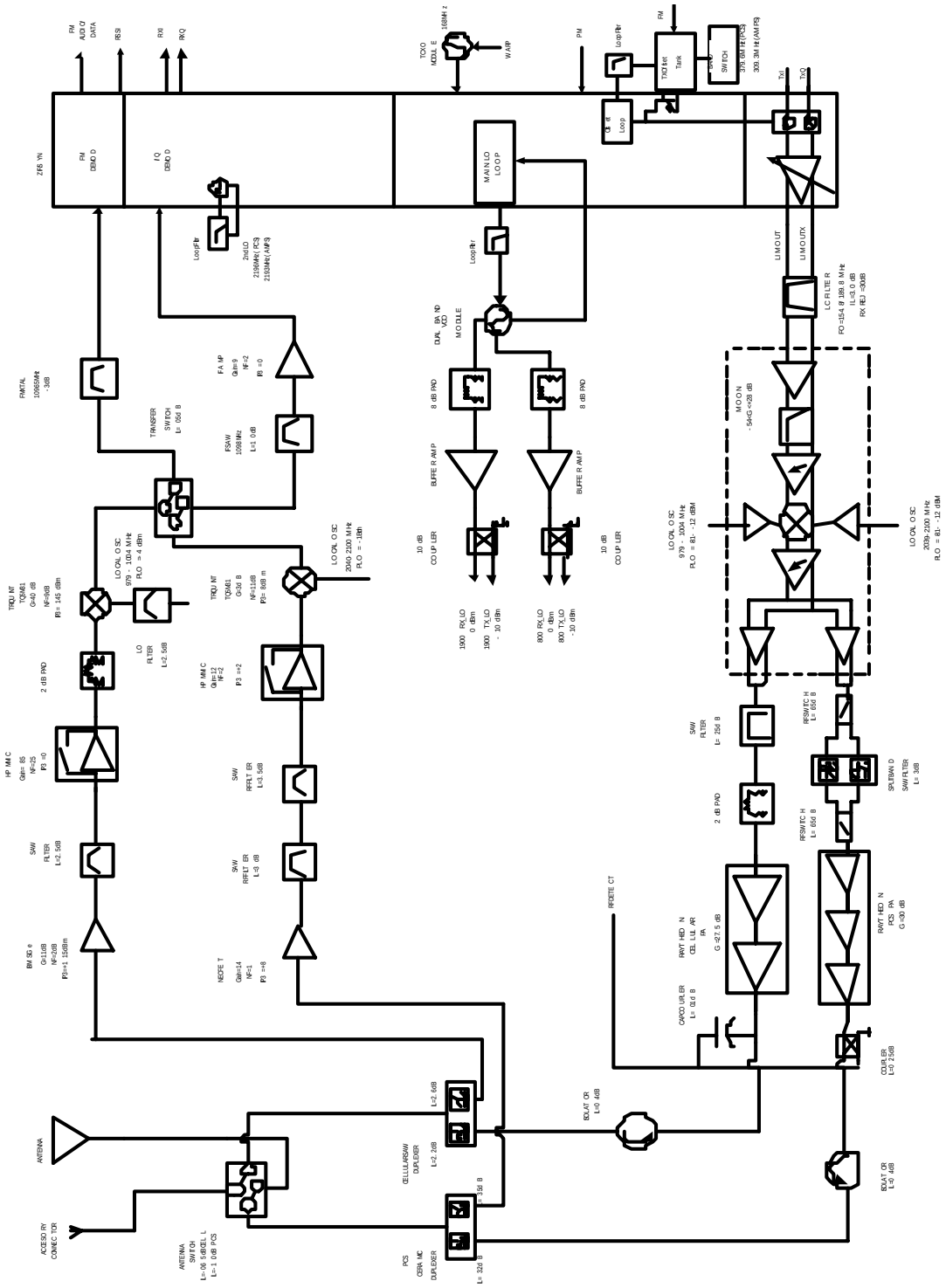
In CDMA mode, the digitized TX audio is processed by a CELP variable rate vocoder, U1100. The digital signal is then routed through microprocessor U1100 and processed by the CDMA Modem IC, U1100, which produces the 1.2288 Mb/sec. CDMA data
stream. This stream is then converted to analog OQPSK signals (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:

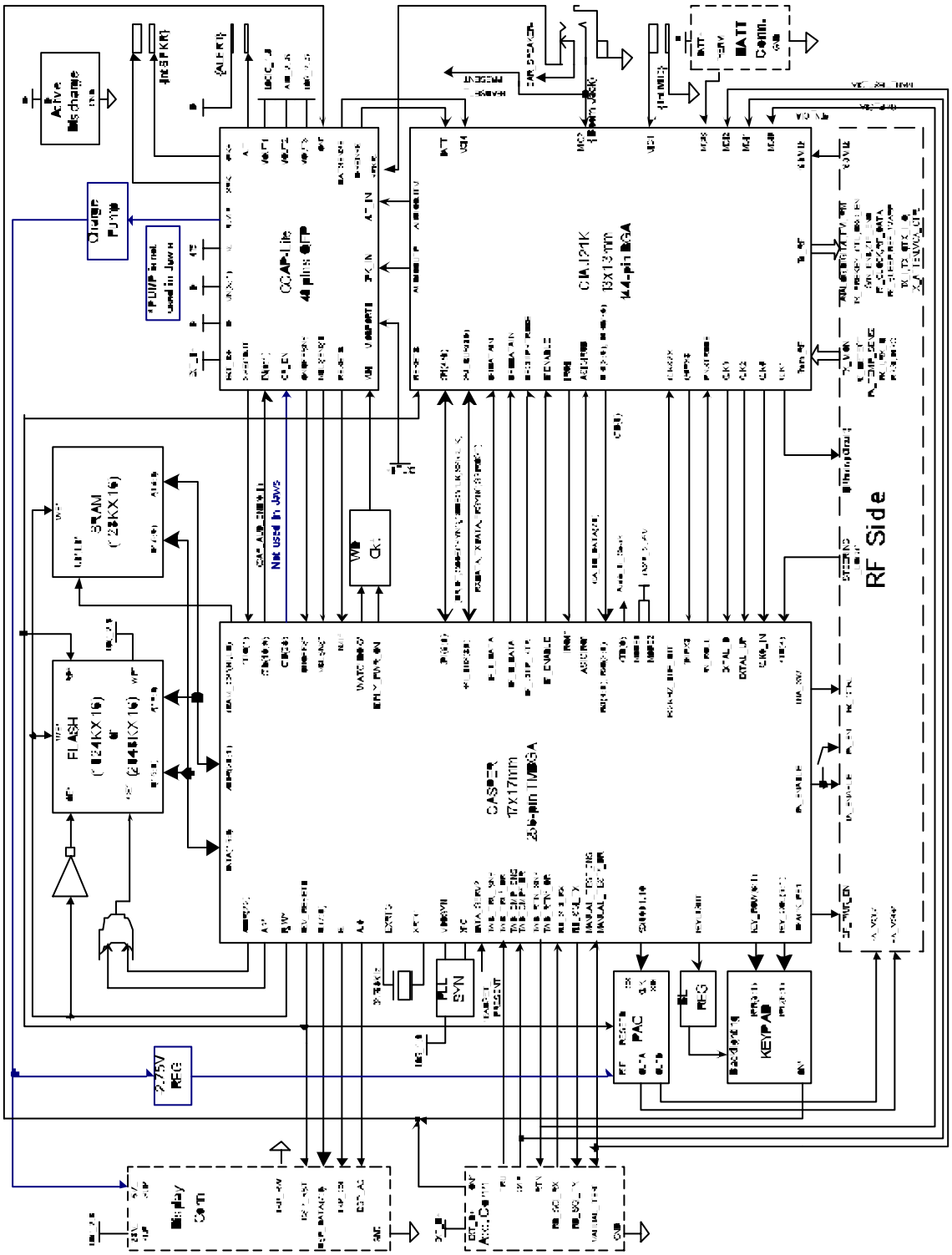


Forward Audio Functionality:





RF Block Diagram



Audio Logic Side Block Diagram

Tests & 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

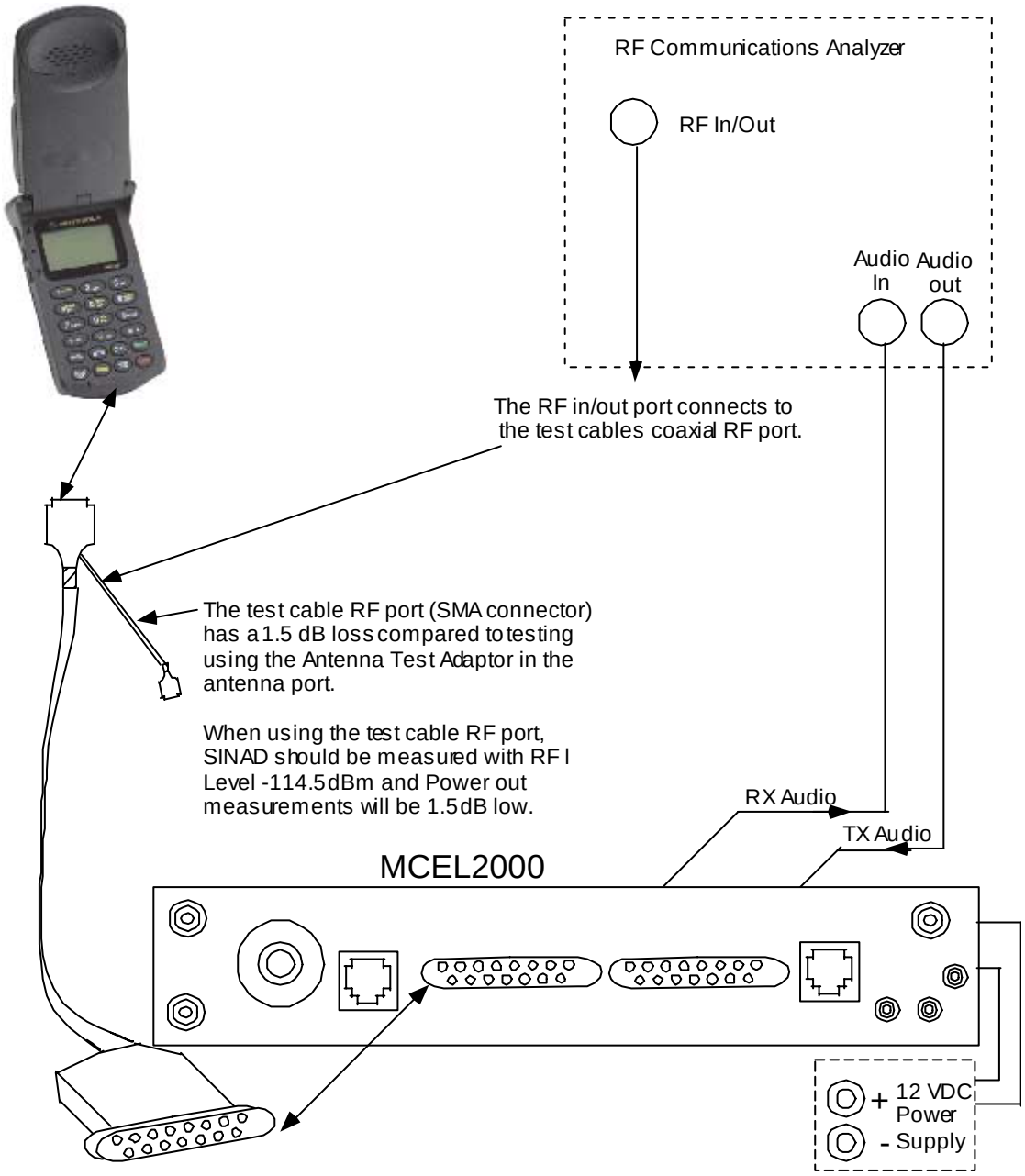
Figure 7: “Connections for Testing and Adjustments” on page 48 shows the audio and RF connections to a communications analyzer when using the MCEL 2000 test interface, and SKN4800A test cable.

Adjustments

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

Important

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.)

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 **434**

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 # but-ton 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 indi-cated on the display.

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

While the Test Menu is displayed, any key-press that is not volume or SND will also cause the menu to be exited without execut-ing 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 informa-tion.

- 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.
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)		
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.

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
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).
14#	STON		Enables continuous signalling tone.
15#	STOFF		Disables signalling tone.
16#-18#	(Not Used)		
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.

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).

Table 10:

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

Table 10:

Keypad Entry	*Command Description*	*Status Display*	*Result*
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 identifi-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.

CLR

#

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	 010 042 074 234	**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 Band Tri Mode
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.
	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.

Table 12:

Step	*Factory Default*	*Description*
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.

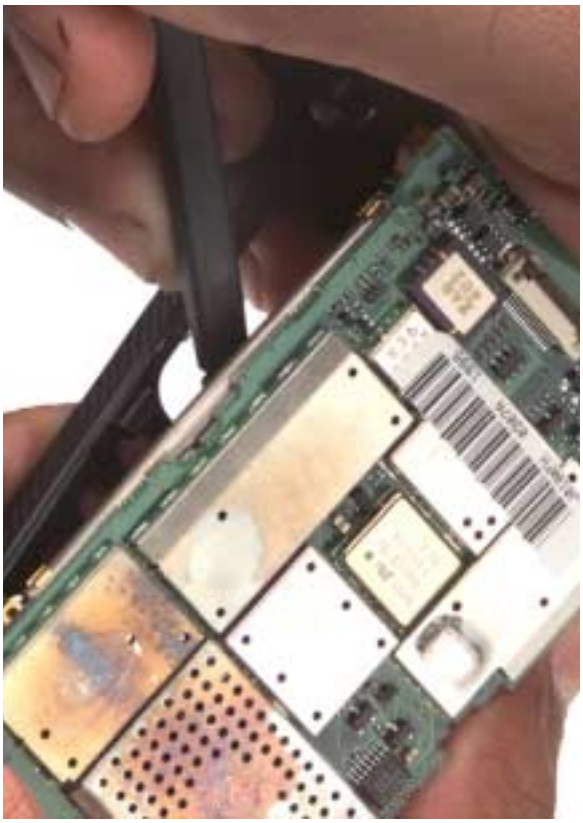
Step 4. Using a small blade screwdriver, slide under housing all the way to corner and lift housing off corner.

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 assem-blies should be available to be used for trou-bleshooting 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 Trouble-shooting and Repair Chart,” on page 56 shows some typical malfunc-tion symptoms and the corresponding verifica-tion and repair procedures. Refer to the disassembly instructions located in the “Disas-sembly” 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.

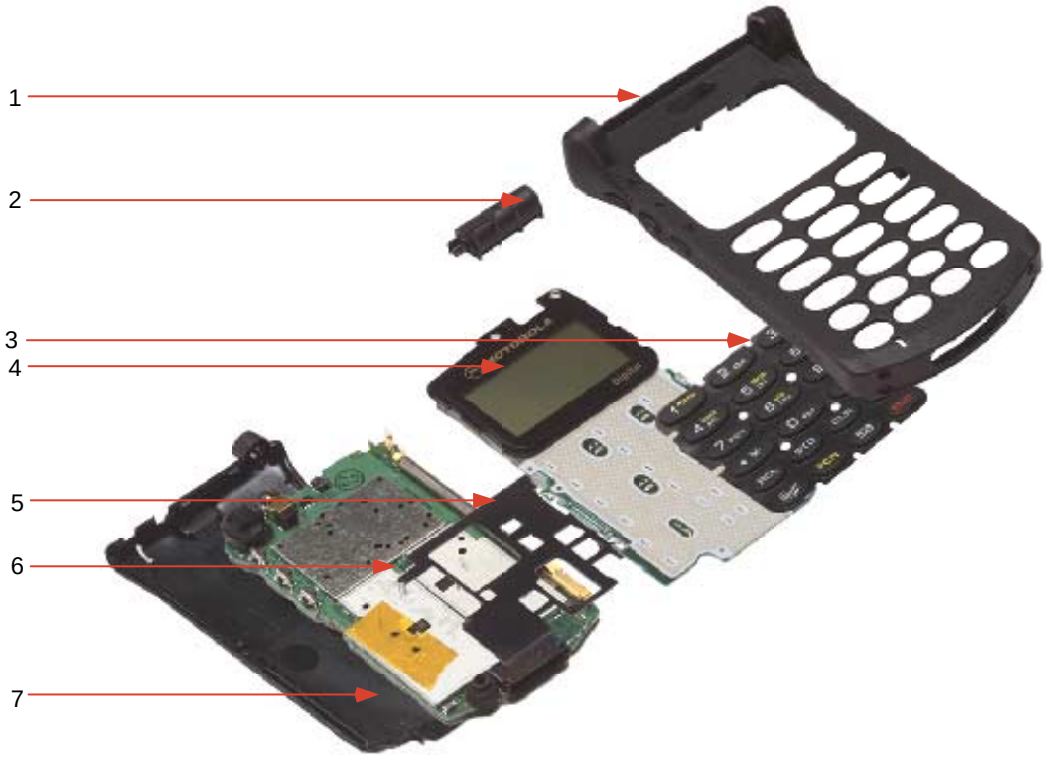
Table 13:

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

REF	PART NUMBER	DEVICE	PACKAGE	VALUE	SIDE
FID0	00-BRD00046	FID	s_fid_040		2
FID1	00-BRD00046	FID	s_fid_040		2
FID2	00-BRD00046	FID	s_fid_040		1
FID3	00-BRD00046	FID	s_fid_040		1
SHRT4	00-BRD00305	SHORTABC	s_short3_10mil		2
R1100	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R1101	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R1203	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R1300	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R1914	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R1915	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R2011	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R2019	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R2022	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R2024	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R2025	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R2026	00-BRD00307	RES_SHORT	s_r0402_short10mi l		2
R1108	00-BRD00307	RES_SHORT	s_r0402_short5mil		2
R1119	00-BRD00307	RES_SHORT	s_r0402_short5mil		2
R1120	00-BRD00307	RES_SHORT	s_r0402_short5mil		2
R1207	00-BRD00307	RES_SHORT	s_r0402_short5mil		2
R1964	00-BRD00307	RES_SHORT	s_r0402_short5mil		2
R2012	00-BRD00307	RES_SHORT	s_r0402_short5mil		2
TP705	00-BRD00491	TP	s_tp020r_nopaste		1
TP1100	00-BRD00491	TP	s_tp020r_nopaste		2
TP1101	00-BRD00491	TP	s_tp020r_nopaste		2
TP1104	00-BRD00491	TP	s_tp020r_nopaste		2
TP1105	00-BRD00491	TP	s_tp020r_nopaste		2
TP1106	00-BRD00491	TP	s_tp020r_nopaste		2
TP1107	00-BRD00491	TP	s_tp020r_nopaste		2
TP1108	00-BRD00491	TP	s_tp020r_nopaste		2
TP1109	00-BRD00491	TP	s_tp020r_nopaste		2
TP1110	00-BRD00491	TP	s_tp020r_nopaste		2
TP1900	00-BRD00491	TP	s_tp020r_nopaste		2
TP1901	00-BRD00491	TP	s_tp020r_nopaste		2
TP1902	00-BRD00491	TP	s_tp020r_nopaste		2
TP1903	00-BRD00491	TP	s_tp020r_nopaste		2
TP1904	00-BRD00491	TP	s_tp020r_nopaste		2
TP1905	00-BRD00491	TP	s_tp020r_nopaste		2
TP1906	00-BRD00491	TP	s_tp020r_nopaste		2
TP1907	00-BRD00491	TP	s_tp020r_nopaste		2
TP1908	00-BRD00491	TP	s_tp020r_nopaste		2
TP1909	00-BRD00491	TP	s_tp020r_nopaste		2
TP1910	00-BRD00491	TP	s_tp020r_nopaste		2

TP1911	00-BRD00491	TP	s_tp020r_nopaste		2
TP1912	00-BRD00491	TP	s_tp020r_nopaste		2
TP1913	00-BRD00491	TP	s_tp020r_nopaste		2
TP1914	00-BRD00491	TP	s_tp020r_nopaste		2
TP1915	00-BRD00491	TP	s_tp020r_nopaste		2
TP1916	00-BRD00491	TP	s_tp020r_nopaste		2
TP1917	00-BRD00491	TP	s_tp020r_nopaste		2
TP1918	00-BRD00491	TP	s_tp020r_nopaste		2
TP1919	00-BRD00491	TP	s_tp020r_nopaste		2
TP1920	00-BRD00491	TP	s_tp020r_nopaste		2
R202	00-DNP00037	RES	s_r0402	DNP-0402	1
R403	00-DNP00037	RES	s_r0402	DNP-0402	1
R406	00-DNP00037	RES	s_r0402	DNP-0402	1
R480	00-DNP00037	RES	s_r0402	DNP-0402	1
R551	00-DNP00037	RES	s_r0402	DNP-0402	1
R559	00-DNP00037	RES	s_r0402	DNP-0402	1
R1301	00-DNP00037	RES	s_r0402	DNP-0402	2
R1500	00-DNP00037	RES	s_r0402	DNP-0402	2
R1602	00-DNP00037	RES	s_r0402	DNP-0402	2
R1732	00-DNP00037	RES	s_r0402	DNP-0402	2
R1950	00-DNP00037	RES	s_r0402	DNP-0402	2
C206	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C258	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C429	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C486	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C562	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C572	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C575	00-DNP00043	CAPN	s_c0402	DNP-0402	1
C2401	00-DNP00043	CAPN	s_c0402	DNP-0402	2
C2403	00-DNP00043	CAPN	s_c0402	DNP-0402	2
C10237	00-DNP00043	CAPN	s_c0402	DNP-0402	2
Q480	00-DNP00287	NPNEBC_BR	s_sc90		1
L480	00-DNP00317	INDNIO	s_ind0402	DNP	1
U1600	00-DNP00386	AND2	s_ssop5_050		2
R1000	06-09591M37	RES2	s_2r0402	10K	2
R1060	06-60076N25	RES	s_r0603	100	2
L454	06-60076S01	RES	s_r0603	0	1
R563	06-60076S01	RES	s_r0603	0	1
R112	06-62057M01	RES	s_r0402	0	1
R206	06-62057M01	RES	s_r0402	0	1
R401	06-62057M01	RES	s_r0402	0	1
R402	06-62057M01	RES	s_r0402	0	1
R550	06-62057M01	RES	s_r0402	0	1
R558	06-62057M01	RES	s_r0402	0	1
R1102	06-62057M01	RES	s_r0402	0	2
R1103	06-62057M01	RES	s_r0402	0	2
R1503	06-62057M01	RES	s_r0402	0	2
R1601	06-62057M01	RES	s_r0402	0	2
R1603	06-62057M01	RES	s_r0402	0	2
R11631	06-62057M01	RES	s_r0402	0	2
R107	06-62057M02	RES	s_r0402	1	1
R2002	06-62057M02	RES	s_r0402	1	2
R212	06-62057M26	RES	s_r0402	10	1
R213	06-62057M26	RES	s_r0402	10	1
R450	06-62057M26	RES	s_r0402	10	1
R556	06-62057M26	RES	s_r0402	10	1
R700	06-62057M26	RES	s_r0402	10	1
R703	06-62057M26	RES	s_r0402	10	1
R709	06-62057M26	RES	s_r0402	10	1
R729	06-62057M26	RES	s_r0402	10	1

R732	06-62057M26	RES	s_r0402		10	1
R1130	06-62057M26	RES	s_r0402		10	2
R2035	06-62057M26	RES	s_r0402		10	2
R2100	06-62057M26	RES	s_r0402		10	2
R115	06-62057M30	RES	s_r0402		15	1
R264	06-62057M32	RES	s_r0402		18	1
R552	06-62057M32	RES	s_r0402		18	1
R2400	06-62057M32	RES	s_r0402		18	2
R573	06-62057M33	RES	s_r0402		20	1
R101	06-62057M34	RES	s_r0402		22	1
R211	06-62057M34	RES	s_r0402		22	1
R410	06-62057M36	RES	s_r0402		27	1
R204	06-62057M39	RES	s_r0402		36	1
R111	06-62057M40	RES	s_r0402		39	1
R210	06-62057M40	RES	s_r0402		39	1
R574	06-62057M43	RES	s_r0402		51	1
R670	06-62057M43	RES	s_r0402		51	1
R676	06-62057M43	RES	s_r0402		51	1
R690	06-62057M43	RES	s_r0402		51	1
R696	06-62057M43	RES	s_r0402		51	1
R100	06-62057M44	RES	s_r0402		56	1
R105	06-62057M44	RES	s_r0402		56	1
R208	06-62057M44	RES	s_r0402		56	1
R103	06-62057M46	RES	s_r0402		68	1
R106	06-62057M46	RES	s_r0402		68	1
R113	06-62057M46	RES	s_r0402		68	1
R114	06-62057M46	RES	s_r0402		68	1
R601	06-62057M46	RES	s_r0402		68	1
R728	06-62057M50	RES	s_r0402		100	1
R752	06-62057M50	RES	s_r0402		100	1
R2503	06-62057M50	RES	s_r0402		100	2
R205	06-62057M52	RES	s_r0402		120	1
R672	06-62057M52	RES	s_r0402		120	1
R674	06-62057M52	RES	s_r0402		120	1
R692	06-62057M52	RES	s_r0402		120	1
R694	06-62057M52	RES	s_r0402		120	1
R11641	06-62057M52	RES	s_r0402		120	1
R1707	06-62057M54	RES	s_r0402		150	2
R409	06-62057M58	RES	s_r0402		220	1
R411	06-62057M58	RES	s_r0402		220	1
R2000	06-62057M58	RES	s_r0402		220	2
R407	06-62057M60	RES	s_r0402		270	1
R417	06-62057M60	RES	s_r0402		270	1
R418	06-62057M60	RES	s_r0402		270	1
R602	06-62057M60	RES	s_r0402		270	1
R116	06-62057M64	RES	s_r0402		390	1
R117	06-62057M64	RES	s_r0402		390	1
R261	06-62057M64	RES	s_r0402		390	1
R11640	06-62057M64	RES	s_r0402		390	1
R400	06-62057M66	RES	s_r0402		470	1
R414	06-62057M66	RES	s_r0402		470	1
R2007	06-62057M66	RES	s_r0402		470	2
R553	06-62057M68	RES	s_r0402		560	1
R650	06-62057M71	RES	s_r0402		750	1
R104	06-62057M74	RES	s_r0402	1K		1
R200	06-62057M74	RES	s_r0402	1K		1
R325	06-62057M74	RES	s_r0402	1K		1
R600	06-62057M74	RES	s_r0402	1K		1
R1996	06-62057M74	RES	s_r0402	1K		2
R1998	06-62057M74	RES	s_r0402	1K		2

R2030	06-62057M74	RES	s_r0402	1K	2
R2401	06-62057M74	RES	s_r0402	1K	2
R730	06-62057M76	RES	s_r0402	1.2K	1
R731	06-62057M76	RES	s_r0402	1.2K	1
R263	06-62057M78	RES	s_r0402	1.5K	1
R652	06-62057M78	RES	s_r0402	1.5K	1
R262	06-62057M82	RES	s_r0402	2.2K	1
R1008	06-62057M82	RES	s_r0402	2.2K	2
R326	06-62057M84	RES	s_r0402	2.7K	1
R655	06-62057M84	RES	s_r0402	2.7K	1
R1802	06-62057M85	RES	s_r0402	3K	2
R300	06-62057M86	RES	s_r0402	3.3K	1
R2402	06-62057M88	RES	s_r0402	3.9K	2
R482	06-62057M90	RES	s_r0402	4.7K	1
R1151	06-62057M90	RES	s_r0402	4.7K	2
R1902	06-62057M90	RES	s_r0402	4.7K	2
R1960	06-62057M90	RES	s_r0402	4.7K	1
R11625	06-62057M90	RES	s_r0402	4.7K	2
R201	06-62057M92	RES	s_r0402	5.6K	1
R203	06-62057M92	RES	s_r0402	5.6K	1
R451	06-62057M92	RES	s_r0402	5.6K	1
R555	06-62057M92	RES	s_r0402	5.6K	1
R560	06-62057M92	RES	s_r0402	5.6K	1
R653	06-62057M92	RES	s_r0402	5.6K	1
R2013	06-62057M92	RES	s_r0402	5.6K	2
R1909	06-62057M94	RES	s_r0402	6.8K	2
R2031	06-62057M94	RES	s_r0402	6.8K	2
R483	06-62057M95	RES	s_r0402	7.5K	1
R1932	06-62057M95	RES	s_r0402	7.5K	2
R1933	06-62057M95	RES	s_r0402	7.5K	2
R72	06-62057M98	RES	s_r0402	10K	1
R73	06-62057M98	RES	s_r0402	10K	1
R207	06-62057M98	RES	s_r0402	10K	1
R301	06-62057M98	RES	s_r0402	10K	1
R328	06-62057M98	RES	s_r0402	10K	1
R486	06-62057M98	RES	s_r0402	10K	1
R488	06-62057M98	RES	s_r0402	10K	2
R562	06-62057M98	RES	s_r0402	10K	1
R651	06-62057M98	RES	s_r0402	10K	1
R720	06-62057M98	RES	s_r0402	10K	1
R726	06-62057M98	RES	s_r0402	10K	1
R727	06-62057M98	RES	s_r0402	10K	1
R1002	06-62057M98	RES	s_r0402	10K	2
R1003	06-62057M98	RES	s_r0402	10K	2
R1005	06-62057M98	RES	s_r0402	10K	2
R1006	06-62057M98	RES	s_r0402	10K	2
R1007	06-62057M98	RES	s_r0402	10K	2
R1009	06-62057M98	RES	s_r0402	10K	2
R1106	06-62057M98	RES	s_r0402	10K	2
R1107	06-62057M98	RES	s_r0402	10K	2
R1140	06-62057M98	RES	s_r0402	10K	2
R1141	06-62057M98	RES	s_r0402	10K	2
R1142	06-62057M98	RES	s_r0402	10K	2
R1700	06-62057M98	RES	s_r0402	10K	2
R1702	06-62057M98	RES	s_r0402	10K	2
R1703	06-62057M98	RES	s_r0402	10K	2
R1705	06-62057M98	RES	s_r0402	10K	2
R1716	06-62057M98	RES	s_r0402	10K	2
R1723	06-62057M98	RES	s_r0402	10K	2
R1730	06-62057M98	RES	s_r0402	10K	2

R1906	06-62057M98	RES	s_r0402	10K	2
R1916	06-62057M98	RES	s_r0402	10K	2
R1917	06-62057M98	RES	s_r0402	10K	2
R1918	06-62057M98	RES	s_r0402	10K	2
R1721	06-62057N01	RES	s_r0402	12K	2
R11630	06-62057N01	RES	s_r0402	12K	2
R327	06-62057N03	RES	s_r0402	15K	1
R1001	06-62057N03	RES	s_r0402	15K	2
R1913	06-62057N03	RES	s_r0402	15K	2
R415	06-62057N05	RES	s_r0402	18K	1
R481	06-62057N05	RES	s_r0402	18K	1
R102	06-62057N06	RES	s_r0402	20K	1
R416	06-62057N06	RES	s_r0402	20K	1
R2032	06-62057N07	RES	s_r0402	22K	2
R2014	06-62057N09	RES	s_r0402	27K	2
R2015	06-62057N09	RES	s_r0402	27K	2
R1706	06-62057N10	RES	s_r0402	30K	2
R484	06-62057N11	RES	s_r0402	33K	1
R654	06-62057N11	RES	s_r0402	33K	1
R1722	06-62057N11	RES	s_r0402	33K	2
R1904	06-62057N13	RES	s_r0402	39K	2
R503	06-62057N15	RES	s_r0402	47K	1
R1116	06-62057N15	RES	s_r0402	47K	2
R1121	06-62057N15	RES	s_r0402	47K	2
R1501	06-62057N15	RES	s_r0402	47K	2
R1502	06-62057N15	RES	s_r0402	47K	2
R1600	06-62057N15	RES	s_r0402	47K	2
R1704	06-62057N15	RES	s_r0402	47K	2
R1911	06-62057N15	RES	s_r0402	47K	2
R2003	06-62057N15	RES	s_r0402	47K	2
R11629	06-62057N15	RES	s_r0402	47K	2
R2207	06-62057N17	RES	s_r0402	56K	2
R725	06-62057N19	RES	s_r0402	68K	1
R2005	06-62057N19	RES	s_r0402	68K	2
R1912	06-62057N20	RES	s_r0402	75K	2
R74	06-62057N23	RES	s_r0402	100K	1
R250	06-62057N23	RES	s_r0402	100K	1
R404	06-62057N23	RES	s_r0402	100K	1
R485	06-62057N23	RES	s_r0402	100K	1
R487	06-62057N23	RES	s_r0402	100K	1
R489	06-62057N23	RES	s_r0402	100K	1
R660	06-62057N23	RES	s_r0402	100K	1
R1010	06-62057N23	RES	s_r0402	100K	2
R1011	06-62057N23	RES	s_r0402	100K	2
R1720	06-62057N23	RES	s_r0402	100K	2
R1961	06-62057N23	RES	s_r0402	100K	1
R2510	06-62057N23	RES	s_r0402	100K	1
R2511	06-62057N23	RES	s_r0402	100K	1
R1907	06-62057N27	RES	s_r0402	150K	2
R1910	06-62057N27	RES	s_r0402	150K	2
R2033	06-62057N27	RES	s_r0402	150K	2
R1171	06-62057N31	RES	s_r0402	220K	2
R1731	06-62057N34	RES	s_r0402	300K	2
R2004	06-62057N37	RES	s_r0402	390K	2
R1061	06-62057N47	RES	s_r0402	1Meg	2
R1930	06-62057V07	RES	s_r0402	15K	2
R1931	06-62057V07	RES	s_r0402	15K	2
R1004	06-80195M64	RES	s_r2010	0.24	2
J1000	09-09059E01	CON	s_cn0909059e01		1

J5000	09-09195E01	CON	l_cn0909195e01_noslot		1
J2000	09-09399T07	CON_POWERJACK_K	s_cn0909399t07		2
J1	09-09449B04	CON	s_cn0909449b04		2
C672	21-09445U03	CAPN	s_c0402	1pf	1
C1913	21-09622N06	CAPN	s_c0603	1000pf	2
C483	21-13740F02	CAPN	s_c0603	.75pf	1
C462	21-13740F18	CAPN	s_c0603	4.3pf	1
C78	21-13740F23	CAPN	s_c0603	6.8pf	1
C561	21-13740F23	CAPN	s_c0603	6.8pf	1
C77	21-13740F37	CAPN	s_c0603	27pf	1
C490	21-13740F39	CAPN	s_c0603	33pf	1
C460	21-13740L22	CAPN	s_c0603	15pf	1
C1908	21-13741F12	CAPN	s_c0603	300pf	2
C1909	21-13741F12	CAPN	s_c0603	300pf	2
C1915	21-13741F33	CAPN	s_c0603	2200pf	2
C786	21-13741F49	CAPN	s_c0603	0.01uf	1
C1154	21-13741F49	CAPN	s_c0603	0.01uf	2
C600	21-13743B29	CAPN	s_c1206	1uf	1
C2008	21-13743E03	CAPN	s_c0603	0.015uf	2
C1920	21-13743E10	CAPN	s_c0603	0.033uf	2
C655	21-13743E12	CAPN	s_c0603	0.047uf	1
C300	21-13743E20	CAPN	s_c0603	0.1uf	1
C700	21-13743E20	CAPN	s_c0603	0.1uf	1
C704	21-13743E20	CAPN	s_c0603	0.1uf	1
C706	21-13743E20	CAPN	s_c0603	0.1uf	1
C784	21-13743E20	CAPN	s_c0603	0.1uf	1
C1100	21-13743E20	CAPN	s_c0603	0.1uf	2
C1102	21-13743E20	CAPN	s_c0603	0.1uf	2
C1105	21-13743E20	CAPN	s_c0603	0.1uf	2
C1111	21-13743E20	CAPN	s_c0603	0.1uf	2
C1113	21-13743E20	CAPN	s_c0603	0.1uf	2
C1119	21-13743E20	CAPN	s_c0603	0.1uf	2
C1120	21-13743E20	CAPN	s_c0603	0.1uf	2
C1121	21-13743E20	CAPN	s_c0603	0.1uf	2
C1131	21-13743E20	CAPN	s_c0603	0.1uf	2
C1153	21-13743E20	CAPN	s_c0603	0.1uf	2
C1903	21-13743E20	CAPN	s_c0603	0.1uf	2
C1914	21-13743E20	CAPN	s_c0603	0.1uf	2
C1916	21-13743E20	CAPN	s_c0603	0.1uf	2
C1919	21-13743E20	CAPN	s_c0603	0.1uf	2
C1930	21-13743E20	CAPN	s_c0603	0.1uf	2
C2006	21-13743E20	CAPN	s_c0603	0.1uf	2
C2007	21-13743E20	CAPN	s_c0603	0.1uf	2
C2099	21-13743E20	CAPN	s_c0603	0.1uf	2
C789	21-13743F16	CAPN	s_c0805	1uf	1
C2011	21-13743F18	CAPN	s_c0805	2.2uf	2
C458	21-13743G26	CAPN	s_c1206	4.7uf	1
C1060	21-13743G26	CAPN	s_c1206	4.7uf	2
C563	21-13743H14	CAPN	s_c1210_06ht	10uf	1
C730	21-13743L01	CAPN	s_c0402	220pf	1
C731	21-13743L01	CAPN	s_c0402	220pf	1
C2503	21-13743L09	CAPN	s_c0402	470pf	2
C108	21-13743L11	CAPN	s_c0402	560pf	1
C51	21-13743L17	CAPN	s_c0402	1000pf	1
C76	21-13743L17	CAPN	s_c0402	1000pf	1
C80	21-13743L17	CAPN	s_c0402	1000pf	1
C110	21-13743L17	CAPN	s_c0402	1000pf	1
C204	21-13743L17	CAPN	s_c0402	1000pf	1
C212	21-13743L17	CAPN	s_c0402	1000pf	1

C214	21-13743L17	CAPN	s_c0402	1000pf	1
C260	21-13743L17	CAPN	s_c0402	1000pf	1
C261	21-13743L17	CAPN	s_c0402	1000pf	1
C265	21-13743L17	CAPN	s_c0402	1000pf	1
C266	21-13743L17	CAPN	s_c0402	1000pf	1
C330	21-13743L17	CAPN	s_c0402	1000pf	1
C452	21-13743L17	CAPN	s_c0402	1000pf	1
C453	21-13743L17	CAPN	s_c0402	1000pf	1
C457	21-13743L17	CAPN	s_c0402	1000pf	1
C480	21-13743L17	CAPN	s_c0402	1000pf	1
C676	21-13743L17	CAPN	s_c0402	1000pf	1
C679	21-13743L17	CAPN	s_c0402	1000pf	1
C727	21-13743L17	CAPN	s_c0402	1000pf	2
C775	21-13743L17	CAPN	s_c0402	1000pf	1
C2021	21-13743L17	CAPN	s_c0402	1000pf	2
C554	21-13743L21	CAPN	s_c0402	1500pf	1
C556	21-13743L21	CAPN	s_c0402	1500pf	1
C557	21-13743L21	CAPN	s_c0402	1500pf	1
C565	21-13743L21	CAPN	s_c0402	1500pf	1
C567	21-13743L21	CAPN	s_c0402	1500pf	1
C754	21-13743L21	CAPN	s_c0402	1500pf	1
R408	21-13743L21	CAPN	s_c0402	1500pf	1
C2014	21-13743L21	CAPN	s_c0402	1500pf	2
C329	21-13743L25	CAPN	s_c0402	2200pf	1
C2505	21-13743L25	CAPN	s_c0402	2200pf	1
C301	21-13743L41	CAPN	s_c0402	0.010uf	1
C325	21-13743L41	CAPN	s_c0402	0.010uf	1
C332	21-13743L41	CAPN	s_c0402	0.010uf	2
C400	21-13743L41	CAPN	s_c0402	0.010uf	1
C403	21-13743L41	CAPN	s_c0402	0.010uf	1
C414	21-13743L41	CAPN	s_c0402	0.010uf	1
C415	21-13743L41	CAPN	s_c0402	0.010uf	1
C602	21-13743L41	CAPN	s_c0402	0.010uf	1
C660	21-13743L41	CAPN	s_c0402	0.010uf	1
C682	21-13743L41	CAPN	s_c0402	0.010uf	1
C721	21-13743L41	CAPN	s_c0402	0.010uf	1
C732	21-13743L41	CAPN	s_c0402	0.010uf	1
C750	21-13743L41	CAPN	s_c0402	0.010uf	1
C751	21-13743L41	CAPN	s_c0402	0.010uf	1
C752	21-13743L41	CAPN	s_c0402	0.010uf	1
C753	21-13743L41	CAPN	s_c0402	0.010uf	1
C755	21-13743L41	CAPN	s_c0402	0.010uf	1
C756	21-13743L41	CAPN	s_c0402	0.010uf	1
C777	21-13743L41	CAPN	s_c0402	0.010uf	1
C778	21-13743L41	CAPN	s_c0402	0.010uf	1
C779	21-13743L41	CAPN	s_c0402	0.010uf	1
C785	21-13743L41	CAPN	s_c0402	0.010uf	1
C1061	21-13743L41	CAPN	s_c0402	0.010uf	2
C1132	21-13743L41	CAPN	s_c0402	0.010uf	2
C1152	21-13743L41	CAPN	s_c0402	0.010uf	2
C1907	21-13743L41	CAPN	s_c0402	0.010uf	2
C1933	21-13743L41	CAPN	s_c0402	0.010uf	2
C1934	21-13743L41	CAPN	s_c0402	0.010uf	2
C2502	21-13743L41	CAPN	s_c0402	0.010uf	2
C1901	21-13743M08	CAPN	s_c0402	0.022uf	2
C2023	21-13743M08	CAPN	s_c0402	0.022uf	2
C202	21-13743M24	CAPN	s_c0402	0.1uf	1
C326	21-13743M24	CAPN	s_c0402	0.1uf	1
C454	21-13743M24	CAPN	s_c0402	0.1uf	1
C484	21-13743M24	CAPN	s_c0402	0.1uf	1

C566	21-13743M24	CAPN	s_c0402	0.1uf	1
C657	21-13743M24	CAPN	s_c0402	0.1uf	1
C671	21-13743M24	CAPN	s_c0402	0.1uf	1
C680	21-13743M24	CAPN	s_c0402	0.1uf	1
C689	21-13743M24	CAPN	s_c0402	0.1uf	1
C709	21-13743M24	CAPN	s_c0402	0.1uf	1
C723	21-13743M24	CAPN	s_c0402	0.1uf	1
C724	21-13743M24	CAPN	s_c0402	0.1uf	1
C1200	21-13743M24	CAPN	s_c0402	0.1uf	2
C1201	21-13743M24	CAPN	s_c0402	0.1uf	2
C1300	21-13743M24	CAPN	s_c0402	0.1uf	2
C1714	21-13743M24	CAPN	s_c0402	0.1uf	2
C1910	21-13743M24	CAPN	s_c0402	0.1uf	2
C1912	21-13743M24	CAPN	s_c0402	0.1uf	2
C1921	21-13743M24	CAPN	s_c0402	0.1uf	2
C1922	21-13743M24	CAPN	s_c0402	0.1uf	2
C1923	21-13743M24	CAPN	s_c0402	0.1uf	2
C1924	21-13743M24	CAPN	s_c0402	0.1uf	2
C2300	21-13743M24	CAPN	s_c0402	0.1uf	2
C2302	21-13743M24	CAPN	s_c0402	0.1uf	2
C75	21-13743N02	CAPN	s_c0402	0.75pf	1
C412	21-13743N03	CAPN	s_c0402	1pf	1
C413	21-13743N03	CAPN	s_c0402	1pf	1
C409	21-13743N05	CAPN	s_c0402	1.2pf	1
C417	21-13743N05	CAPN	s_c0402	1.2pf	1
C418	21-13743N05	CAPN	s_c0402	1.2pf	1
C692	21-13743N05	CAPN	s_c0402	1.2pf	1
C654	21-13743N07	CAPN	s_c0402	1.5pf	1
C257	21-13743N08	CAPN	s_c0402	1.6pf	1
C410	21-13743N08	CAPN	s_c0402	1.6pf	1
C574	21-13743N09	CAPN	s_c0402	2pf	1
C73	21-13743N11	CAPN	s_c0402	2.4pf	1
C74	21-13743N11	CAPN	s_c0402	2.4pf	1
C407	21-13743N12	CAPN	s_c0402	2.7pf	1
C408	21-13743N12	CAPN	s_c0402	2.7pf	1
C673	21-13743N12	CAPN	s_c0402	2.7pf	1
C675	21-13743N12	CAPN	s_c0402	2.7pf	1
C411	21-13743N13	CAPN	s_c0402	3pf	1
C253	21-13743N14	CAPN	s_c0402	3.3pf	1
C255	21-13743N14	CAPN	s_c0402	3.3pf	1
C305	21-13743N14	CAPN	s_c0402	3.3pf	1
C101	21-13743N16	CAPN	s_c0402	3.9pf	1
C200	21-13743N16	CAPN	s_c0402	3.9pf	1
C425	21-13743N16	CAPN	s_c0402	3.9pf	1
C427	21-13743N16	CAPN	s_c0402	3.9pf	1
C428	21-13743N16	CAPN	s_c0402	3.9pf	1
C650	21-13743N16	CAPN	s_c0402	3.9pf	1
C678	21-13743N16	CAPN	s_c0402	3.9pf	1
C740	21-13743N16	CAPN	s_c0402	3.9pf	1
C741	21-13743N16	CAPN	s_c0402	3.9pf	1
C252	21-13743N17	CAPN	s_c0402	4.3pf	1
C104	21-13743N18	CAPN	s_c0402	4.7pf	1
C677	21-13743N18	CAPN	s_c0402	4.7pf	1
C205	21-13743N21	CAPN	s_c0402	6.2pf	1
C254	21-13743N21	CAPN	s_c0402	6.2pf	1
C451	21-13743N21	CAPN	s_c0402	6.2pf	1
C256	21-13743N24	CAPN	s_c0402	8.2pf	1
C259	21-13743N24	CAPN	s_c0402	8.2pf	1
C304	21-13743N24	CAPN	s_c0402	8.2pf	1
C651	21-13743N24	CAPN	s_c0402	8.2pf	1

C426	21-13743N26	CAPN	s_c0402	10pf	1
C573	21-13743N26	CAPN	s_c0402	10pf	1
C653	21-13743N26	CAPN	s_c0402	10pf	1
C1171	21-13743N26	CAPN	s_c0402	10pf	2
C1172	21-13743N26	CAPN	s_c0402	10pf	2
C207	21-13743N28	CAPN	s_c0402	12pf	1
C208	21-13743N28	CAPN	s_c0402	12pf	1
C209	21-13743N28	CAPN	s_c0402	12pf	1
C210	21-13743N28	CAPN	s_c0402	12pf	1
C215	21-13743N28	CAPN	s_c0402	12pf	1
C401	21-13743N28	CAPN	s_c0402	12pf	1
C402	21-13743N28	CAPN	s_c0402	12pf	1
C416	21-13743N28	CAPN	s_c0402	12pf	1
C485	21-13743N28	CAPN	s_c0402	12pf	1
C652	21-13743N28	CAPN	s_c0402	12pf	1
C670	21-13743N28	CAPN	s_c0402	12pf	1
C674	21-13743N28	CAPN	s_c0402	12pf	1
C2404	21-13743N28	CAPN	s_c0402	12pf	1
C113	21-13743N30	CAPN	s_c0402	15pf	1
C250	21-13743N32	CAPN	s_c0402	18pf	1
C251	21-13743N32	CAPN	s_c0402	18pf	1
C114	21-13743N34	CAPN	s_c0402	22pf	1
C216	21-13743N34	CAPN	s_c0402	22pf	1
C659	21-13743N35	CAPN	s_c0402	24pf	1
C790	21-13743N36	CAPN	s_c0402	27pf	1
C405	21-13743N38	CAPN	s_c0402	33pf	1
C50	21-13743N40	CAPN	s_c0402	39pf	1
C79	21-13743N40	CAPN	s_c0402	39pf	1
C106	21-13743N40	CAPN	s_c0402	39pf	1
C109	21-13743N40	CAPN	s_c0402	39pf	1
C111	21-13743N40	CAPN	s_c0402	39pf	1
C201	21-13743N40	CAPN	s_c0402	39pf	1
C203	21-13743N40	CAPN	s_c0402	39pf	1
C303	21-13743N40	CAPN	s_c0402	39pf	1
C406	21-13743N40	CAPN	s_c0402	39pf	1
C450	21-13743N40	CAPN	s_c0402	39pf	1
C461	21-13743N40	CAPN	s_c0402	39pf	1
C482	21-13743N40	CAPN	s_c0402	39pf	1
C491	21-13743N40	CAPN	s_c0402	39pf	1
C576	21-13743N40	CAPN	s_c0402	39pf	1
C681	21-13743N40	CAPN	s_c0402	39pf	1
C684	21-13743N40	CAPN	s_c0402	39pf	1
C688	21-13743N40	CAPN	s_c0402	39pf	1
C690	21-13743N40	CAPN	s_c0402	39pf	1
C694	21-13743N40	CAPN	s_c0402	39pf	1
C701	21-13743N40	CAPN	s_c0402	39pf	1
C703	21-13743N40	CAPN	s_c0402	39pf	1
C705	21-13743N40	CAPN	s_c0402	39pf	1
C707	21-13743N40	CAPN	s_c0402	39pf	1
C710	21-13743N40	CAPN	s_c0402	39pf	2
C711	21-13743N40	CAPN	s_c0402	39pf	2
C712	21-13743N40	CAPN	s_c0402	39pf	2
C713	21-13743N40	CAPN	s_c0402	39pf	2
C714	21-13743N40	CAPN	s_c0402	39pf	2
C715	21-13743N40	CAPN	s_c0402	39pf	2
C716	21-13743N40	CAPN	s_c0402	39pf	2
C717	21-13743N40	CAPN	s_c0402	39pf	2
C718	21-13743N40	CAPN	s_c0402	39pf	2
C719	21-13743N40	CAPN	s_c0402	39pf	2
C722	21-13743N40	CAPN	s_c0402	39pf	2

C725	21-13743N40	CAPN	s_c0402	39pf	2
C726	21-13743N40	CAPN	s_c0402	39pf	2
C728	21-13743N40	CAPN	s_c0402	39pf	2
C729	21-13743N40	CAPN	s_c0402	39pf	2
C733	21-13743N40	CAPN	s_c0402	39pf	2
C734	21-13743N40	CAPN	s_c0402	39pf	2
C735	21-13743N40	CAPN	s_c0402	39pf	2
C736	21-13743N40	CAPN	s_c0402	39pf	2
C737	21-13743N40	CAPN	s_c0402	39pf	2
C739	21-13743N40	CAPN	s_c0402	39pf	2
C742	21-13743N40	CAPN	s_c0402	39pf	2
C743	21-13743N40	CAPN	s_c0402	39pf	2
C744	21-13743N40	CAPN	s_c0402	39pf	2
C746	21-13743N40	CAPN	s_c0402	39pf	2
C787	21-13743N40	CAPN	s_c0402	39pf	1
C1000	21-13743N40	CAPN	s_c0402	39pf	1
C1703	21-13743N40	CAPN	s_c0402	39pf	2
C1704	21-13743N40	CAPN	s_c0402	39pf	2
C1705	21-13743N40	CAPN	s_c0402	39pf	2
C1706	21-13743N40	CAPN	s_c0402	39pf	2
C1707	21-13743N40	CAPN	s_c0402	39pf	2
C1708	21-13743N40	CAPN	s_c0402	39pf	2
C1709	21-13743N40	CAPN	s_c0402	39pf	2
C1710	21-13743N40	CAPN	s_c0402	39pf	2
C1711	21-13743N40	CAPN	s_c0402	39pf	2
C1712	21-13743N40	CAPN	s_c0402	39pf	1
C1731	21-13743N40	CAPN	s_c0402	39pf	2
C1917	21-13743N40	CAPN	s_c0402	39pf	2
C2500	21-13743N40	CAPN	s_c0402	39pf	1
C10238	21-13743N40	CAPN	s_c0402	39pf	1
C302	21-13743N42	CAPN	s_c0402	47pf	1
C456	21-13743N42	CAPN	s_c0402	47pf	1
C328	21-13743N46	CAPN	s_c0402	68pf	1
C404	21-13743N50	CAPN	s_c0402	100pf	1
C501	21-13743N50	CAPN	s_c0402	100pf	1
C502	21-13743N50	CAPN	s_c0402	100pf	1
C503	21-13743N50	CAPN	s_c0402	100pf	1
C504	21-13743N50	CAPN	s_c0402	100pf	1
C505	21-13743N50	CAPN	s_c0402	100pf	1
C506	21-13743N50	CAPN	s_c0402	100pf	1
C507	21-13743N50	CAPN	s_c0402	100pf	1
C508	21-13743N50	CAPN	s_c0402	100pf	1
C509	21-13743N50	CAPN	s_c0402	100pf	1
C570	21-13743N50	CAPN	s_c0402	100pf	1
C571	21-13743N50	CAPN	s_c0402	100pf	1
C112	21-13743N54	CAPN	s_c0402	150pf	1
C211	21-13743N54	CAPN	s_c0402	150pf	1
C213	21-13743N54	CAPN	s_c0402	150pf	1
C2033	21-13928A01	CAPN	s_c0603	1uf	2
C327	21-13928C03	CAPN	s_c0805	1uf	1
C658	21-13928C03	CAPN	s_c0805	1uf	1
C2019	21-13928C04	CAPN	s_c0805	4.7uf	2
C2020	21-13928C04	CAPN	s_c0805	4.7uf	2
C2022	21-13928C04	CAPN	s_c0805	4.7uf	2
C2024	21-13928C04	CAPN	s_c0805	4.7uf	2
C2025	21-13928C04	CAPN	s_c0805	4.7uf	2
C2027	21-13928C04	CAPN	s_c0805	4.7uf	2
C2029	21-13928C04	CAPN	s_c0805	4.7uf	2
C2031	21-13928C04	CAPN	s_c0805	4.7uf	2
C2032	21-13928C04	CAPN	s_c0805	4.7uf	2

C2103	21-13928C04	CAPN	s_c0805	4.7uf	2
C2402	21-13928C04	CAPN	s_c0805	4.7uf	2
C3000	21-13928C04	CAPN	s_c0805	4.7uf	2
C3001	21-13928C04	CAPN	s_c0805	4.7uf	2
C331	21-13928G01	CAPN	s_c0603	.22uf	1
C455	21-13928G01	CAPN	s_c0603	.22uf	1
C2301	21-13928G01	CAPN	s_c0603	.22uf	2
C776	21-13928H02	CAPN	s_c0603	.22uf	1
C102	21-13928N01	CAPN	s_c0402	.1uf	1
C103	21-13928N01	CAPN	s_c0402	.1uf	1
C107	21-13928N01	CAPN	s_c0402	.1uf	1
C601	21-13928N01	CAPN	s_c0402	.1uf	1
C780	21-13928N01	CAPN	s_c0402	.1uf	1
C781	21-13928N01	CAPN	s_c0402	.1uf	1
C782	21-13928N01	CAPN	s_c0402	.1uf	1
C783	21-13928N01	CAPN	s_c0402	.1uf	1
C1730	21-13928N01	CAPN	s_c0402	.1uf	2
C2000	21-13928N01	CAPN	s_c0402	.1uf	2
C2001	21-13928N01	CAPN	s_c0402	.1uf	2
C2012	21-13928N01	CAPN	s_c0402	.1uf	2
C2030	21-13928N01	CAPN	s_c0402	.1uf	2
C720	21-13928P04	CAPN	s_c0603	1uf	1
C2100	21-13928P04	CAPN	s_c0603	1uf	2
C2101	21-13928P04	CAPN	s_c0603	1uf	2
C2501	21-13928P04	CAPN	s_c0603	1uf	2
C2504	21-13928P04	CAPN	s_c0603	1uf	1
C1006	21-85736G01	CAPN	s_c1210_06ht	22uf	2
C1500	21-85736G01	CAPN	s_c1210_06ht	22uf	2
C2400	21-85736G01	CAPN	s_c1210_06ht	22uf	2
C552	21-87936K42	CAPN	s_c0402	4.2pF	1
C2003	23-09121D19	CAPP	s_ctantb_158x114	10uf	2
C656	23-11049A07	CAPP	s_ctanta_134x071	1uf	1
C708	23-11049A07	CAPP	s_ctanta_134x071	1uf	1
C683	23-11049C18	CAPP	s_ctanta_134x071lp	4.7uf	1
C1130	23-11049C18	CAPP	s_ctanta_134x071lp	4.7uf	2
L252	24-04574Z08	INDNIO	s_ind090x068	82nH	1
L253	24-04574Z08	INDNIO	s_ind090x068	82nH	1
L250	24-04574Z13	INDNIO	s_ind090x068	220nH	1
L251	24-04574Z13	INDNIO	s_ind090x068	220nH	1
L2000	24-09092R09	INDNIO	s_ind110x086	15uH	2
L200	24-09154M02	INDNIO	s_ind0402	1.2nH	1
L203	24-09154M02	INDNIO	s_ind0402	1.2nH	1
L402	24-09154M02	INDNIO	s_ind0402	1.2nH	1
L416	24-09154M05	INDNIO	s_ind0402	2.2nH	1
L670	24-09154M07	INDNIO	s_ind0402	3.3nH	1
L202	24-09154M08	INDNIO	s_ind0402	3.9nH	1
L411	24-09154M08	INDNIO	s_ind0402	3.9nH	1
L570	24-09154M09	INDNIO	s_ind0402	4.7nH	1
L201	24-09154M10	INDNIO	s_ind0402	5.6nH	1
L414	24-09154M10	INDNIO	s_ind0402	5.6nH	1
L415	24-09154M10	INDNIO	s_ind0402	5.6nH	1
L100	24-09154M12	INDNIO	s_ind0402	8.2nH	1
L107	24-09154M12	INDNIO	s_ind0402	8.2nH	1
L403	24-09154M13	INDNIO	s_ind0402	10nH	1
L404	24-09154M13	INDNIO	s_ind0402	10nH	1
L204	24-09154M15	INDNIO	s_ind0402	15nH	1
L401	24-09154M16	INDNIO	s_ind0402	18nH	1
L406	24-09154M17	INDNIO	s_ind0402	22nH	1

L410	24-09154M17	INDNIO	s_ind0402	22nH	1
L405	24-09154M19	INDNIO	s_ind0402	33nH	1
L205	24-09154M28	INDNIO	s_ind0402_022ht	2.2nH	1
L102	24-09154M37	INDNIO	s_ind0402_022ht	12nH	1
L103	24-09154M38	INDNIO	s_ind0402_022ht	15nH	1
L105	24-09154M38	INDNIO	s_ind0402_022ht	15nH	1
L101	24-09154M60	INDNIO	s_ind0402	5.6nH	1
L690	24-09154M65	INDNIO	s_ind0402	15nH	1
L728	24-09154M75	INDNIO	s_ind0402	100nH	1
L104	24-09167T26	INDNIO	s_ind0603	180nH	1
L206	24-09167T26	INDNIO	s_ind0603	180nH	1
L453	24-09257L03	INDNIO	s_ind0603_02ht	1.8nH	1
L551	24-09257L09	INDNIO	s_ind0603_02ht	5.6nH	1
L552	24-09257L09	INDNIO	s_ind0603_02ht	5.6nH	1
L75	24-09414M01	INDNIO	s_ind085x060	1.8nH	1
L78	24-09414M01	INDNIO	s_ind085x060	1.8nH	1
L550	24-09414M05	INDNIO	s_ind085x060	8.2nH	1
L76	24-09414M07	INDNIO	s_ind085x060	12nH	1
L77	24-09414M08	INDNIO	s_ind085x060	15nH	1
L300	24-09414M11	INDNIO	s_ind085x060	27nH	1
L452	24-09594M07	INDNIO	s_ind2409594m	6.5nH	1
L450	24-09646M02	INDNIO	s_ind0603	4.7nH	1
L451	24-09646M10	INDNIO	s_ind0603	22nH	1
L676	24-09646M11	INDNIO	s_ind0603	27nH	1
L677	24-09646M35	INDNIO	s_ind0603	22nH	1
L412	24-09646M85	INDNIO	s_ind0603	22nH	1
L413	24-09646M85	INDNIO	s_ind0603	22nH	1
L400	24-09646M96	INDNIO	s_ind0603	68nH	1
L407	24-09646M96	INDNIO	s_ind0603	68nH	1
L408	24-09646M96	INDNIO	s_ind0603	68nH	1
L409	24-09646M96	INDNIO	s_ind0603	68nH	1
L651	24-13926D29	INDNIO	s_ind0805	330nH	1
L325	24-62587P36	INDNIO	s_ind098x080	100uH	1
L2500	24-62587P36	INDNIO	s_ind098x080	100uH	2
L777	24-62587Q44	INDNIO	s_ind0805	560nH	1
L650	24-62587V25	INDNIO	s_ind2462587v	18nH	1
L652	24-62587V30	INDNIO	s_ind2462587v	47nH	1
L425	24-62587V38	INDNIO	s_ind2462587v	220nH	1
L426	24-62587V38	INDNIO	s_ind2462587v	220nH	1
SH1000	26-09475U01	SHIELD	s_sh2609475u01		2
SH500	26-85753K01	SHIELD	s_sh2685753k01		1
SH450	26-85754K01	SHIELD	s_sh2685754k01		1
SH400	26-85755K01	SHIELD	s_sh2685755k01		1
SH900	26-85756K01	SHIELD	s_sh2685756k01		1
SH1001	26-85961K01	SHIELD	s_sh2685961k01		2
SH1003	26-87796K01	SHIELD	s_sh2687796k01		2
SH800	26-88282K01	SHIELD	s_sh2688282k01		1
SH600	26-88283K01	SHIELD	s_sh2688283k01		1
SH700	26-88284K01	SHIELD	s_sh2688284k01		1
SH1002	26-88285K01	SHIELD	s_sh2688285k01		2
J101	28-09454C02	CON	s_cn2809454c02		2
A1	39-09101E03	SHIELD	s_cn3909101e03		2
S701	40-09060E04	SW_PUSHB_PN	s_sw4009060e04		2
S702	40-09060E04	SW_PUSHB_PN	s_sw4009060e04		2
S703	40-09060E04	SW_PUSHB_PN	s_sw4009060e04		2
S490	40-88279K01	SW_SPSTIIOO	s_sw4088279k01		2
A4	42-09038E01	ANTENNA_2P	s_a4209038e01		2
A2	42-09480E01	ANTENNA	s_a4209480e01		2
A3	42-09480E01	ANTENNA	s_a4209480e01		2
CR1150	48-09118D02	LED2ACCA	s_ds4809118d02		1

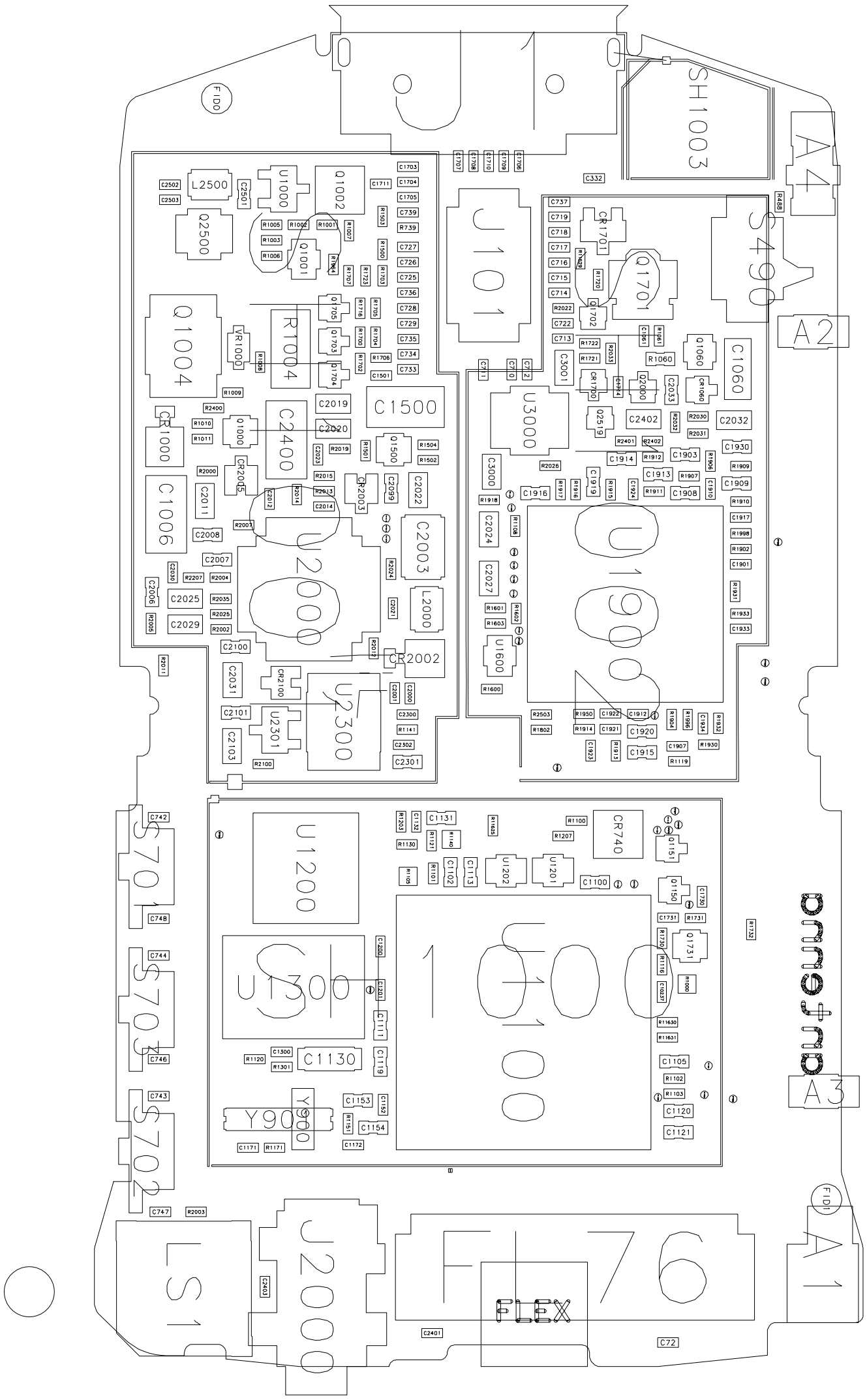
U680	48-09283D66	VCO_VOD2070D	s_os4809283d66	1
Q1004	48-09523E02	MOSFETP_AA_SGDD_CC	s_soic8_150	2
Q250	48-09527E38	NPNEBC	s_q4809527e38	1
Q551	48-09579E02	MOSFETNSGD_EN	s_sc90	1
Q650	48-09579E02	MOSFETNSGD_EN	s_sc90	1
Q1150	48-09579E02	MOSFETNSGD_EN	s_sc90	2
Q1151	48-09579E02	MOSFETNSGD_EN	s_sc90	2
Q1703	48-09579E02	MOSFETNSGD_EN	s_sc90	2
Q1704	48-09579E02	MOSFETNSGD_EN	s_sc90	2
Q1705	48-09579E02	MOSFETNSGD_EN	s_sc90	2
Q651	48-09579E18	MOSFETPGSD_EN	s_sot23	1
Q2512	48-09579E18	MOSFETPGSD_EN	s_sot23	1
Q2516	48-09579E18	MOSFETPGSD_EN	s_sot23	1
Q1002	48-09579E27	MOSFETPDDGSDD_EN	s_sc59	2
Q750	48-09579E35	DMOSFETN2_SGD_DSG_EN_V2	s_sc70-6	1
Q2520	48-09579E35	DMOSFETN2_SGD_DSG_EN_V2	s_sc70-6	1
Q1000	48-09579E39	MOSFET_FDG6323	s_sc70-6	2
Q1500	48-09579E39	MOSFET_FDG6323	s_sc70-6	2
Q1060	48-09579E40	DMOSFET2_NSGD_PDSG_EN	s_sc70-6	2
Q1731	48-09579E40	DMOSFET2_NSGD_PDSG_EN	s_sc70-6	2
Q200	48-09579E41	GAASFETSGSD	s_q4809579e41	1
Q450	48-09579E47	MOSFETPDDGSDD_EN	s_q4809579e47	1
Q550	48-09579E47	MOSFETPDDGSDD_EN	s_q4809579e47	1
Q1008	48-09579E47	MOSFETPDDGSDD_EN	s_q4809579e47	1
CR1060	48-09606E02	DIODE2AAC	s_sc90	2
CR1700	48-09606E02	DIODE2AAC	s_sc90	2
CR700	48-09606E03	DIODECCA	s_sc90	1
CR480	48-09606E05	DIODE2CCAA	s_sot143	1
CR1960	48-09606E08	DIODE2AAC	s_sc70	1
Q1701	48-09607E04	PNPBCE	s_sot89	2
Q251	48-09608E03	PNPGIO	s_sc90	1
Q500	48-09608E03	PNPGIO	s_sc90	1
Q2000	48-09608E03	PNPGIO	s_sc90	2
Q2519	48-09608E03	PNPGIO	s_sc90	2
Q2521	48-09608E03	PNPGIO	s_sc90	1
CR1000	48-09653F02	DIODEAC	s_cr4809653f02	2
CR2002	48-09653F02	DIODEAC	s_cr4809653f02	2
VR1000	48-09788E08	DIODEZAC	s_sod323	2
U325	48-09863M15	OSCVGOV	s_os4809863m15	1
CR300	48-09877C08	VARACTORAC	s_vr052x036	1
CR650	48-09877C17	VARACTORAC	s_sod323	1
CR2100	48-09924D09	DIODEACCA	s_sc70	2
CR2003	48-09924D11	DIODECCA	s_sc70	2
CR2005	48-09924D11	DIODECCA	s_sc70	2
Q1001	48-09939C02	NPN2OIGOIG	s_um6	2
Q325	48-09939C04	NPNPNPOOGIG	s_um5	1
Q661	48-09939C27	PNP2OIGOIG_1BR	s_um6	1
Q452	48-09940E03	NPNEBC_BR	s_sc90	1
Q552	48-09940E03	NPNEBC_BR	s_sc90	1
Q1702	48-09940E03	NPNEBC_BR	s_sc90	2
Q400	48-09940E07	PNPGIO_1BR	s_sc90	1
Q660	48-09940E07	PNPGIO_1BR	s_sc90	1
Q662	48-09940E07	PNPGIO_1BR	s_sc90	1
CR652	48-09948D10	DIODEAC	s_sod323	1
Y901	48-09995L09	XTALIGGO	s_y4809995l09alt	2
CR1701	48-13830A70	DIODEZ2CCA	s_sot23	2
VR1960	48-13830A73	DIODEZANC	s_sot23	1
CR740	48-13832P70	MMQA5V6T1	s_sc59	2
CR2222	48-13832P70	MMQA5V6T1	s_sc59	1
CR651	48-62824C01	VARACTORAC	s_vr075x057	1

U100	48-87716K01	TRANS_IBMSGRF0100	s_sot353	1
LS1	50-09365S01	SPEAKER_P	s_tr5009365s01	2
U1300	51-09509A31	HY62UF16201_48BGA	s_u48bga_0295_6x8_272x374	2
Q2500	51-09512F17	TK11242A_SOT23L	s_sot23l	2
Q2501	51-09512F17	TK11242A_SOT23L	s_sot23l	1
U251	51-09522E05	XOR2_VDDVSS	s_ssop5	1
U2511	51-09522E14	OR2	s_ssop5_050	1
U480	51-09522E17	NAND2	s_ssop5_050	1
U482	51-09522E17	NAND2	s_ssop5_050	1
U1202	51-09522E23	TC7S04F	s_ssop5_050	2
U1201	51-09522E24	OR2	s_ssop5_050	2
S1	51-09572E30	AS152	s_sot26	1
U250	51-09572E30	AS152	s_sot26	1
U501	51-09572E36	EN14973	s_u5109572e36	1
U502	51-09572E36	EN14973	s_u5109572e36	1
U2300	51-09632D99	MAX511	s_qsop16_150	2
U550	51-09730C14	RMPA190153	s_u5109730c14	1
U450	51-09730C17	RMPA091453	s_u5109730c17	1
U451	51-09768D06	LM60_SOT23	s_sot23	1
U1100	51-09773F15	CASPER_J13W_256BGA	s_u256bga_0394_16x16_670sq	2
U2301	51-09781E78	ILC7362_SOT23	s_sot23-3	2
U200	51-09781E91	MDC5001	s_sot363_043ht	1
U3000	51-09781E93	TK11233_SOT89-5	s_sot89-5	2
U1000	51-09817F17	TC54_SOT23	s_sot23-3	2
U700	51-09879E19	ZIF_SYN_BGA144	s_u144bga_0394_12x12_512sq_063ht	1
U1900	51-09923D36	CIA_J21K_144BGA	s_u144bga_0394_12x12_516sq	2
U2000	51-09923D39	CCAP_LITE_QFP48	s_pqfp48	2
U400	51-09923D40	MOON	s_u5109923d40	1
U50	51-09923D49	MDC5100	s_msop8_120	1
U102	51-09940K28	TQ5M31	s_sot23-6	1
U202	51-09940K28	TQ5M31	s_sot23-6	1
U101	51-09940K31	AMPGOIG	s_u5109940k31	1
U201	51-09940K31	AMPGOIG	s_u5109940k31	1
U670	51-09940K32	UPC2712	s_um6	1
U690	51-09940K32	UPC2712	s_um6	1
U481	51-88085K01	NAND2	s_sc70-5	1
U1200	51-99422A01	EPROM_28F160B3_48BGA	s_u48bga_0295_8x6_291x278	2
CPL690	58-03703S01	COUPLER_IOTO_PN	s_cp5803703s01	1
U576	58-03912K03	ISOLATOR_I6O1_PN	s_iso5803912k03	1
CPL670	58-04632Z01	COUPLER_IOTO_PN	s_cp5804632z01	1
U476	58-04997Z01	ISOLATOR_I1O6_PN	s_iso5804997z01	1
CPL570	58-85811G04	COUPLER_OIOC	s_cp5885811g04	1
FL402	91-03913K01	FILTER_I2O5_PN	s_fl9103913k01	1
FL100	91-03913K02	FILTER_I2O5_PN	s_fl9103913k02	1
FL201	91-09239M01	FILTER_I2O5_PN	s_fl9109239m01	1
FL200	91-09239M06	FILTER_I2O5_PN	s_fl9109239m06	1
FL110	91-09303U02	FILTER_LFSA25	s_fl9109303u02	1
FL75	91-09361K03	FILTER_DUPARAT_PN	s_fl9109361k	1
FL251	91-85672J01	FILTER_I10O5_IG1OG6_PN	s_fl9185672j01	1
FL500	91-85726J01	FILTER_I1I3O5O7_PN	s_fl9185726j01	1
FL76	91-85783G03	FILTER_DUPTARG_PN	s_fl9185783g03	2
FL250	91-85838J01	FILTER_I1O5_PN	s_fl9185838j01	1

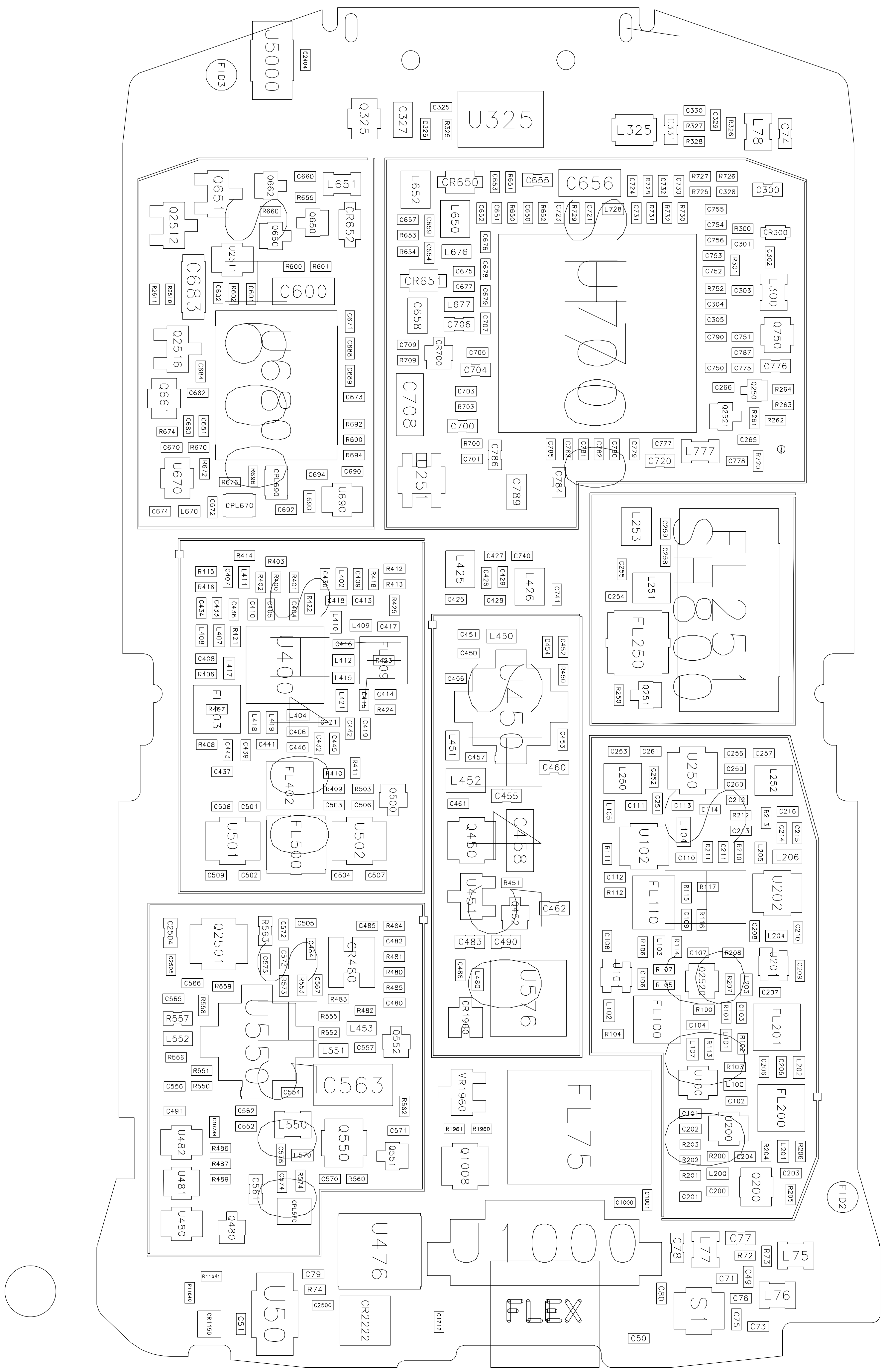
			total Mentor
	84-87841K01	PCB ST7868W	
	01-87394K06	**Display/Keyboard assy EL**	
Standard StarTAC Housing			
	01-85798G04	Rear Assy	SHN7482 A
	01-87367K02	Lens Assy	SHN7482 A
	01-87798K01	ASSEMBLY FRONT FLIP	SHN7482 A
	01-88291K01	ST7868W Antenna Assembly	SHN7481 A
	05-03856K01	Mic Grommet	SHN7482 A
	05-09472U01	Alert Grommet	SHN7482 A
	07-04767Z02	SPACER KEYPAD	SHN7481 A
	11-85855G01	Mular Lens Tape	SHN7482 A
	37-04947Z01	TUBE ANTENNA ST7867	SHN7481A
	38-09423U11	KYPD BROWSER	SHN7482 A
	50-09186K01	MIC ASSY ELCTRT OMNT-DIR PHS	SHN7481 A
	54-02393T01	LABEL STARTAC SMARTFLEX	SHN7481 A
	01-85693K02	Front Hsg Assy	Unique
	01-85697K01	Lens Assy	Unique
	01-85798K02	Rear hsg assy	Unique
	01-85815K02	Flip assy	Unique
	01-88291K01	ST7868W Antenna Assembly	Generic
	05-85701K01	Alert Grommet	Unique
	05-85702K01	Mic Grommet	Unique
	07-04767Z02	SPACER KEYPAD	Generic
	11-85855G01	Mular Lens Tape	Unique
	37-04947Z01	TUBE ANTENNA ST7867	SHN7481A
	38-85696K04	Keypad	Unique
	47-09038K02	RIGHT SHAFT COVER CHAM	Unique

50-09186K01	MIC ASSY ELCTRT OMNT-DIR PHS	Generic
54-02393T01	LABEL STARTAC SMARTFLEX	Generic
54-03801S01	LABEL POWER AUDIO FLEX	Unique
55-09242E01	Hinge GSM	Unique

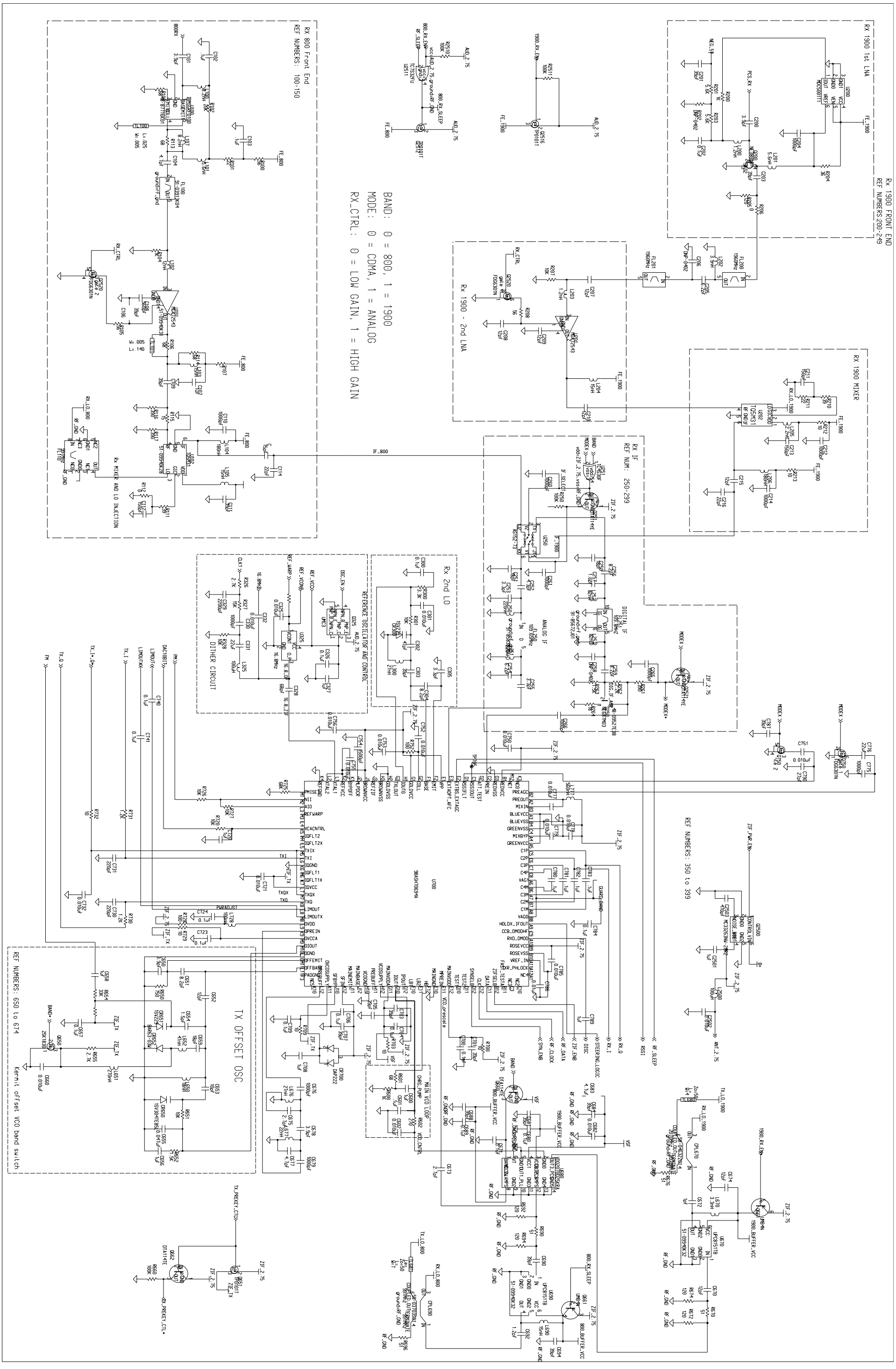
CDMA ST7868W : TOP SIDE BOARD OVERLAY



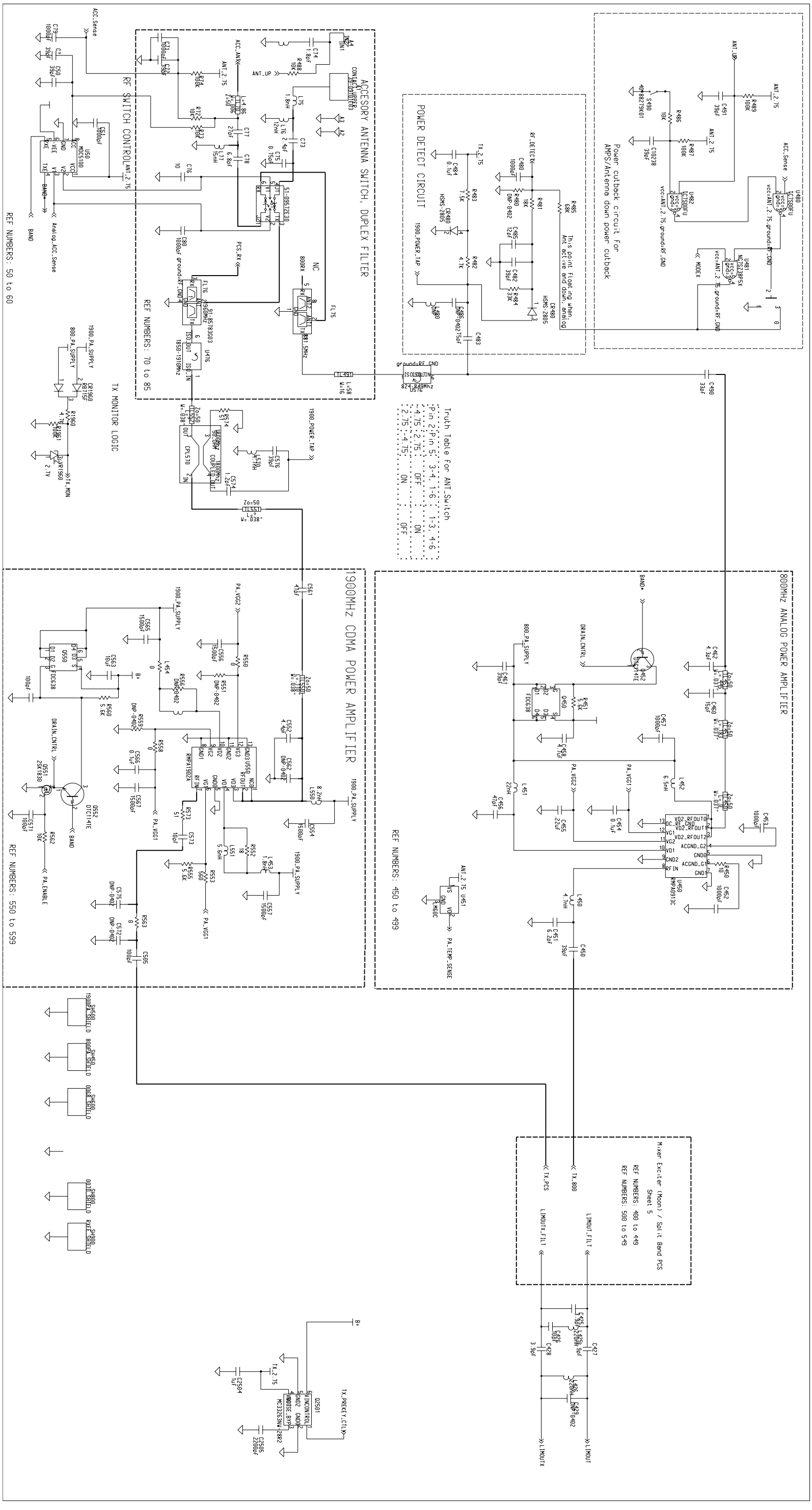
CDMA ST7868W : BOTTOM SIDE BOARD OVERLAY



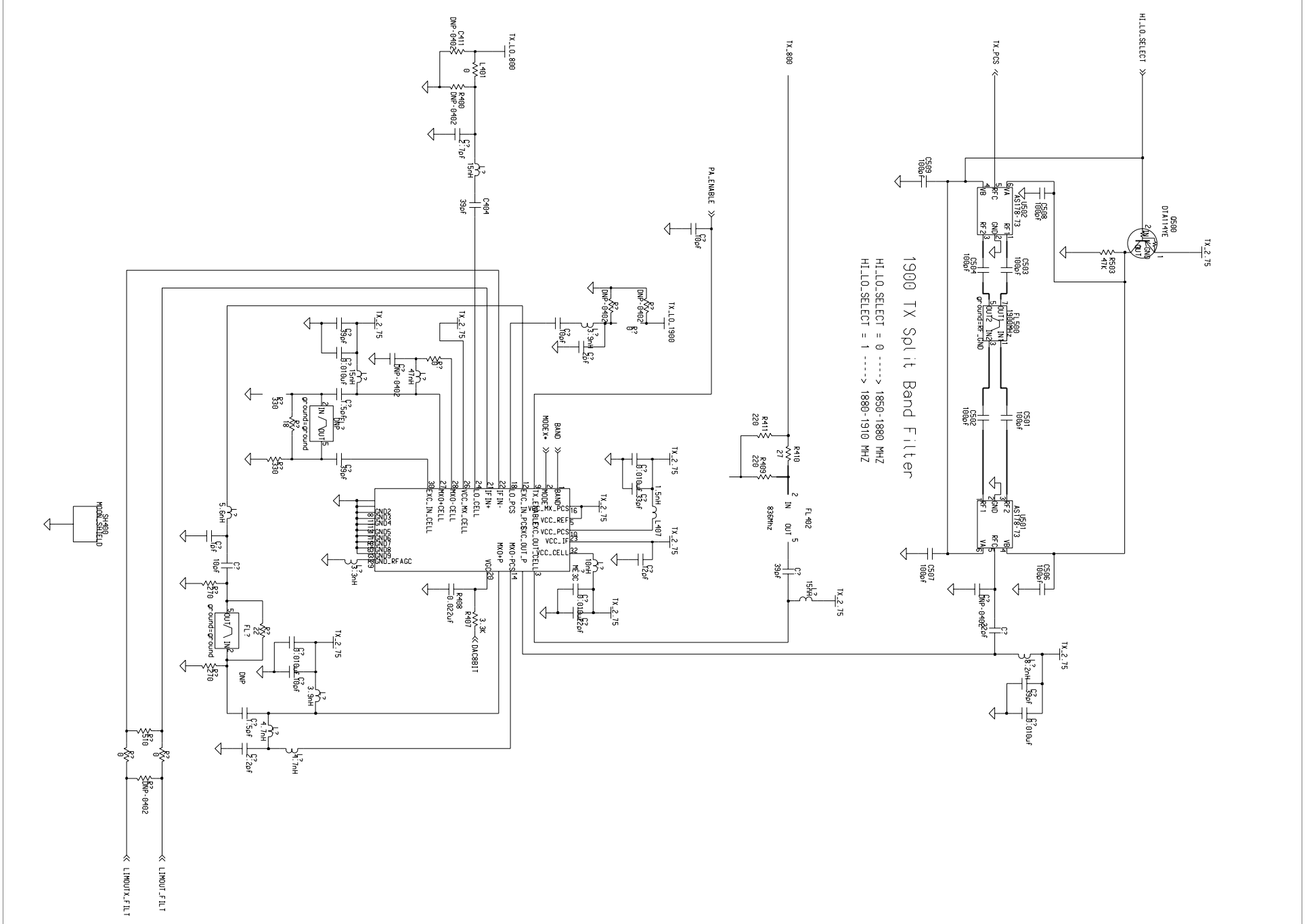
CDMA ST7868W : RF SCHEMATICS SIDE 1 OF 3



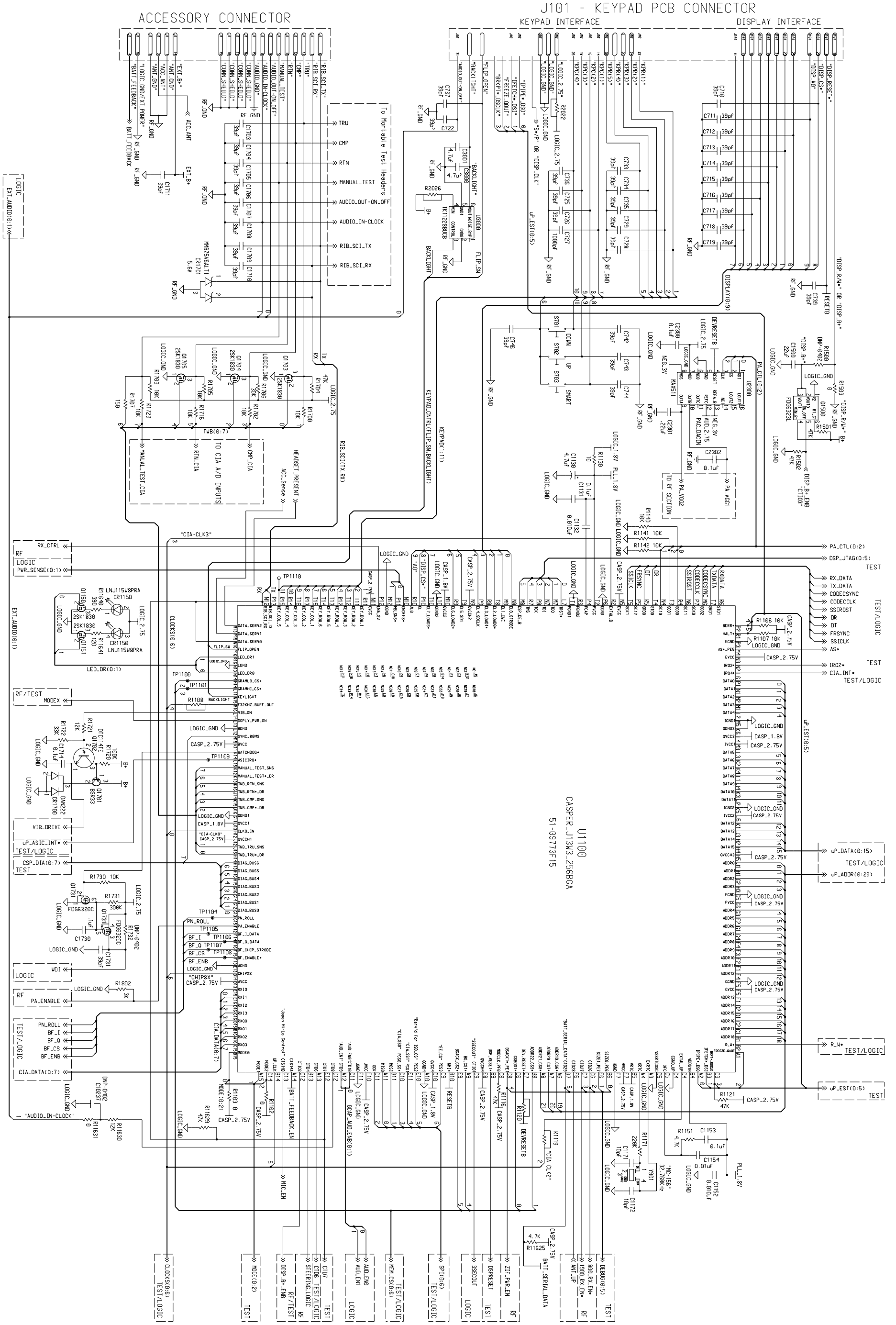
CDMA ST7868W : RF SCHEMATICS SIDE 2 OF 3



CDMA ST7868W : RF SCHEMATICS SIDE 3 OF 3



CDMA ST7868W : AL SCHEMATICS SIDE 1 OF 2



CDMA ST7868W : AL SCHEMATICS SIDE 2 OF 2