

Abc

Developers Manual
rev. X1 draft 142
9808901C64
23 February 2003

APPLICANT: MOTOROLA INC.

FCC ID: IHDT56CW1

EXHIBIT 8

c18 DEVELOPERS KIT MANUAL

A preliminary draft copy of the Users Manual follows:

preliminary

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c18 DEVELOPERS KIT MANUAL

preliminary

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.

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 to 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

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

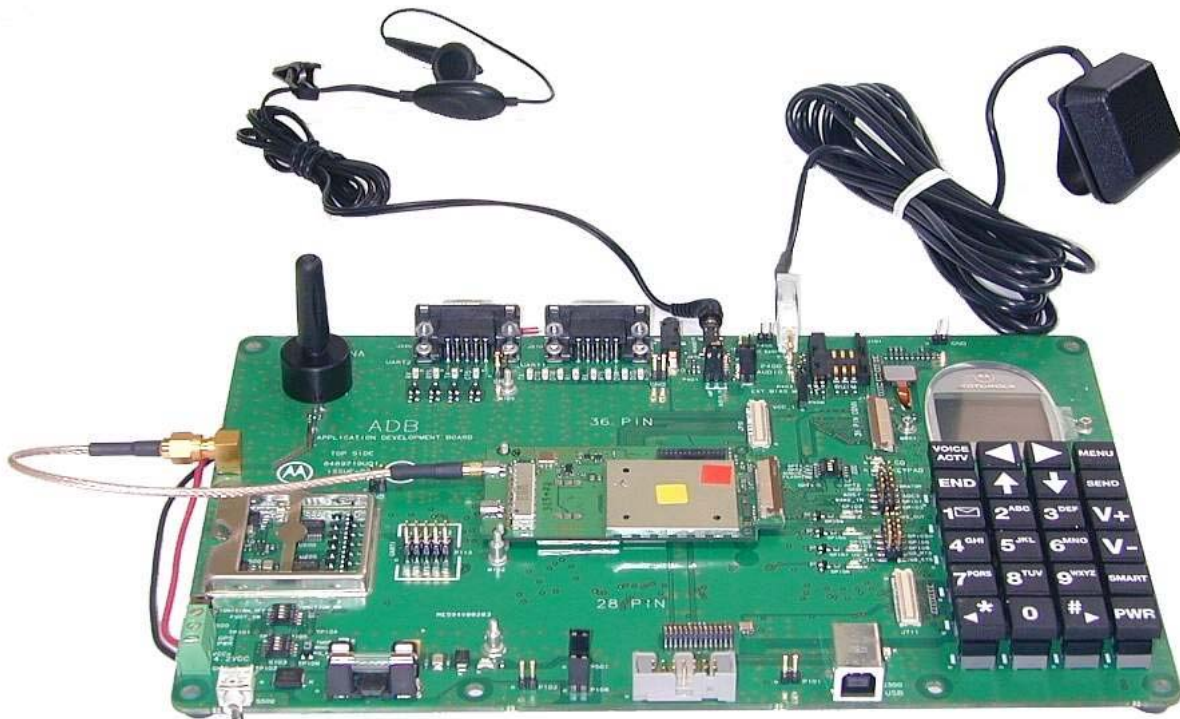
Safety Precautions

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.

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

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

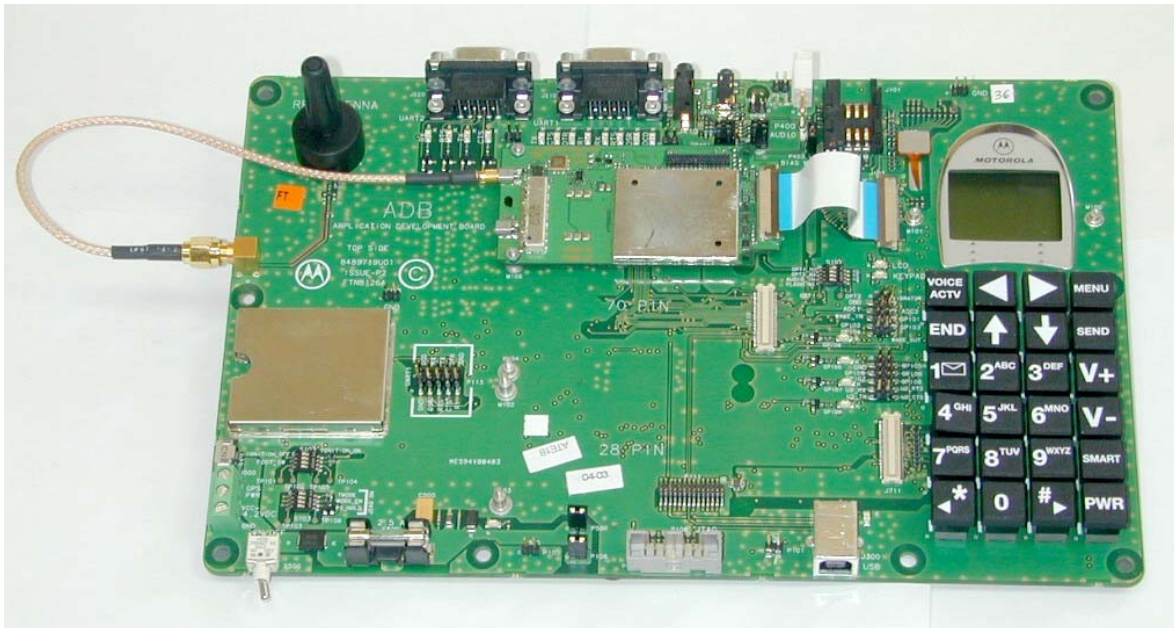
Hardware Setup

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:

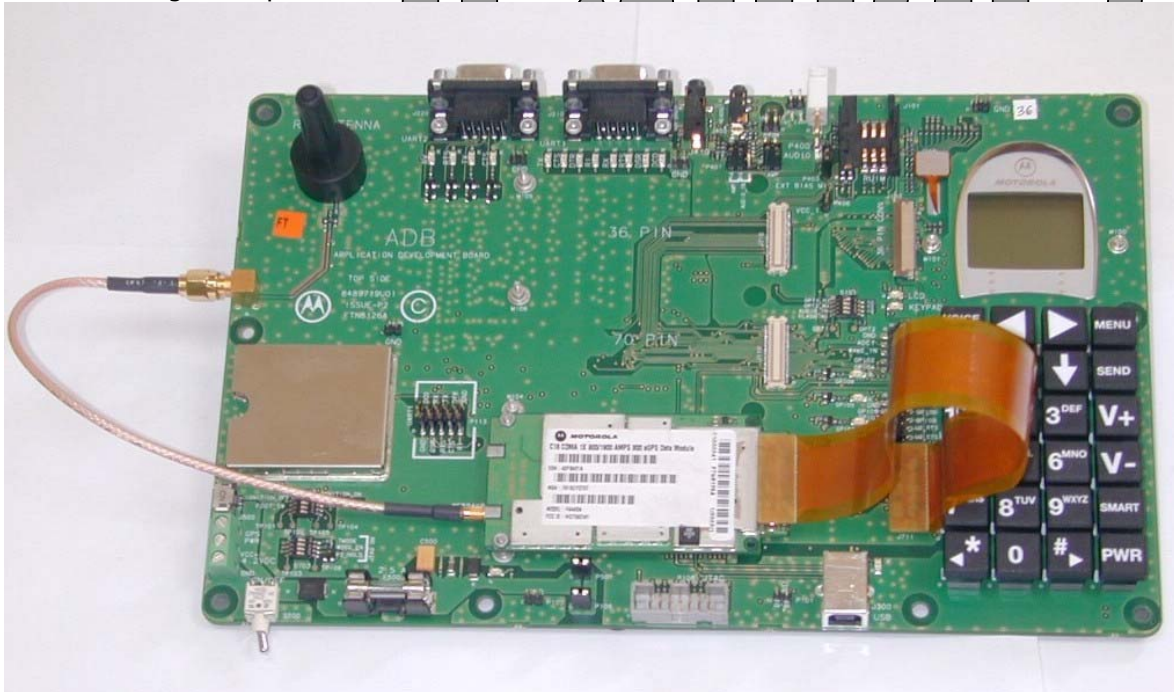
For users using the fully featured 70 pin interface:



For users using the 36 ZIF connector interface:



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.

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.

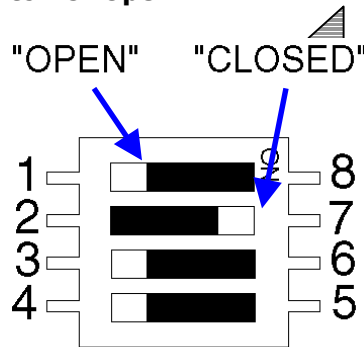
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Configuring Communication Mode

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".



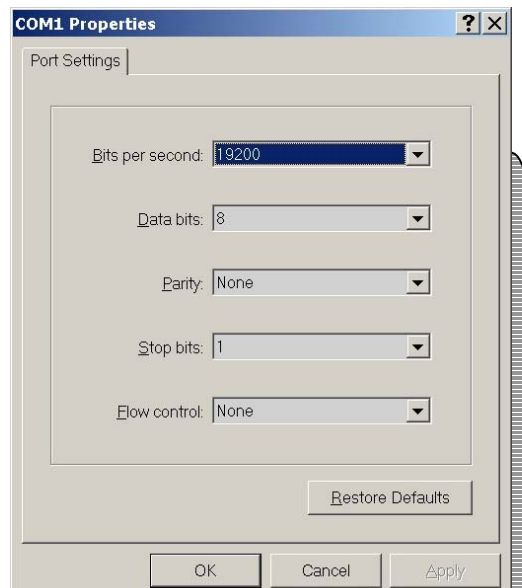
For detailed description of configuration switches setting and available modes, please refer to chapter x.x "CONFIGURATION SWITCHES DESCRIPTION".

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.

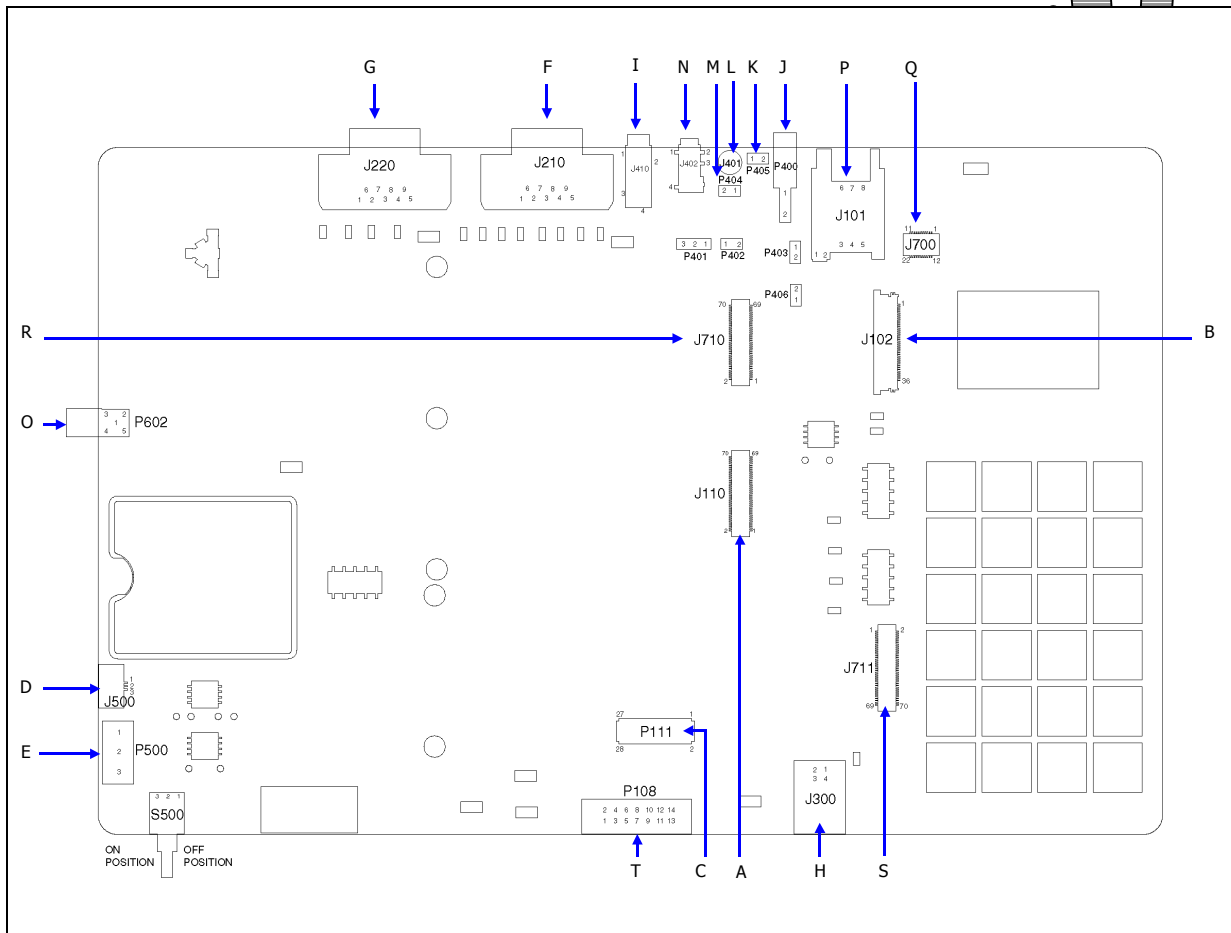


USB Communication: TBD

Developers Board Description

DEVELOPER BOARD CONNECTOR DESCRIPTION

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



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.

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

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:

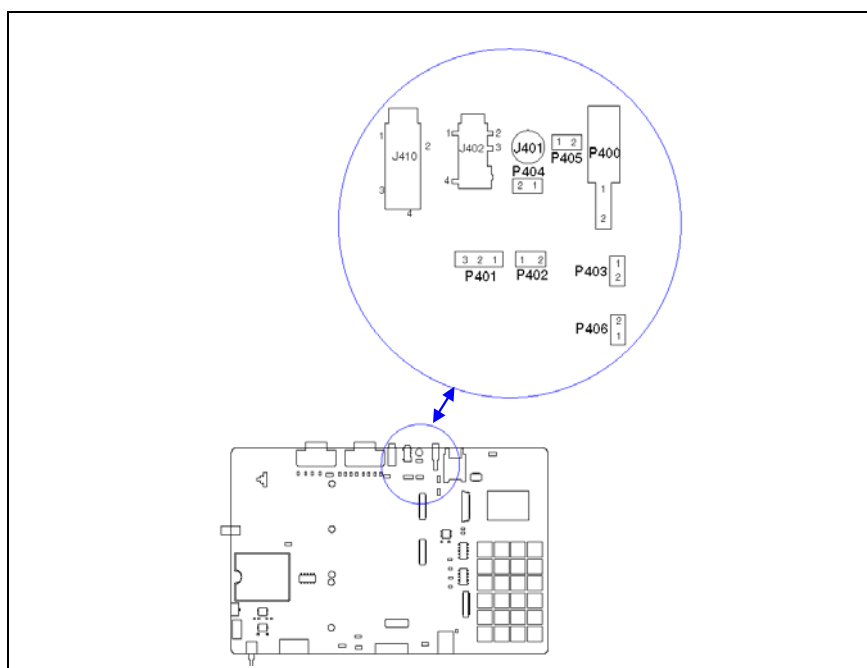
Pin #	Pin Name
1	AGND
2	AUDIO_IN

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.



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+

J402 – Headset interface connector

Pin #	Pin Name
1	AGND
2	HEADSET_INT_N
3	HEADSET_SP
4	HEADSET_MIC
5	PD (2.2k Ω 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.

P108 – JTAG Connector

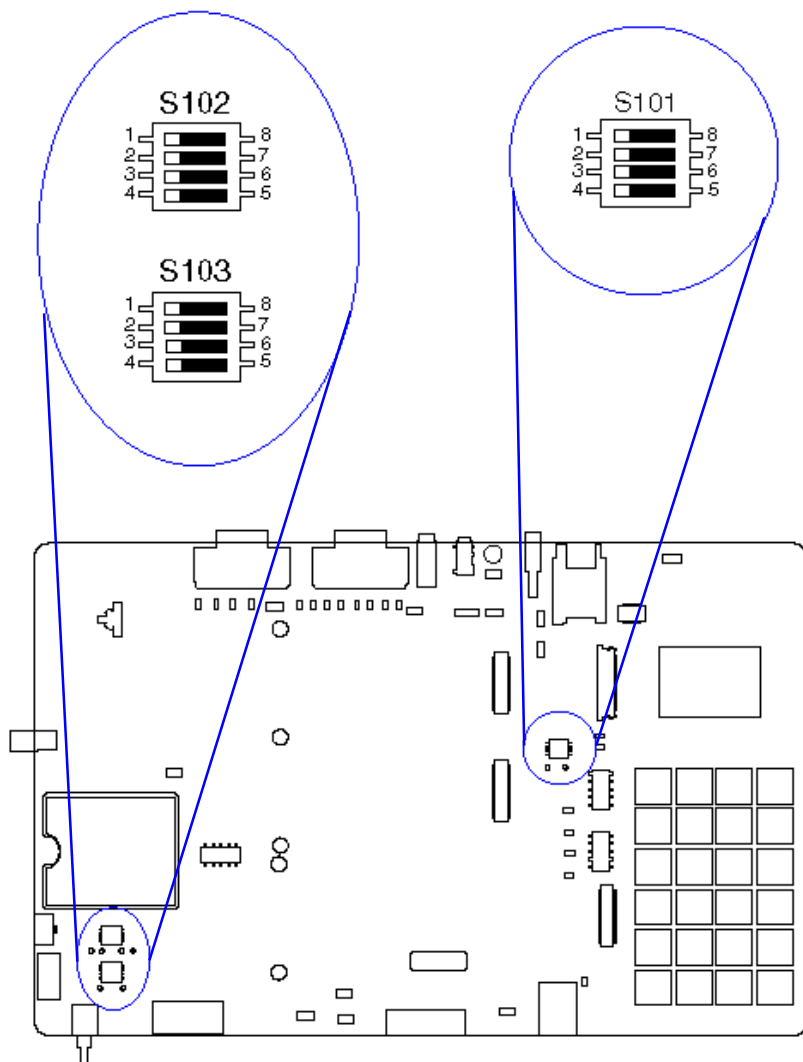
Commercial c18 models do not support JTAG interface! Connector P108 should not be used with commercial c18 modules, as it could alter their proper operation, and possibly cause damage to them.

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

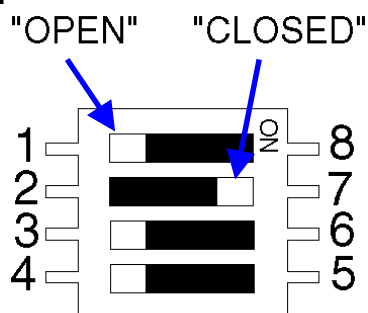
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CONFIGURATION SWITCHES DESCRIPTION

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".



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
OPT1	Closed
OPT2	Opened
AUDIO_IN	Opened
FLASHING	Opened

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

USB Mode:

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

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

USB_VBUS >4.0V

RS232 + USB mode:

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

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

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

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

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

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SERVICE AND SUPPORT

Web Pages: TBD

Customer Assistance

Helpdesk Email: n2cshd@motorola.com
Helpdesk Tel: +972-3-568-4040

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SCHEMATICS, PLACEMENT and PART LIST

Developers Board Schematics

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Developers Board Placement

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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

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	4813833E04	3.0A SCHOTTKY MFRS320
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	0988716K01	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

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
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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 MAX3223E
U205	5109781E76	RS232 TRANSCIEVER MAX3223E
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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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