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APPLICANT: MOTOROLA INC.   **FCC ID: IHDT56CW1**

EXHIBIT 8

c18 DEVELOPERS KIT MANUAL

A preliminary draft copy of the Users Manual follows:

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c18 DEVELOPERS KIT MANUAL

Preliminary

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Preface

Scope of this Manual

Data terminal equipment (DTE) OEM teams are often pulled together quickly from other work
groups.
For this reason, OEM team members often need advice about how to best sustain a concerted
design
And development effort. The goal of this guide is to assist the team to successfully produce a
ireless
Product that integrates a Motorola c18 wireless modem.

Who Should Use This Manual

Our readers are intended to be data terminal equipment (DTE) OEM integration team members.
Teams historically consist of representative from the disciplines of hardware, software, and RF
engineering.

Disclaimer

This guide provides advice and guidelines to OEM teams. Responsibility for how the information
is
Used lies entirely with the OEM. Statements indicating support provided by or offered by Motorola
are subject to change at any time. Motorola reserves the right to make any changes to this
specification.

Regulatory Requirements

The Federal Communications Commission (FCC) requires application for certification of digital
devices in accordance with CFR Title 47, Part 2 and Part 15. This includes Electromagnetic
Energy
Exposure (EME) testing. As the c18 modem is not a stand alone transceiver but is an integrated
module, the c18 cannot be tested by itself for EME certification. It is, however, the integrator
responsibility to have the completed device tested for EME certification.

Regulatory Statement

The following safety precautions must be observed during all phases of the operation,
usage, service or repair of any cellular terminal or mobile incorporating c18 module.
Manufacturers of the cellular terminal are advised to convey the following safety
information to users and operating personnel and to incorporate these guidelines into all
manuals supplied with the product. Failure to comply with these precautions violates
safety standards of design, manufacture and intended use of the product. Motorola
assumes no liability for customer failure to comply with these precautions.

1. The c18 must be operated at the voltages described in the technical documentation.

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2. The c18 must not be mechanically nor electrically changed. Usage of connectors should follow the
guidance of the technical documentation.
3. The c18 has been designed the meet the EMC requirements of ETS 300 342.
4. When integrating the c18 into a system, Motorola recommends testing the system to
ETS300342-1.
5. The c18 meets the safety requirements of EN60950.
6. Systems using the c18 will be subject to mandatory EMC testing under directive 89/336/EEC and
only optional (see 3.) Other directives like the LVD directive 73/23/EEC might also be applicable to a
system using c18.

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Safety

User Operation

Do not operate your telephone when a person is within 8 inches (20 centimeters) of the antenna.
A person or object within 8 inches (20 centimeters) of the antenna could impair call quality and
may cause the phone to operate at a higher power level than necessary and expose that person
to
RF energy in excess of that established by the FCC RF Exposure Guidelines.

IMPORTANT: The telephone must be installed in a manner that provides a minimum separation
Distance of 20 cm or more between the antenna and persons to satisfy FCC RF exposure
requirements for mobile transmitting devices.

IMPORTANT: To comply with the FCC RF exposure limits and satisfy the categorical exclusion
requirements for mobile transmitters, the following requirements must be met.

Antenna Installation
1. A minimum separation distance of 20 cm must be maintained between the antenna and all persons.
2. The transmitter effective radiated power must be less than 1.5 Watts ERP (2.45 Watts or 33.9 dBm EIRP).
This requires that the combination of antenna gain and feed line loss does not exceed 6.1 dBi.

Applicable Documents

c18 Cellular Engine Module Description - 9808901C63

Arrangement of this Manual

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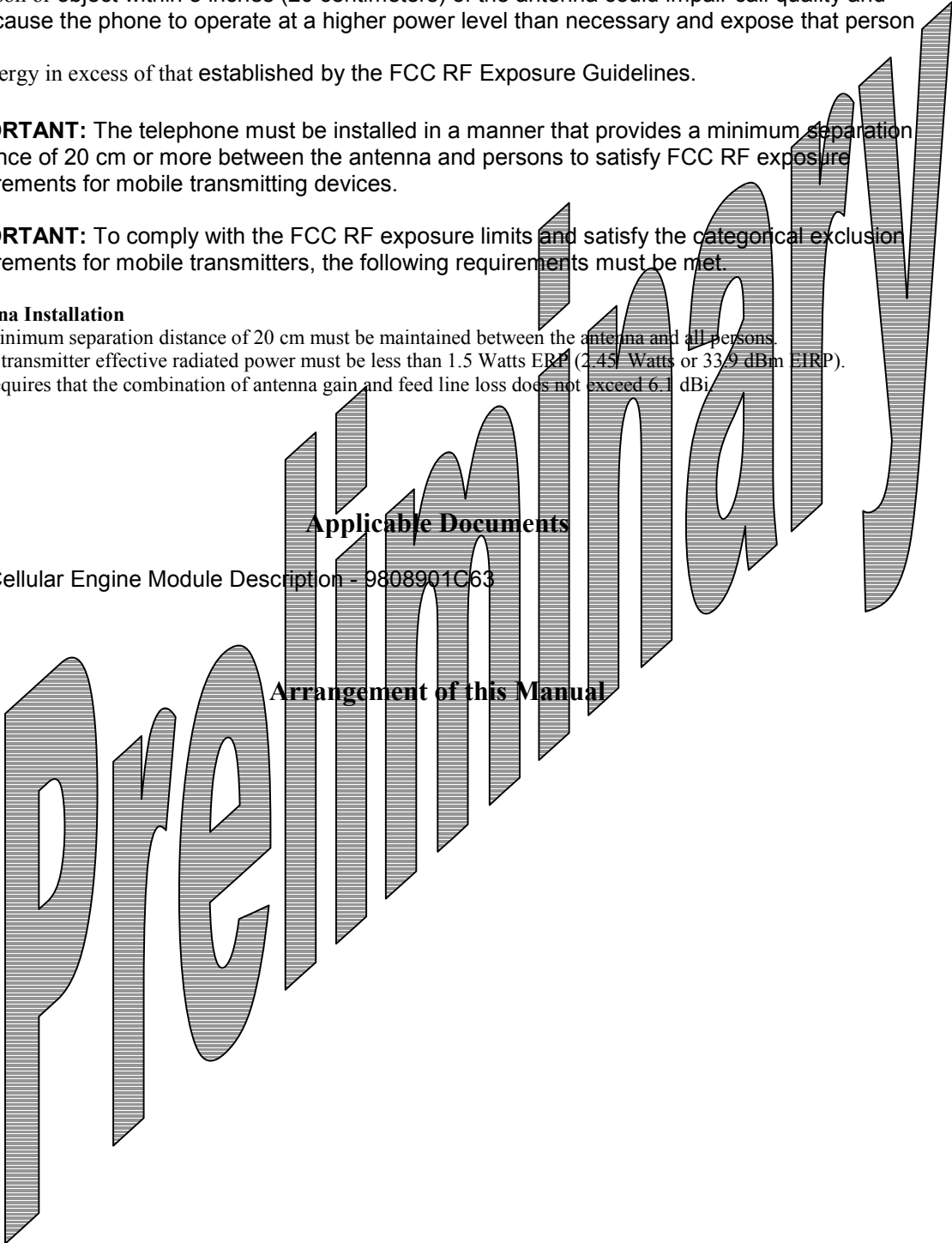
Introduction

General Description

c18 Developer's Kit (F4441A) is intended for developing and testing software applications for c18 module, as well as for c18 evaluation. Developer's kit can accommodate different c18 models – with different interfaces (i.e. full featured 70 pin interface connector, 36 pin ZIF connector and 28 pin DIN connector).

Terms and Abbreviations

| Acronyms / Terms	Definition / Description
1X	Platform 1X
ACK	Acknowledgement from the radio that the test command was successful
ADB	Application Development Board (old name for Developer Board)
AGND	Audio Ground
BOM	Bill of Materials
c18a	Full c18 OEM model
c18c	c18 CDMA800 only model
CDMA	Code Division Multiple Access
ESD	Electro-Static Discharge
GHz	Gigahertz
GND	Electrical Ground
KHz	Kilohertz
LPF	Low Pass Filter
mA	Milliamp
MHz	Megahertz
N/A	Not Applicable
NC	Not Connected
PA	Power Amplifier
PCS	Personal Communications System
PCS	PCS Band. Also known as CDMA 1900
RF	Radio Frequency
R-UIM	Removable User Identity Module
SW	Software
TBD	To Be Determined
ZIF	Zero Insertion Force

Safety Precautions

Majority of the Developer's Board circuits are not shielded. Take maximum precaution measures to avoid ESD. ESD may damage Developer's Board and/or c18 module attached to it.

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Developer Board and Interfaces Description

General

The Developer Board is the main part of the Developer's Kit. It serves as a mounting platform for c18 module. It provides c18 with supply voltage and provides a user with standard communication interfaces (USB and RS232).
A picture of Developer Board with some of its accessories and c18 attached to it is shown below:
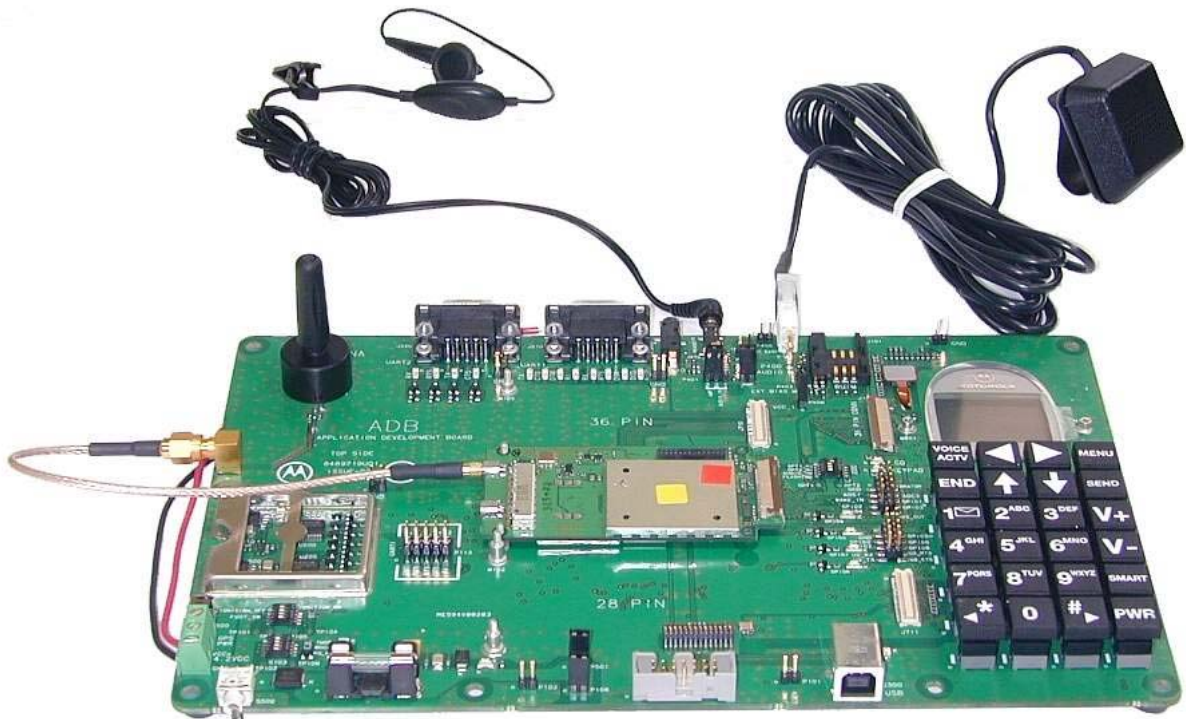
GETTING STARTED (USING THE DEVELOPER'S KIT)

Developer's Kit contents:

Item #	Item Description	Part Number	Quantity
1	c18a	FTN8125A	1
2	Developer's Board	FTN8126A	1
3	Power Supply	SPN4716B	1
4	Euro Adapter Plug	SYN7456A	1
5	RS232 Cable		1
6	USB Cable		1
7	RF Cable	3087563V05	2
8	Documentation and Driver Bundle CD	FTN6246A	1
9	Nut M2x0.4	0280349L02	4
10	Antenna	8509397T03	1
11	Spare 1.6A Fast-Acting Fuse	6502069C48	1
12	Spare Jumper	0984181L01	1

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| 13	Headset	SYN8419B	1
14	Microphone	SMN4020B	1
15	36 Lead Flex Cable 50mm	3086229J10	1
16	70 lead Flex cable (option)		
17	70 lead Flex cable (option)		

System requirements
- Personal Computer
- Available COM port
- Available USB 2.0 (full-speed) port
- Available RS232 ports

Hardware Setup

Mount the c18 module supplied with the kit on the supporting spacers and plug it into the matching connector on the Developer's Board. Secure the module using two M2x0.4 nuts provided in the kit (other two nuts are spare). There are three possible configurations, shown in the following pictures:

For users using the fully featured 70 pin interface:
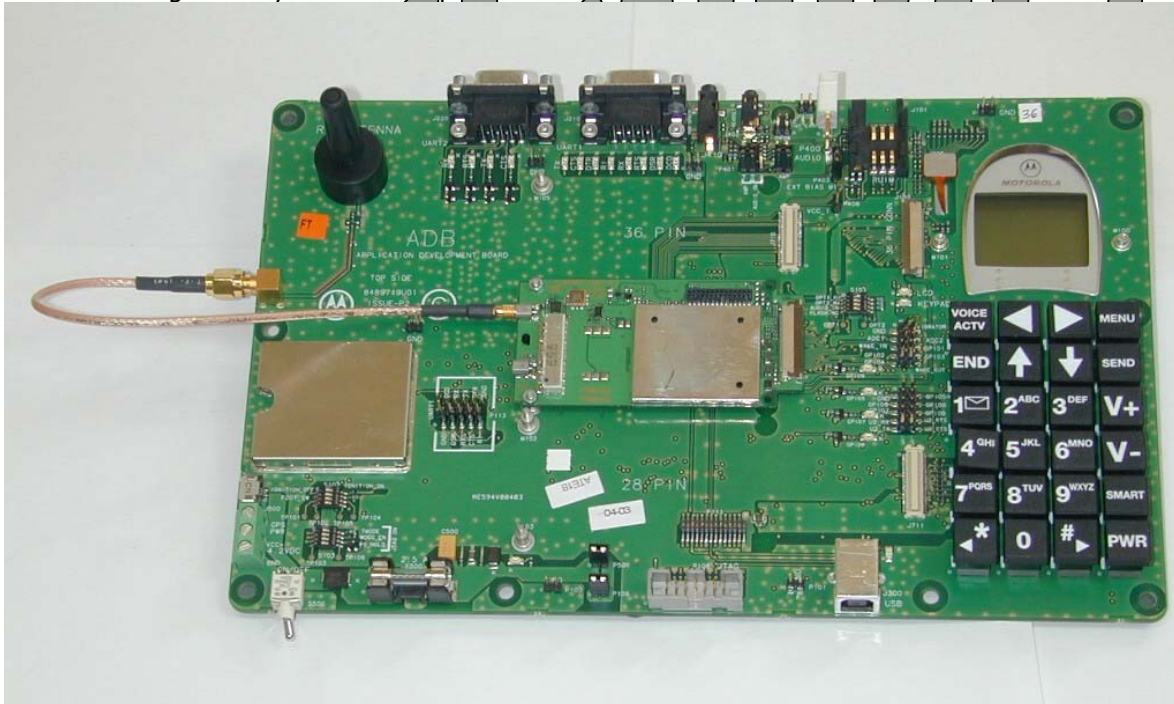
For users using the 36 ZIF connector interface:

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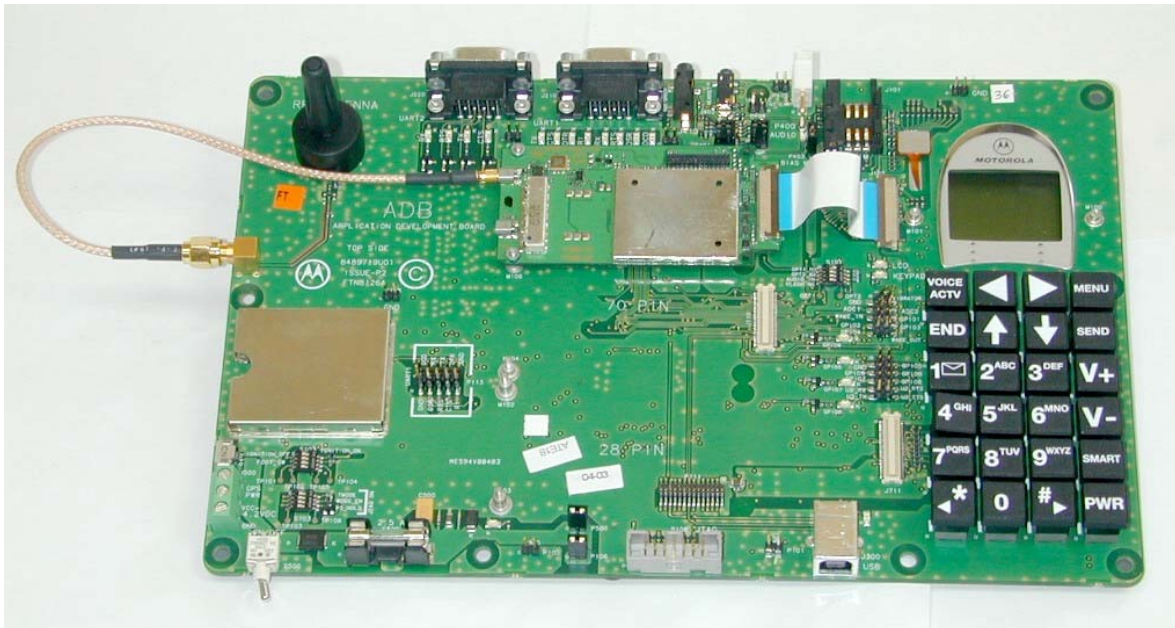
For users using the 28pin DIN connector interface:
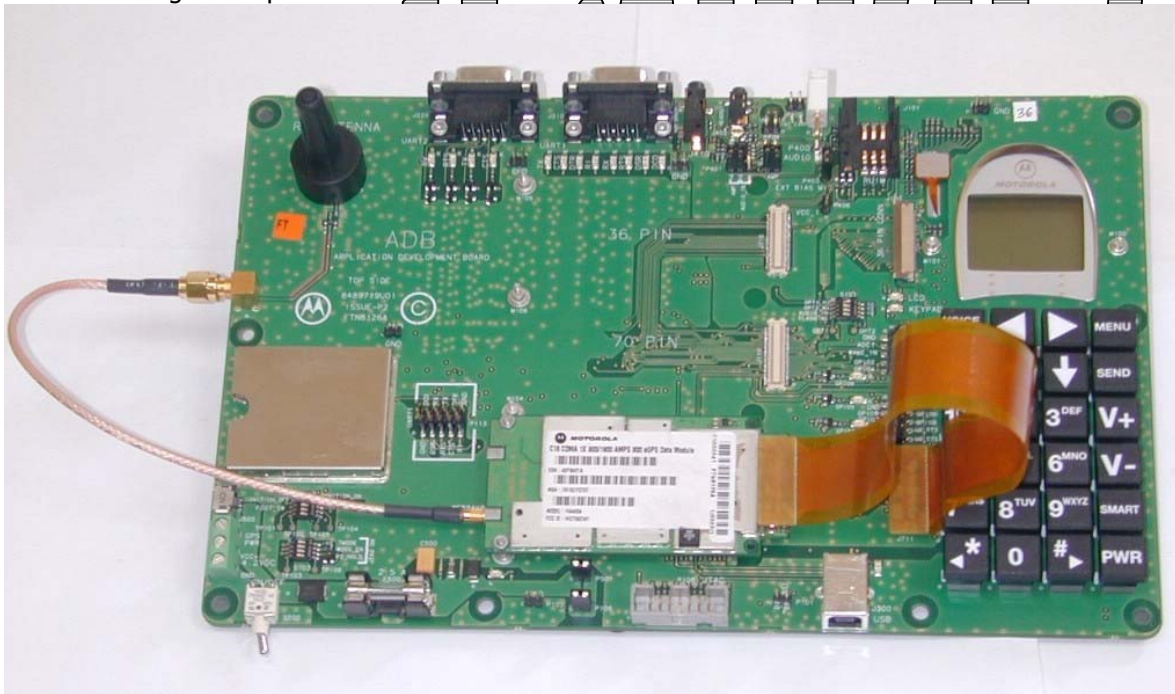
Plug the RF cable (3087563V05) into the Developer's Board and then to c18 module. Attach the headset supplied to headset connector on the Developer's Board. Mount the Antenna onto the Antenna Base (M601) on the Developer's Board.

Connect the desired communications cable between a PC and the Developer's Board (RS232 or USB). If RS232 cable is used, connect the RS232 cable to connector marked J210 and UART1.

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Connect the Power supply provided in the kit to Developers Board Power Connector J500. Plug the Power Supply into the mains.

Power-up
Switch the Power switch S500 into the "ON" position. This will turn some of the Developer's Board LEDs on. At this point, Developer's Board is on, and c18 module has voltage supply. The c18 module will remain off and LCD will remain blank.
To turn the module on, press on the keypad key "PWR" for at least 2 seconds to turn the module on.

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Configuring Communication Mode

The c18 module will enter the USB communications mode when it's powered up, no configuration switches are closed and a USB cable connects the Developer's Board with an active USB port on a PC.
In order to choose RS232 mode, make sure RS232 cable is properly connected to the Developer's Board and a PC. Move the S101 "OPT1" configuration switch to closed position.

Note: Configuration Switches have a small mark "ON" printed on them. When a switch tab is in "ON" mark direction, the switch is "Closed". When it is in the opposite direction of the mark, the switch is "Open".
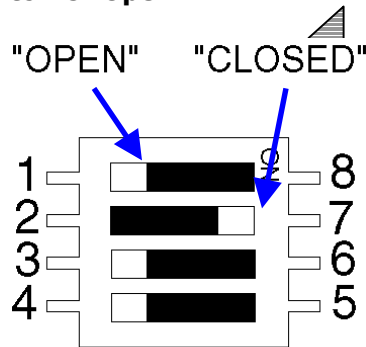
For detailed description of configuration switches setting and available modes, please refer to chapter x.x "CONFIGURATION SWITCHES DESCRIPTION".

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Testing the installation

Once the hardware setup has been completed, you may test the communication with the module.

RS232 communication:
Below is an example of a setup needed for HyperTerminal in order to communicate with the module.

USB Communication: TBD

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Developers Board Description
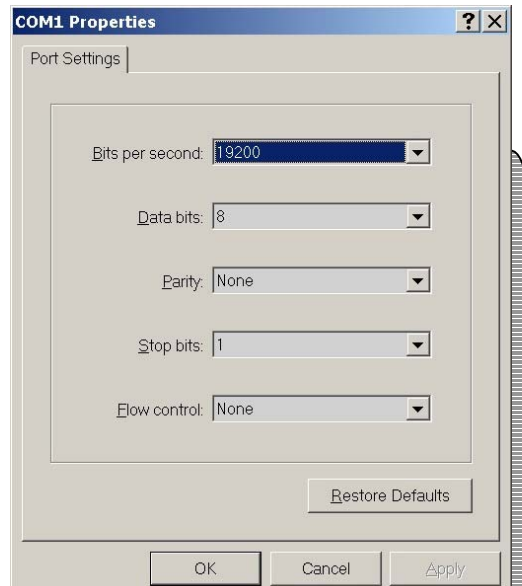
DEVELOPER BOARD CONNECTOR DESCRIPTION

Figure below shows the location of connectors on the Developer's Board:

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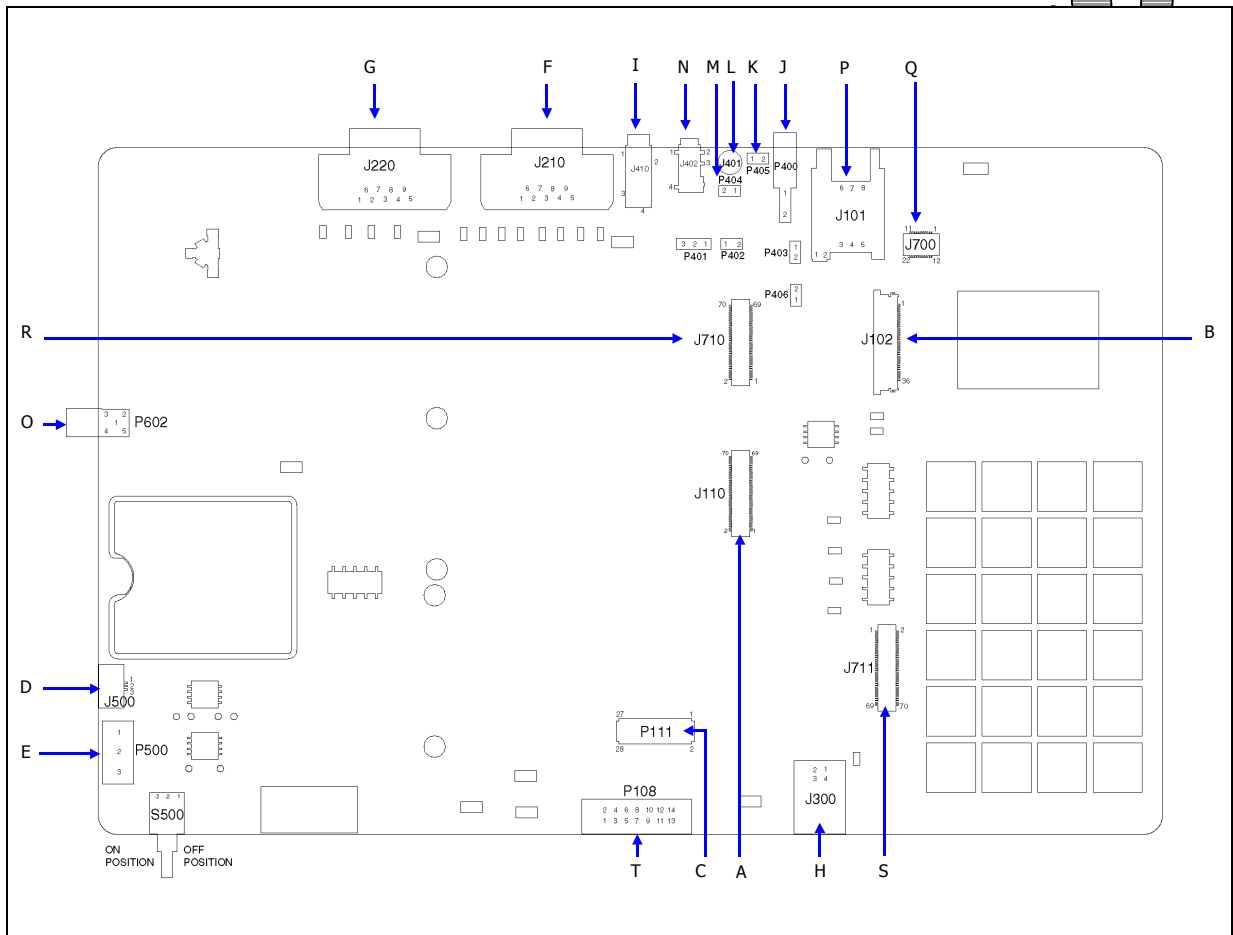
A	J110 – Fully-featured 70 pin Interface Connector	K	P405 – Differential Earpiece Output
B	J102 – 36pin ZIF Interface Connector	L	J401 – Socket for condenser (electret) microphone
C	P111 – 28pin DIN Interface Connector	M	P404 – Differential Microphone Input
D	J500 – Power Supply Connector	N	J402 – Headset Interface Connector
E	P500 – Power Supply Connector	O	P602 – RF Antenna Connector
F	J210 – RS232 DB9 connector (UART1)	P	J101 – R-UIM card socket
G	J220 – RS232 DB9 connector (UART2)	Q	J700 LCD Connector
H	J300 – USB connector	R	J710 – Supplementary Connector for J102
I	J410 – Auxiliary Audio Output	S	J711 – Supplementary Connector for P111
J	P400 – Auxiliary Audio Input	T	P108 JTAG Connector

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Developers Board to c18 connectors
J110 – Fully-featured 70 pin interface connector
c18 models with 70-pin connector should be directly plugged into J110. Nuts (provided in the kit) should be used to mechanically secure a c18. Alternatively, c18 can be connected to the Developer's Board through the 70 lead flex cable provided with the kit (Motorola P/N XXXXXXx), for easy access to the bottom side of c18.
For users that use c18 with different type of 70 pin connector, a flex cable with matching mating connectors is supplied with the kit.

NOTE: 70pin board-to-board connectors can withstand relatively limited number of insertions. c18 module should not be removed frequently from the Developers Board after being mounted on it. After crossing the maximum guaranteed number of insertions, the kit might stop operating properly.

J102 – 36pin ZIF Interface Connector
c18 models with 36 pin ZIF connector should be connected through 5cm 36-lead flex cable provided with the kit (Motorola P/N 3086229J10) to J102 on Developers Board. If desired, longer, 30cm 36-lead flex cable can be used (It can be purchased separately - Motorola P/N 3086229J09).

P111 – 28pin DIN Interface Connector
c18 models with 28-pin DIN connector should be plugged onto the J102 on a Developers Board.

Power Supply Connectors
J500 – Power Supply connector intended for use with power supply PSM4716A (included in the Developers kit).

Pin #	Pin Name
1	GND
2	Not Connected
3	PS_VCC

P500 – Power Supply connector intended for use with laboratory power supplies. Power supply should be capable of providing 4.5V dc and continuous current of at least 1.5A. Protection circuitry generates voltage drop of approximately 0.5V at full load (maximum c18 power), therefore providing c18 module with nominal 4.0V.
Supply for active GPS antenna should be connected to pin #1 of this connector for c18 models with active GPS antenna capability. Voltage and current supply requirements for power supply for active GPS antenna depend on the type of the active antenna (typically 3 or 5V, with currents of up to tens of mA).

Pin #	Pin Name
1	GPS_ANT_POWER
2	PS_VCC
3	GND

Switch S500 serves as the Developer kit ON/OFF switch. In its OFF position, supply voltage to c18 module and all Developer board circuitry is disconnected. In its ON position voltage supply is routed to the Developer board circuitry and c18.
Note that GPS_ANT_POWER is not influenced by S500 – active antenna supply is directly routed to c18 interface connector.

NOTE: Do not apply both power supply connectors simultaneously! Damage to the kit and/or power supplies might occur. If Power for active GPS antenna is needed, use P500 only.

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Communications Connectors

J210 – RS232 DB9 connector (UART1)
This connector provides RS232 interface for c18 UART1. It has eight communications signals. c18 UART1 signals (from c18 interface connector) are routed to the RS232 Transceiver on the Developer's Board. The transceiver converts UART LV TTL to RS232 signals.

Pin #	Pin Name
1	U1_RS232_DCD
2	U1_RS232_RX
3	U1_RS232_TX
4	U1_RS232_DTR
5	GND
6	U1_RS232_DSR
7	U1_RS232_RTS
8	U1_RS232_CTS
9	U1_RS232_RI

J220 – RS232 DB9 connector (UART2)
This connector provides RS232 interface with c18 UART2. It has four communication signals. c18 UART2 signals (from c18 interface connector) are routed to the RS232 Transceiver on the Developer's Board. The transceiver converts UART LV TTL to RS232 signals.

Pin #	Pin Name
1	NC
2	U2_RS232_RX
3	U2_RS232_TX
4	NC
5	GND
6	NC
7	U2_RS232_RTS
8	U2_RS232_CTS
9	NC

J300 – USB connector
USB connector provides a user with the USB interface to c18. Signals from this connector are directly routed to the c18 interface connector. Connector pinout is as shown in the table below.

Pin #	Pin Name
1	USB_VBUS
2	USB_D-
3	USB_D+
4	GND

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Audio Interface connectors

J410 – Auxiliary Audio Output
This connector provides user with a single ended auxiliary audio output. c18 Auxiliary output is routed through a capacitor to remove its DC bias. Therefore, the audio signal on this interface is the same as at the c18 output.
This output can be used in car-kit like applications. A set of powered PC speakers (with amplifier) can be used as Auxiliary Audio Output indicator when plugged into the J410.

Pin #	Pin Name
1	AGND
2	NC (AUDIO_OUT)
3	AUDIO_OUT
4	NC

P400 – Auxiliary Audio Input
This connector provides user with a single ended auxiliary audio input.

P400 pinout:

Pin #	Pin Name
1	AGND
2	AUDIO_IN

Two different modes of operation are supported for this input. In the first mode, it can be directly routed to the c18 interface connector, via 1uF capacitor. In the other mode, this input is routed through a preamplifier on Developer's Board. In the preamplifier mode, a DC bias can be added to the audio input, thus making an interface capable of accommodating different active microphones (typically found in car-kit like applications). Preamplifier gain is set to 9.1.
Behavior of this input is defined by P401, P402, P406 and P403 jumper position:

Mode	Jumper Position			
	P401	P402	P406	P403
Directly routed	1-2	Open	Open	NC
Directly routed with internal bias *	1-2	Closed	Closed	NC
Preamplifier without input DC bias	2-3	Closed	Open	NC
Preamplifier with internal Bias	2-3	Closed	Closed	NC
Preamplifier with external Bias	2-3	Closed	Open	Connect desired DC bias voltage from external source

* For use with microphone supplied with the Kit.

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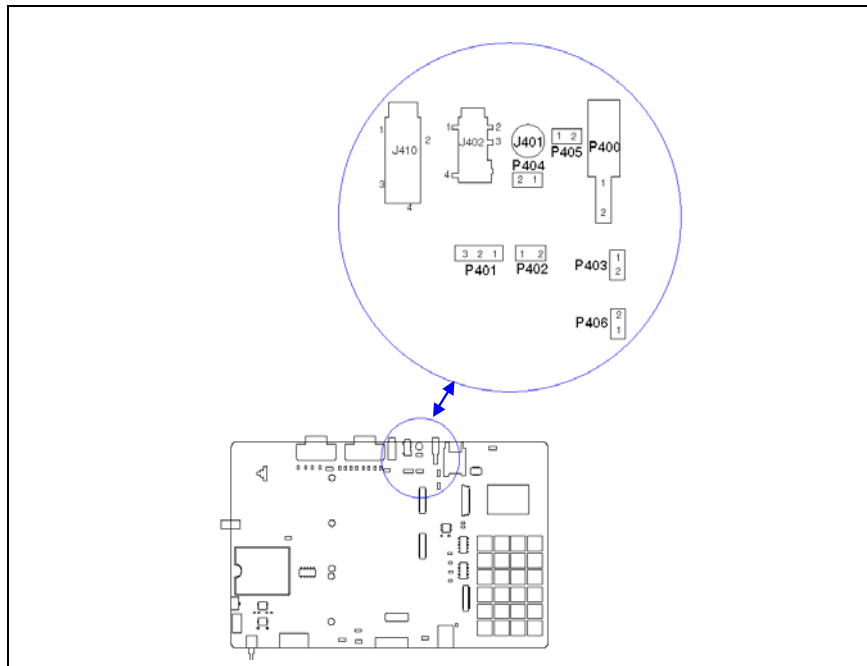
P405 – Differential Earpiece Output
This differential output is intended for handset like applications. c18 is capable of driving 35mW in
32Ω earpiece on this output. Common mode is 1.2V DC typical.

Pin #	Pin Name
1	EARPIECE-
2	EARPIECE+

J401 – Socket for condenser (electret) microphone (e.g. Motorola P/N XXXXXXXX)
This differential input is intended for handset like applications. This socket is routed directly to
MIC_IN- and MIC_IN+ differential inputs of c18. c18 provides the required biasing for active
condenser microphone (1.8V).

Pin #	Pin Name
1	MIC_IN+
2	MIC_IN+
3	MIC_IN-
4	MIC_IN-

P404 – Differential microphone input
This header can be used for monitoring differential microphone input or for applying different
condenser microphone, which doesn't fit the J401 socket. In cases when different microphone is
applied to P404, microphone installed in socket J401 (supplied with Developers Kit) need to be
removed.

Pin #	Pin Name
1	MIC_IN-
2	MIC_IN+

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J402 – Headset interface connector

Pin #	Pin Name
1	AGND
2	HEADSET_INT_N
3	HEADSET_SP
4	HEADSET_MIC
5	PD (2.2kΩ Pull down)

RF Antenna connector

P602 – Provides connection between c18 and an on-board antenna M601 via RF cable (Motorola P/N 3087563V05) provided in the Developer's Kit. The cable can be used to connect the c18 RF interface with an external (user provided) antenna, or to a test equipment. In that case, it should be disconnected from P602, and connected to the desired test equipment or antenna.
The second RF connector provided in the kit is for interfacing with the c18 active GPS antenna connector. This input connects to the GPS antenna directly – without going through the Developer's Board.

R-UIM connector

J101 – R-UIM card socket

Pin #	Pin Name
1	GND
2	UIM_CR_DET
3	UIM_CLK
4	UIM_RESET
5	UIM_PWR
6	UIM_DATA
7	UIM_PWR (UIM_VPP)
8	GND

Miscellaneous connectors

J700 – Serial LCD Connector
Provides an interface between a Developer's Board and the LCD module.

J710 – Supplementary Connector for J102
This connector provides means of using keypad and LCD module on c18 modules with 36 pin ZIF connector, for development purposes.

J711 – Supplementary Connector for P111
This connector provides means of using keypad and LCD module on c18 modules with 28 pin DIN connector, for development purposes.

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P108 – JTAG Connector
Commercial c18 models do not support JTAG interface! Connector P108 should not be used with commercial c18 modules, as it could alter their proper operation, and possibly cause damage to them.

Pin #	Pin Name
1	JTAG_VCC
2	GND
3	TRST_N
4	GND
5	TDI
6	GND
7	TMS
8	GND
9	TCK
10	GND
11	TDO
12	RESET_IN
13	JTAG_VCC
14	GND

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CONFIGURATION SWITCHES DESCRIPTION

Drawing below shows locations of the three Developer's Board configuration switches:
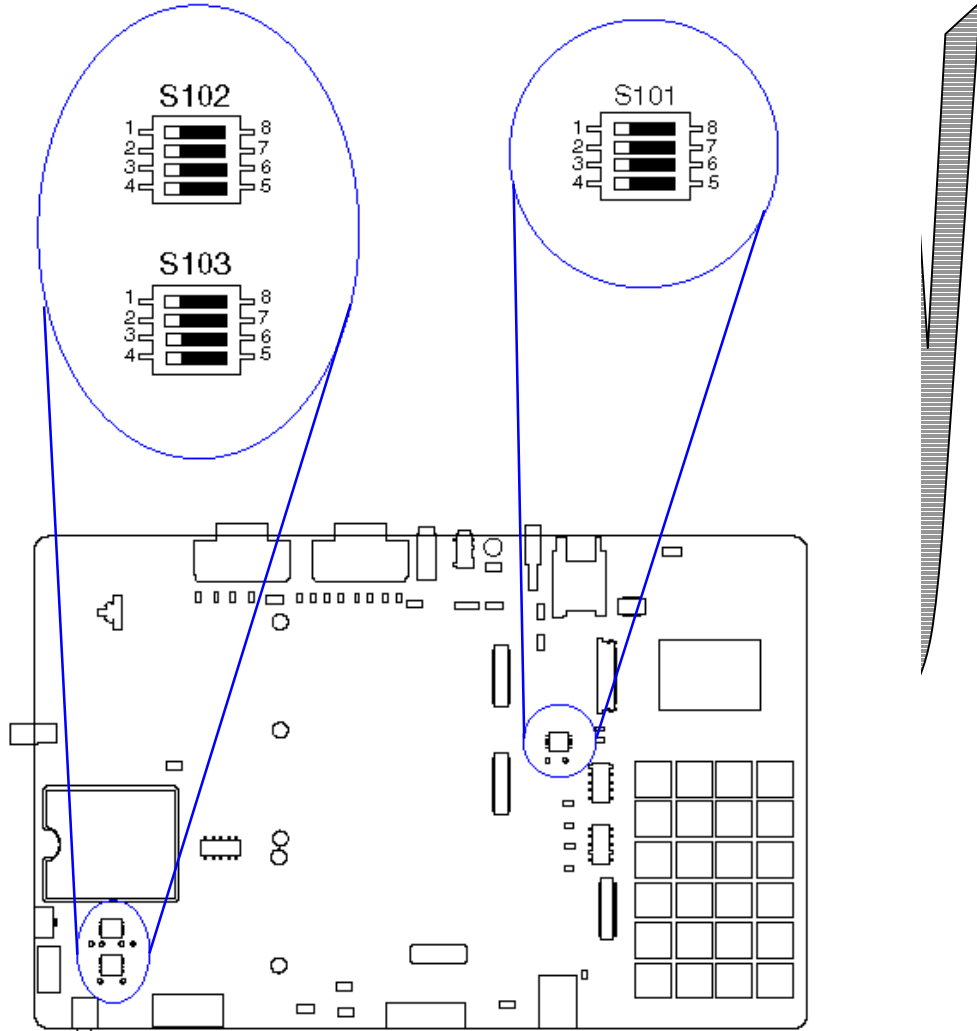
Note: Configuration Switches have a small mark "ON" printed on them. When a switch tab is in "ON" mark direction, the switch is "Closed". When it's in the opposite direction of the mark, the switch is "Open".

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S101 – Operation Mode Switch

Switch pins	Switch Name	Signal State (value)	
		Open (OFF)	Closed (ON)
1 – 8	OPT1	1	0
2 – 7	OPT2	1	0
3 – 6	AUDIO_IN	1	0
4 – 5	FLASHING	Disabled	Enabled

S102 – Ignition Switch

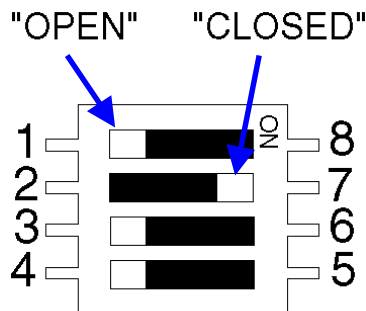| Switch pins	Switch Name	Signal State (value)	
		Open (OFF)	Closed (ON)
1 – 8	IGNITION	0	VCC
2 – 7	GPIO8_FOOTSWITCH	1	0
3 – 6	SPARE	-	-
4 – 5	SPARE	-	-

S103 – JTAG Mode Switch

Switch pins	Switch Name	Signal State (value)	
		Open (OFF)	Closed (ON)
1 – 8	TMODE	1	0
2 – 7	WDOG_EN	1	0
3 – 6	PS_HOLD	PS_HOLD	JTAG_VCC
4 – 5	SPARE	-	-

The following operation modes are supported by c18:

RS232 mode:

Switch Name	Switch State		Switch Name	Switch State
OPT1	Closed		IGNITION	Opened
OPT2	Opened		GPIO8_FOOTSWITCH	Don't Care
AUDIO_IN	Opened		SPARE	Don't Care
FLASHING	Opened		SPARE	Don't Care

USB Mode:

Switch Name	Switch State		Switch Name	Switch State
OPT1	Opened		IGNITION	Opened
OPT2	Opened		GPIO8_FOOTSWITCH	Don't Care
AUDIO_IN	Opened		SPARE	Don't Care
FLASHING	Opened		SPARE	Don't Care

USB_VBUS >4.0V

RS232 + USB mode:

Switch Name	Switch State		Switch Name	Switch State
OPT1	Opened		IGNITION	Opened
OPT2	Opened		GPIO8_FOOTSWITCH	Don't Care
AUDIO_IN	Closed		SPARE	Don't Care
FLASHING	Opened		SPARE	Don't Care

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Flashing mode:

Switch Name	Switch State
OPT1	Opened
OPT2	Opened
AUDIO_IN	Opened
FLASHING	Closed

Switch Name	Switch State
IGNITION	Opened
GPIO8_FOOTSWITCH	Don't Care
SPARE	Don't Care
SPARE	Don't Care

Note: c18 can enter flashing mode only on power-up. Therefore, in order to enter the flashing mode, c18 should be powered down, switches should be set as shown above and then should the c18 be powered up again.

JTAG mode:
NOTE: JTAG Mode is not supported by commercial c18 models!
Trying to enter JTAG mode on commercial c18 models might cause damage to the module, or disturb its proper operation. All four switches should be kept OPEN in all normal usage modes.

In order to enter JTAG mode on JTAG ENABLED c18 models, switches TMODE and WDOG_EN should be CLOSED. The module should be powered up, and only then should PS_HOLD be CLOSED.

JUMPER DESCRIPTION

P501 - c18 Supply

State	Description
Closed	VCC Supplied to c18 module
Opened	VCC disconnected from c18 module

P501 should be closed for proper c18 operation. This jumper could be replaced with ampere-meter to measure c18 current consumption.

Note: Current drawn by c18 may vary from user hardware configuration, due to the different c18 loads (e.g. LCD, backlight LEDs, Vibrator, etc.)

P401 – Audio input path selection

State	Description
1-2	AUDIO_IN directly routed to c18
2-3	AUDIO_IN routed to c18 through pre-amplifier

P402 – Pre-Amplifier input enable

State	Description
Closed	AUDIO_IN routed to the pre-amplifier on a Development Board
Open	AUDIO_IN disconnected from the pre-amplifier

P406 – Internal Bias for Auxiliary Audio input

State	Description
Closed	4.5V DC bias enabled
Open	Internal DC bias disabled

P403 – External Bias for Auxiliary Audio input

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LED Indicators

There are six groups of LED Indicators on a Developers Board:

Green LED Power indicator (D501) – indicates that power supply voltage is present and ON/OFF switch is ON.

Red LED UART1 Indicators (D200 through D207) – Indicate the states of each of the eight UART1 signals.

Red LED UART2 Indicators (D210 through D213) - Indicate the states of each of the four UART2 signals.

Red LED USB VBUS indicator (D300) – Indicates the presence of USB interface.

Red GPIO state indicators (D130 through D133) – Indicate the inverse state of the GPIO5, GPIO6, GPIO7 and GPIO9.

Green Backlight LED Indicators:
D731 – Keypad (KEYB_DRV) Backlight indicator and
D730 – LCD (BL_SINK) Backlight indicator.

HEADERS

Signal Headers:

P107

Pin #	Pin Name
1	GND
2	VIBRATOR
3	ADC1
4	ADC2
5	WAKE_IN_N
6	PCM_DIN_GPIO1
7	PCM_DOUT_GPIO2
8	PCM_CLK_GPIO3
9	PCM_FS_GPIO4
10	WAKE_OUT_N

P112

Pin #	Pin Name
1	GND
2	GPIO5
3	GPIO9
4	GPIO6_ENT_MUTE
5	GPIO7_SP_MUTE
6	GPIO8_FOOTSWITCH
7	U2_RS232_RX
8	U2_RS232_RTS
9	U2_RS232_TX
10	U2_RS232_CTS

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P113

Pin #	Pin Name
1	GND
2	U1_RS232_DCD
3	U1_RS232_DSR
4	U1_RS232_RX
5	U1_RS232_RTS
6	U1_RS232_TX
7	U1_RS232_CTS
8	U1_RS232_DTR
9	U1_RS232_RI
10	GND

VCC Header:
P106 – For monitoring VCC voltage

Ground Headers:
P100, P101, P102, P103, P104 and P105

TEST POINTS

TP100 – OPT1
TP120 – OPT2
TP101 – SPARE
TP104 – SPARE
TP102 – SPARE
TP105 – SPARE
TP103 – SPARE
TP106 – SPARE

MECHANICAL DESCRIPTION

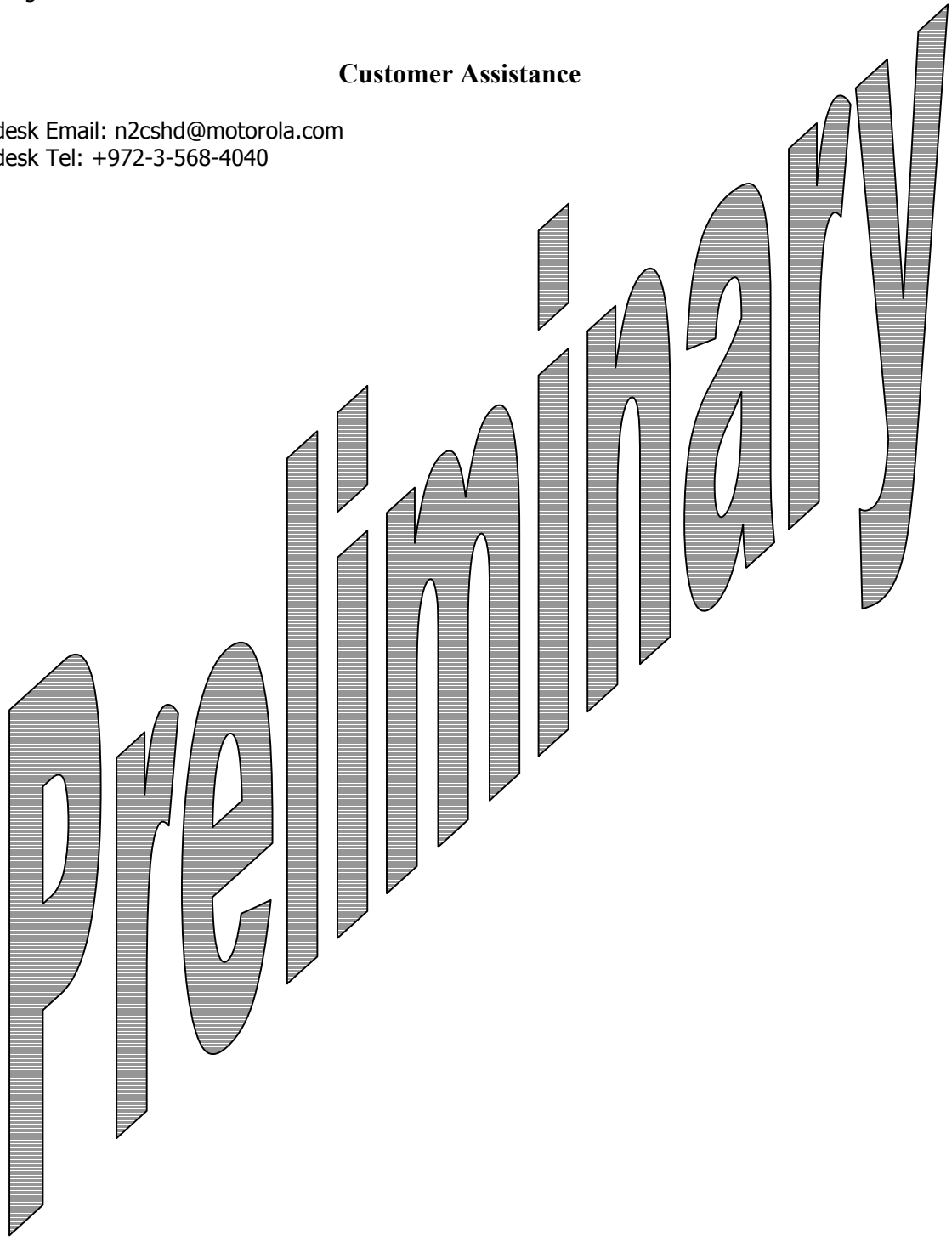# SERVICE AND SUPPORT

Web Pages: TBD

Customer Assistance

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SCHEMATICS, PLACEMENT and PART LIST

Developers Board Schematics

Preliminary

Abc

Developers Board Placement

Abc

Developers Board Part list

```
REFERENCE      MOT. P/N      DESCRIPTION
RESISTORS
R100-102       0662057P10    RES 10K
R103           0662057B47    RES 0
R105           0662057P10    RES 10K
R106           0662057B47    RES 0
R107-110       0662057A45    RES 680
R112-130       0662057B47    RES 0
R132-136       0662057B47    RES 0
R138           0662057B47    RES 0
R140-144       0662057P10    RES 10K
R145           0662057B47    RES 0
R200-207       0662057A45    RES 680
R210-213       0662057A45    RES 680
R233           0662057P10    RES 10K
R234           0662057B47    RES 0
R250-252       0662057B47    RES 0
R300           0662057A45    RES 680
R400           0662057A57    RES 2.2K
R401           0662057A57    RES 2.2K
R404           0662057A80    RES 20K
R406-407       0662057P10    RES 10K
R409           0662057A45    RES 680
R412-413       0662057B47    RES 0
R414           0662057A80    RES 20K
R415           0662057B47    RES 0
R500           0662057A35    RES 270
R501           0662057P15    RES 13K
R502           0662057T61    RES 7.5K
R503           0662057P10    RES 10K
R504           0662057T61    RES 7.5K
R510           0662057B47    RES 0
R511           0662057B47    RES 0
R514           0662057A13    RES 33
R522-523       0662057B47    RES 0
R600           0662057B47    RES 0
R701-714       0662057B47    RES 0
R717           0662057B47    RES 0
R719-722       0662057B47    RES 0
R730-731       0662057A35    RES 270
R748-756       0662057B47    RES 0
CAPACITORS
C101           2113928A01    CAP 1µF
C201           2113928A01    CAP 1µF
C202           2113928A01    CAP 1µF
C203           2113928A01    CAP 1µF
C204           2113928A01    CAP 1µF
C205           2113743E20    CAP 100nF
C211           2113928A01    CAP 1µF
C212           2113928A01    CAP 1µF
C213           2113928A01    CAP 1µF
C214           2113928A01    CAP 1µF
C215           2113743E20    CAP 100nF
C401           2113928A01    CAP 1µF
C402           2113928A01    CAP 1µF
```

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C405        2113928A01   CAP 1μF
C410        2113928A01   CAP 1μF
C500        2311049C55   CAPP 330μF
C501        2113928D08   CAP 10μF
C502        2113928D08   CAP 10μF
C503        2113928D08   CAP 10μF
C504        2113928D08   CAP 10μF
C505        2113743E20   CAP 100nF
C506        2113743E20   CAP 100nF
C507        2113743E20   CAP 100nF
C508        2113743E20   CAP 100nF
C509        2113743E20   CAP 100nF
C510        2109622N06   CAP 1nF
C511        2113743E20   CAP 100nF
C512        2113928D08   CAP 10μF
C513        2113928D08   CAP 10μF
C515        2113928D08   CAP 10μF
C601        2113740F01   CAP 0.5pF
C603        2113740F21   CAP 5.6pF
C700        2113740F41   CAP 39.pF
C701        2113740F41   CAP 39.pF
C702        2113740F41   CAP 39.pF
C703        2113740F41   CAP 39.pF
C704        2113740F41   CAP 39.pF
C705        2113740F41   CAP 39.pF
```

DIODES
```
D130-133    4805729G44   RED LED BR1102W
D200-207    4805729G44   RED LED BR1102W
D210-213    4805729G44   RED LED BR1102W
D300        4805729G44   RED LED BR1102W
D500        4813838B04   3.0A SCHOTTKY MBRS320
D501        4802579S03   GREEN LED AG1102W
D730-731    4802579S03   GREEN LED AG1102W
VR100       4813832C28   15V ZENER MMBZ15
VR200-207   4813832C28   15V ZENER MMBZ15
VR210-213   4813832C28   15V ZENER MMBZ15
VR500       4813831A18   6.8V ZENER 1SMB5913BT3-D
```

CONNECTORS AND HEADERS
```
J101        4009060S03   RUIM SOCKET W CARD DETECT
J102        0988716R01   36 PIN ZIF CONNECTOR
J110        2887581U01   70 PIN CONN
J210        0909672B03   DB9 RECEPTACLE RIGHT ANGLE
J220        0909672B03   DB9 RECEPTACLE RIGHT ANGLE
J300        0987583U01   USB B RECEPTACLE
J401        0985622G01   2 PIN MIC SOCKET
J402        0987837L02   2.5mm HEADSET RECEPTACLE
J410        0909032K01   3.5mm SPEAKER RECEPTACLE
J500        0989601K01   3 PIN RECEPTACLE P2K
J700        0987817K01   22 PIN RECEPTACLE
J710        2887581U01   70 PIN CONN
J711        2887581U01   70 PIN CONN
P100-106    2880001R02   2 PIN HEADER
P107        2802935S07   10 PIN HEADER
P108        2808044H01   14 PIN HEADER
P111        2880471L02   28 PIN MALE DIN
P112-113    2802935S07   10 PIN HEADER
P400        2809711B04   2 PIN HEADER RIGHT ANGLE
```

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```
P401        2880001R03   3 PIN HEADER
P402-406    2880001R02   2 PIN HEADER
P500        3102151C30   3 PIN POWER TERMINAL
P501        2880001R02   2 PIN HEADER
P602        0909908P02   FEMALE SMA CONN
```

INDUCTOR
```
L603        2413926G01   IDCTR 3.3nH
```

TRANSISTORS
```
Q130-133    4809579E18   P-CHAN MOSFET TP0101T
Q200-207    4809579E18   P-CHAN MOSFET TP0101T
Q210-213    4809579E18   P-CHAN MOSFET TP0101T
Q300        4809579E16   N-CHAN MOSFET TN0200T
```

ICs
```
U200        5109781E76   RS232 TRANSCIEVER MAX3238
U205        5109781E76   RS232 TRANSCIEVER MAX3238
U210        5113837A29   TRIPPLE BUFFER NL37WZ16US
U400        5113818A14   DUAL OP AMP MC33202
U500        5104187K10   LINEAR REGULATOR MAX604ESA
U501        5104187K10   LINEAR REGULATOR MAX604ESA
```

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Developers Manual
rev. X1 draft 142
9808901C64
23 February 2003
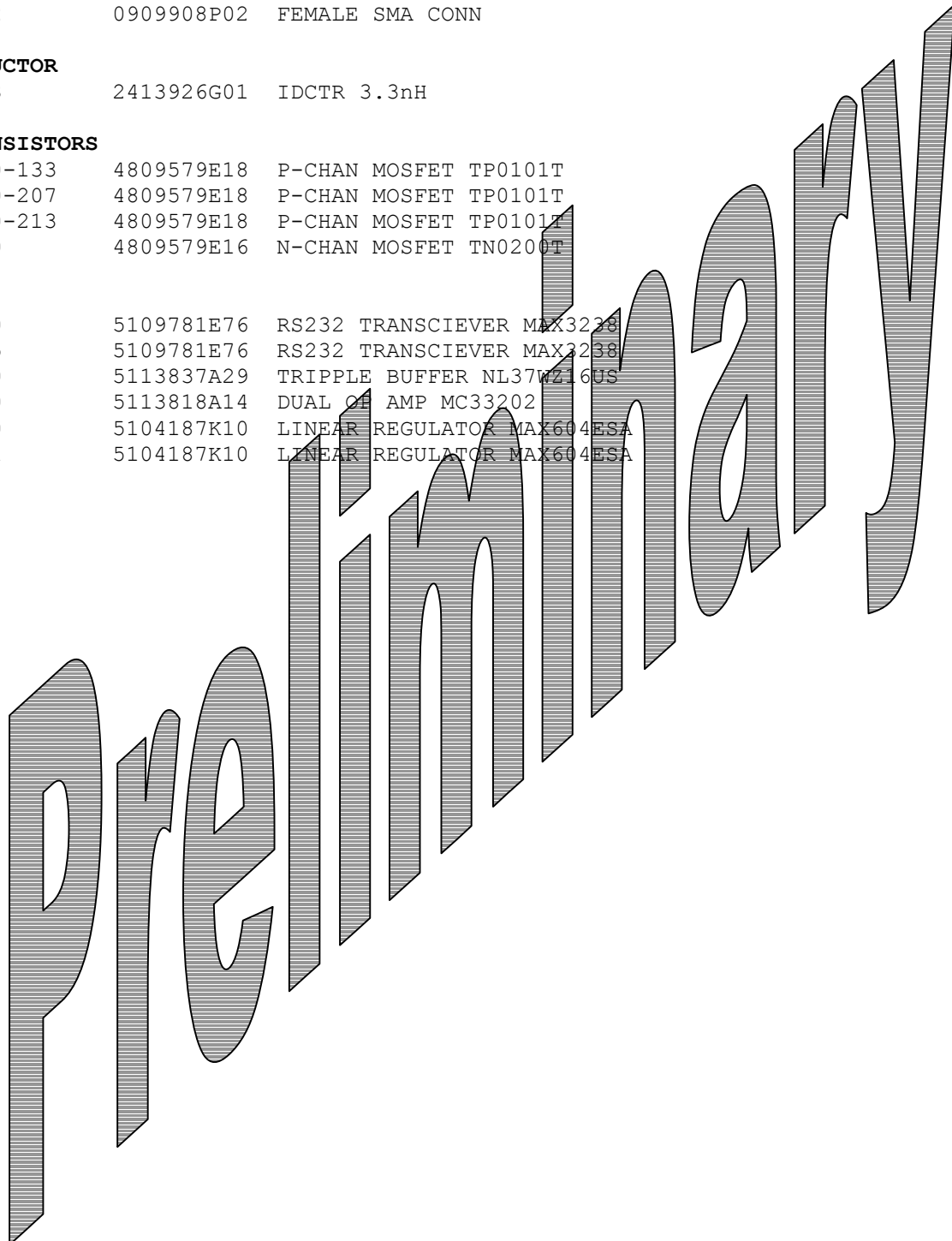
MECHANICAL PARTS
```
M100        4302809C13  SPACER
M101        4302809C13  SPACER
M102        4387646V01  SPACER
M103        4387646V01  SPACER
M104-106    4387647V01  SPACER
M601        3903920K01  ANTENA CONTACT
S101-103    4080564C02  DIP SWITCH
S500        4008241G06  SWITCH ET01
SH1         2604044K01  SHIELD
S_0         4089323U01  SWITCH
S_1         4089323U01  SWITCH
S_2         4089323U01  SWITCH
S_3         4089323U01  SWITCH
S_4         4089323U01  SWITCH
S_5         4089323U01  SWITCH
S_6         4089323U01  SWITCH
S_7         4089323U01  SWITCH
S_8         4089323U01  SWITCH
S_9         4089323U01  SWITCH
S_DOWN      4089323U01  SWITCH
S_END       4089323U01  SWITCH
S_LEFT      4089323U01  SWITCH
S_MENU      4089323U01  SWITCH
S_POUND     4089323U01  SWITCH
S_POWER     4089323U01  SWITCH
S_RIGHT     4089323U01  SWITCH
S_SEND      4089323U01  SWITCH
S_SMART     4089323U01  SWITCH
S_STAR      4089323U01  SWITCH
S_UP        4089323U01  SWITCH
S_VA        4089323U01  SWITCH
S_V_DWN     4089323U01  SWITCH
S_V_UP      4089323U01  SWITCH
F500        0904923K01  FUSE HOLDER
```

Exhibit 8