

JukeBlox Networked Media Module CR Series CR870-2K

Datasheet



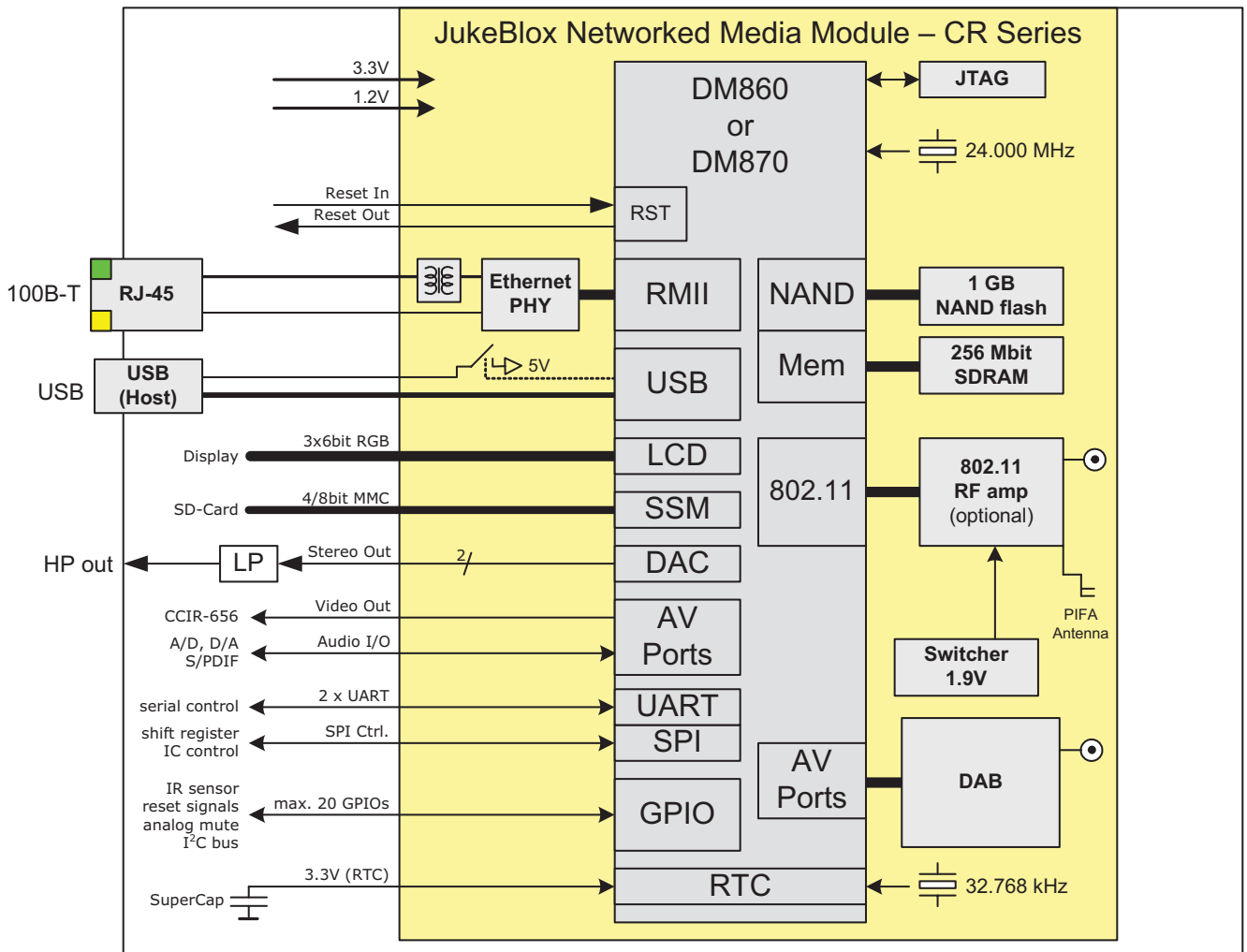
Complete audio networking system on a small module
Integrated Ethernet + USB2.0
WiFi-certified 802.11b/g (optional)
Built-in PIFA antenna
DAB radio receiver (optional)
Glueless audio, video and control ports
FCC certified

CONFIDENTIAL

Introduction

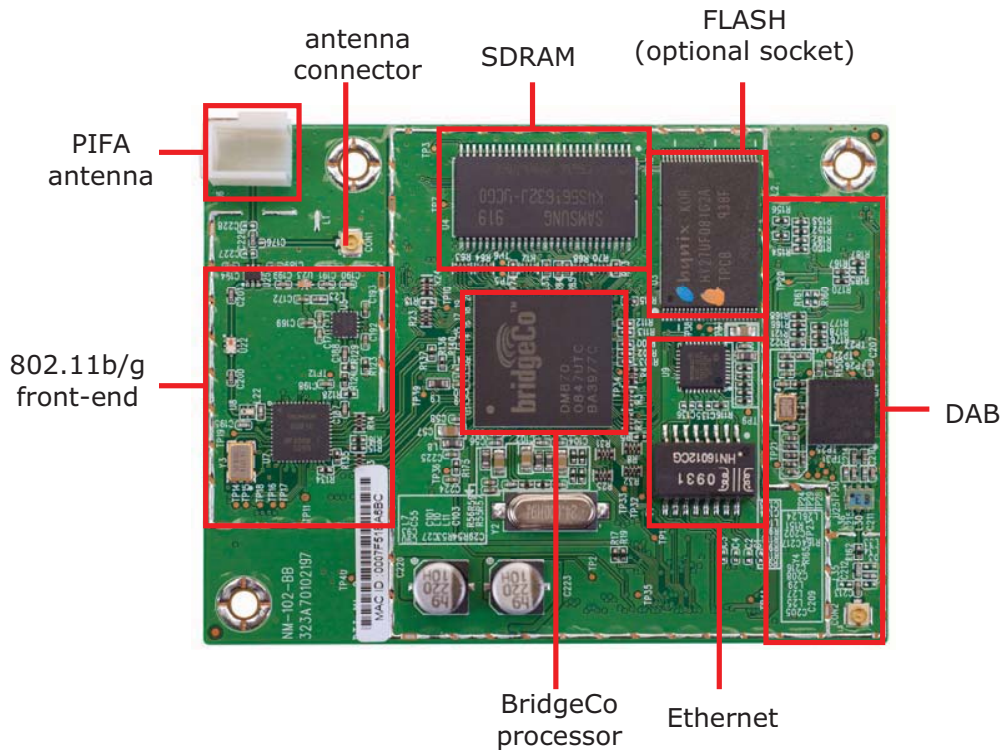
The CR-series module is a single-board networked media player module, based on BridgeCo's DM860 and DM870 media processors, and enables fast product developments with Ethernet, USB and optional WiFi and and/or DAB radio connectivity. The module connects to standard legacy components in various audio, video/LCD and control formats.

Block Diagram

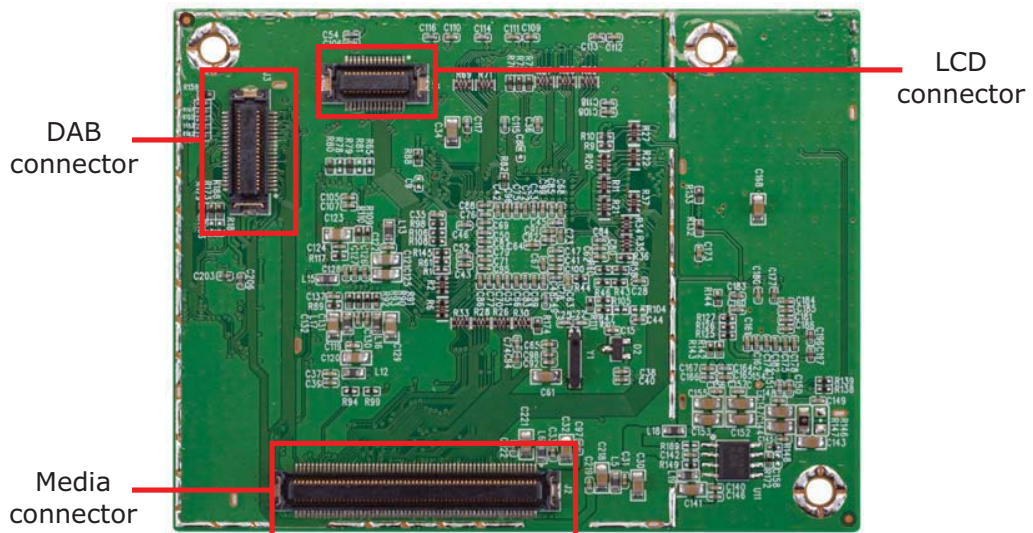


Overview

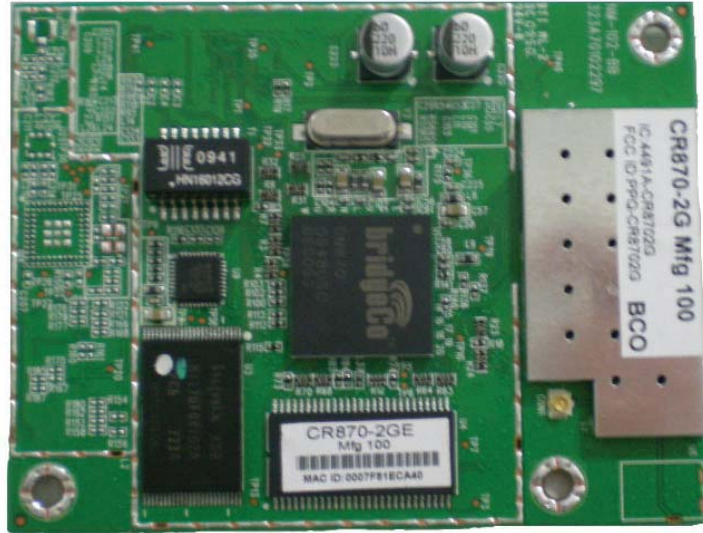
Top View of CR870-2A version



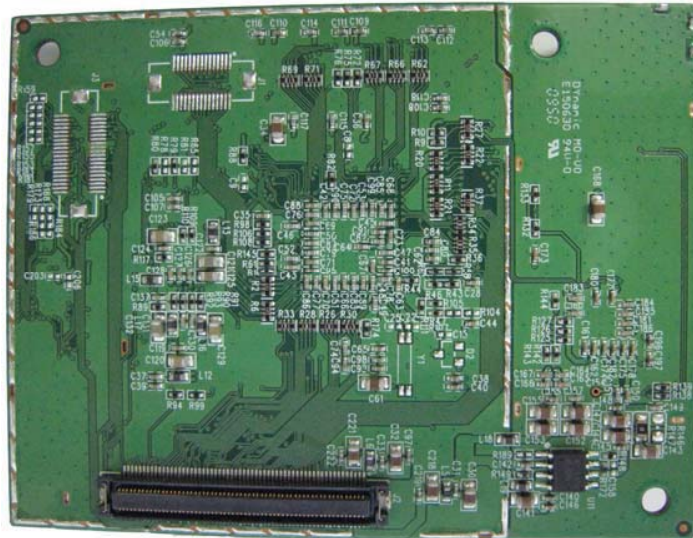
Bottom View of CR870-2A version



Top View of CR870-2G version



Bottom View of CR870-2B, CR870-2C, CR870-2G versions



Please note that production version does not have exposed solder on the underside of the mounting holes.

Ordering Guide

Part Number	BridgeCo ICs	WiFi	Ethernet	USB	Real-Time Clock	DAB / DAB+ / DMB Audio	LCD	PIFA Antenna	Ext. Antenna UFL Conn.	SDRAM	No on-board 1.9V
		Contains shield				Incl. connector	Incl. connector				
CR870-2A	DM870+T6201	X	X	X	X	X	X	X	(X)*	32MB	
CR870-2B	DM870+T6201	X	X	X				X		32MB	
CR870-2C	DM870+T6201	X	X					X		32MB	
CR870-2D	DM870+T6201	X		X	X		X	X		32MB	
CR870-2F	DM870+T6201	X	X	X	X		X	X	(X)*	32MB	
CR870-2G	DM870+T6201	X	X	X					X	32MB	
CR870-2H	DM870+T6201	X	X	X				X	(X)*	16MB	
CR870-2I	DM870+T6201	X		X					X	16MB	
CR870-2J	DM870+T6201	X	X						X	16MB	
CR870-2K	DM870+T6201	X		X				X		16MB	X
CR860-2A	DM860	n/a	X	X				n/a		32MB	
CR860-2B	DM860	n/a	X	X	X		X	n/a		32MB	

* Connector on board, but not enabled

Electrical Specifications

Parameter	State	Model	Component	Voltage	Symbol	min.	typ.	max.	Units
Input Voltage			Main		VIN	+2.97 +1.08	+3.3 +1.2	+3.63 +1.32	V V
			DAB		VIN	+1.62 +2.97 +1.35	+1.8 +3.3 +1.5	+1.98 +3.63 +1.65	V V V
Power Consumption	Reset State	CR870 int 1.9V	Main	3.3V	PIN3.3	-	230	300	mW
				1.2V	PIN1.2	-	45	60	mW
		3.3V		PIN3.3	-	165	215	mW	
		1.2V		PIN1.2	-	45	60	mW	
		1.9V		PIN1.9	-	35	50	mW	
		3.3V		PIN3.3	-	145	190	mW	
	WLAN Operating	CR870 int 1.9V		3.3V	PIN3.3	-	1750	2275	mW
				1.2V	PIN1.2	-	600	800	mW
		3.3V		PIN3.3	-	825	1075	mW	
		1.2V		PIN1.2	-	600	800	mW	
	Operating	CR870 ext 1.9V		1.9V	PIN1.9	-	535	700	mW
				3.3V	PIN3.3	-	760	990	mW
		CR860		1.2V	PIN1.2	-	600	800	mW

Note: The maximum power consumption values are 30% larger than the typical values. The maximum values are intended to be used for power supply sizing calculations.



Absolute Maximum Ratings

Parameter	Component	Min	Max	Units
3.3V Supply Voltage	Main	-0.5	4.6	V
1.2V Supply Voltage		-0.5	1.8	V
Logic Input Voltage		-0.5	6	V
Logic Output Voltage		-0.5	4.6	V

Operating Conditions

Parameter	Min	Max	Units
Operating Temperature	0	+70	°C
Operating Humidity	10	90 (non condensing)	%RH
Storage Temperature	-10	+75	°C
Storage Humidity	10	95 (non condensing)	%RH
Storage Temperature Cycle Test 24 hrs	-10	+75	°C

WiFi Specification (CR870 only)

Feature	Description
WLAN Standards	IEEE 802.11b IEEE 802.11g
Frequency Band	2.412 – 2.472 GHz (2.4GHz ISM Band, 13 Channels) Channel 1 - Channel 13 North America, Japan Telec, Europe ETSI
Modulation	802.11b mode (DS-SS: IEEE 802.11b) 802.11g mode (OFDM: IEEE 802.11g)
Transmission Speed	802.11b mode 11Mbps, 5.5Mbps, 1Mbps 802.11g mode 54Mbps, 48Mbps, 36Mbps, 24Mbps, 18Mbps, 12Mbps, 9Mbps, 6Mbps
Tx Power	802.11b mode (16.5dBm, +/-1dBm) 802.11g mode (21dBm, +/-1dBm)
Power-on Ramp	< 2us
RF Carrier Suppression	< 15dBc
TX EVM	< -5dB @ 6Mbps < -25dB @ 54Mbps
Rx Sensitivity (incl. CE2 Mother board)	802.11b mode =<-88dBm @ 1Mbps, =<-85dBm @ 5.5Mbps, =<-83dBm @ 11Mbps 802.11g mode =<-86dBm @ 6Mbps, =<-75dBm @ 36Mbps, =<-69dBm @ 54Mbps
Throughput Rate (measured for each module)	See factory test specification

Regulatory compliance

Description	Country	Compliance
Electromagnetic Compatibility (Prescan)	USA Europe	FCC CFR47 Part15B EN 55022 EN 55024 EN 61000-3-2 EN 61000-3-3 EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-8 EN 61000-4-11
Radio Regulations (CM870 only)	TBD	TBD

RoHS

Uses only RoHS compliant components

Environmental Test

Withstands 4 hours at 70°C, 90% RH

ESD and Transient Test (Applies to LAN and USB external connections only)

ESD: +/- 2kV operation, +/- 4kV no destruction (part of CE test)

Fast electrical transients: +/- 500V operation, +/- 1000V no destruction (part of CE test)

Magnetic Field Test

Passes EN55022 and EN55024 (part of CE test)

MTBF

>10000 hours

Mechanical Specifications

Passes drop test according to I.E.C. 68-2-32, height 100 cm, 1 corner, 6 faces.

Passes vibration test with sine, vertical, 60 minutes, 600 to 18000 cpm, 1G

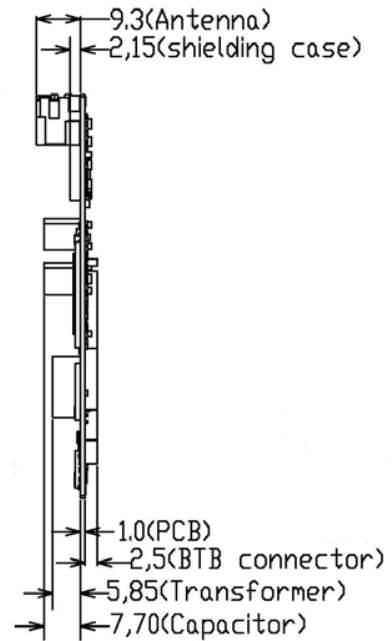
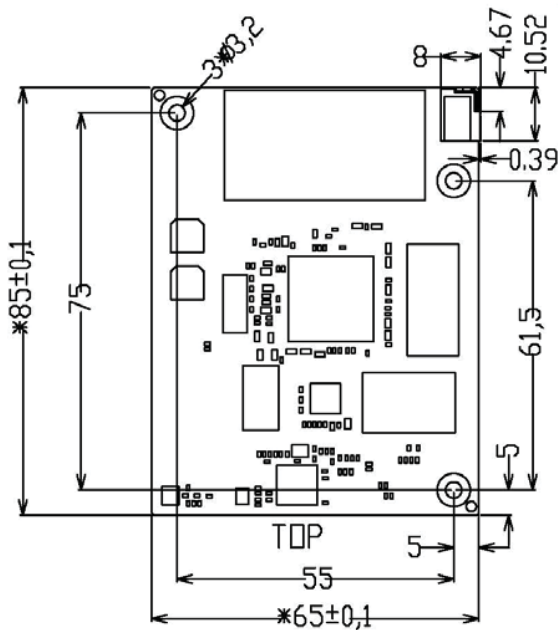
Module Quality

Defect Rate: 7 months <0.5% failures, 14 months <1% failures

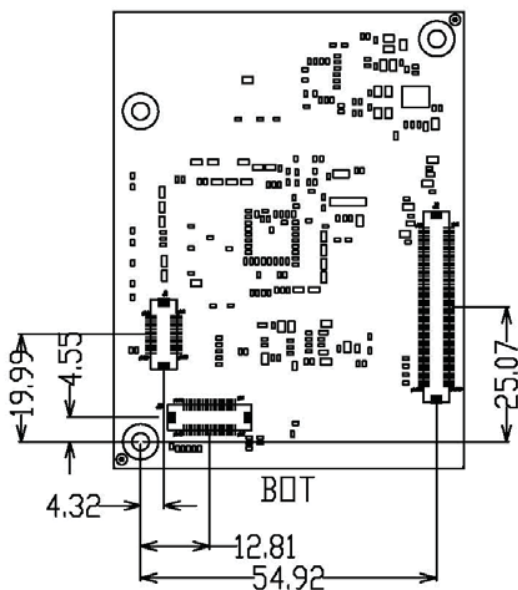
AQL CR=0, MA=0.4, MI=0.4

Board Dimensions

Top View and Side View



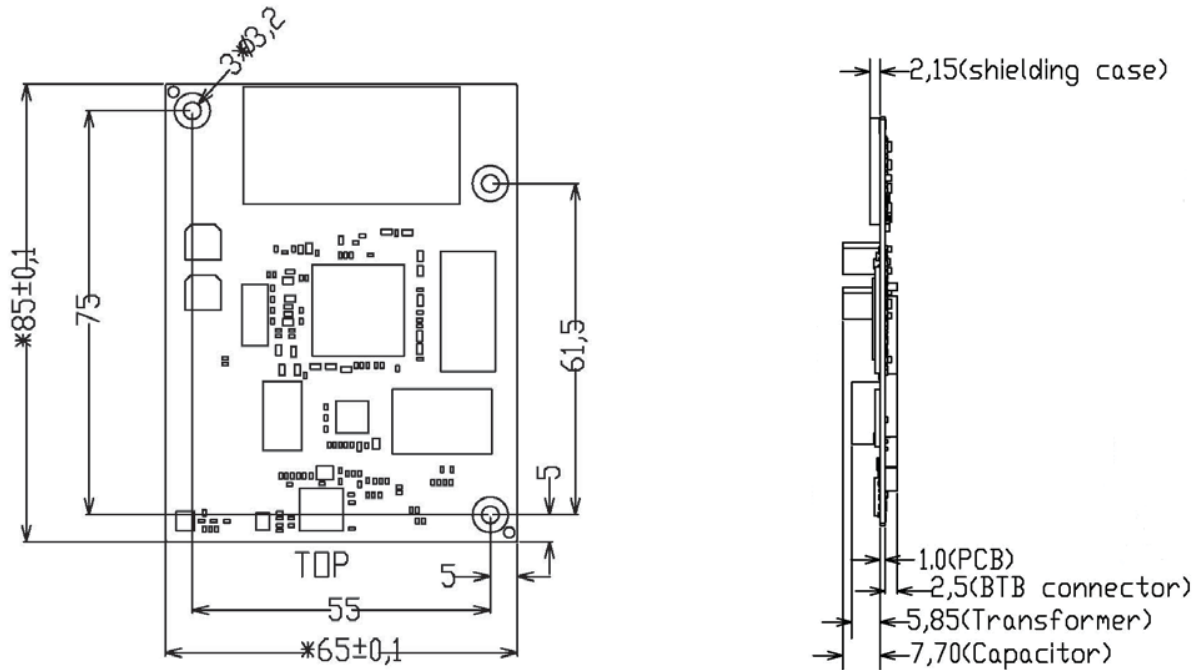
Bottom View (showing connector locations)



Note:

1. All dimensions are measured in **millimetres** (mm).
2. PCB's thickness: 1.00 +/- 0.10mm
3. Tolerance: +/-0.10mm
4. Outline Tolerance: +/-0.10mm
5. NPTH Hole: +/-0.05mm
6. PTH Hole: +/-0.075mm
7. Connector positions, board dimensions, mounting hole positions and sizes are the same for all module variants.

Top and Side View of CR870-2G (no PIFA antenna)



Module weight

CR860: 25g
CR870: 25g

Connectors

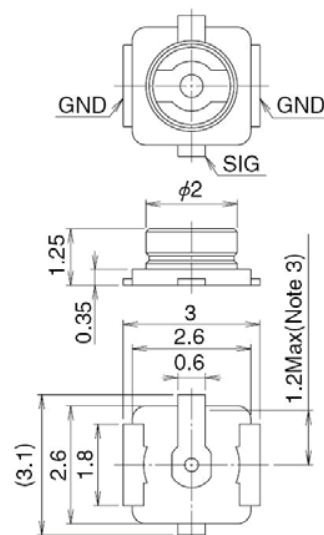
WLAN UFL Antenna Connector (optional)

One coaxial antenna connector is provided as an alternative to the built-in PIFA antenna. The choice between using the PIFA antenna or using the coaxial socket is a build option, determined by the position of a surface mount capacitor on the module PCB. Please see ordering guide for build option details.

The surface-mount receptacle parts:

Hirose
U.FL-R-SMT (CL No. 331-0471-0)

Coaxial antenna connector dimensions



Module Connectors

The CR860/870 module uses 3 female board-to-board connectors as interfaces to the product main board. The connectors needed on the product main board are male type, with the part numbers as shown in the table below.

Connector Number	Connector Purpose	Connector Type	Number of Pins	Pin Configuration	Male Mating Connector Part Numbers
J1	LCD	B2B Connector	30	2 x 15 x 0.5mm	14-5046-030-145-829+ (Kyocera)
J2	Media		120	2 x 60 x 0.5mm	14-5046-120-145-829+ (Kyocera)
J3	DAB		40	2 x 20 x 0.5mm	14-5046-040-145-829+ (Kyocera)



The pinout and signal names are shown on the next page. The following table provides an overview for the most important control and interface signals.

Key Connections

Signal(s)	Connector ID	Pin Number(s)	Description
VIN	J2	3, 4, 5, 6	Input voltage; +3.3V
	J2	9, 10, 11, 12	Input voltage; +1.2V
	J3	4, 6	Input voltage; +1.8V
	J3	10	Input voltage; +3.3V
	J3	12	Input voltage; +1.5V
SPI_DOUT SPI_DIN SPI_CLK SPI_NCS0, 1 SPI_REQ	J2 J2 J2 J2 J2	25 27 29 30, 32 64	SPI bus from DM870's SPI controller. PDSOUT1 signal used as SPI_REQ for eDMP applications
RXD1, TXD1	J2	35, 37	3.3V logic level UART I/Os for the debug UART. Provide external RS-232 transceiver to connect to a PC's COM port.
NRESET_MOD	J2	34	Low-active input to reset the module; internal 10K pull-up
NPD_RF	J2	119	Low-active input to shut down the power for the 802.11 Rf part; internal 10K pull-up
AOUTLP/AOUTLN AOUTRP/AOUTRN	J2 J2	63, 65 60, 58	Differential stereo output from PWM-DAC.
BIST activate	J2	48	Low-active input to invoke the production BIST; DM870-internal pull-up
Factory Reset	J2	68	High-active input to reset the configuration; DM870-internal pull-down
IR input	J2	70	Infrared sensor input. This is a Schmitt-Trigger input and can handle interrupt inputs with slow slopes.
ETH_NRESET	J2	72	Low-active reset for the on-board Ethernet phy. This output is driven by the DM870 and is not suited for other purpose.
SDA, SCL	J2	73, 75	I2C bus created by GPIO-14 and GPIO-13. No internal pull-ups; if I2C is to be used, please add the proper external pull-up resistors.
ETH_LED_ACT ETH_LED_SPEED	J2 J2	100 102	3.3V push-pull outputs (max. ±12mA) to drive the Ethernet LEDs. A low-level indicates 100Mbps mode and activity respectively.



J1 – LCD Connector

Function	GPIO	Signal	IC PIN	Power	PIN Number		Power	IC PIN	Signal	GPIO	Function
				GND	1	2	GND				
LCD Interface		LCDD0	Y7		3	4		W7	LCDD1		LCD Interface
		LCDD2	V7		5	6		Y6	LCDD3		
		LCDD4	W6		7	8		V6	LCDD5		
		LCDD6	U6		9	10		Y5	LCDD7		
		LCDD8	W5		11	12		V5	LCDD9		
		LCDD10	U5		13	14		Y4	LCDD11		
		LCDD12	W4		15	16		V4	LCDD13		
		LCDD14	U4		17	18		Y3	LCDD15		
		LCDD16	W3		19	20		V2	LCDD17		
					GND	21	22	GND			
LCD Interface		LCDCLK	Y9		23	24		W9	LCDCtrl0		LCD Interface
		LCDCtrl1	Y8		25	26		W8	LCDCtrl2		
		LCDCtrl3	V8		27	28	GND				
				GND	29	30	GND				

J3 – DAB Connector

Function	GPIO	Signal	PNM3030E PIN	Power	PIN Number		Power	PNM3030E PIN	Signal	GPIO	Function
				GND	1	2	GND				
		RESETB	30		3	4	VIN (+1.8V)				
		RF_I2C_CK	39		5	6	VIN (+1.8V)				
		I2C_SDA_DAB	3		7	8		40	RF_I2C_DT		
		I2C_SCL_DAB	46		9	10	VIN (+3.3V)				
				GND	11	12	VIN (+1.5V)				
SPI		TEST_1	79		13	14		80	TEST_2		
		DAB_SPI_MOSI	19		15	16		78	TEST_0		
		DAB_SPI_CSB	17		17	18		18	DAB_SPI_CLK		SPI
				19	20		16	DAB_SPI_MISO			
				GND	21	22	GND				
				GND	23	24		14	INT_0		
				GND	25	26		15	INT_1		
		MPEG_ERR	4		27	28		47	MPEG_CLK		
		MPEG_SYNC	5		29	30		48	MPEG_VAL		
		MPEG_DAT7	6		31	32		7	MPEG_DAT6		
		MPEG_DAT5	51		33	34		8	MPEG_DAT4		
		MPEG_DAT3	52		35	36		9	MPEG_DAT2		
		MPEG_DAT1	10		37	38		53	MPEG_DAT0		
				GND	39	40	GND				

Application Notes

There are strict power sequencing and reset timing requirements. Please see DM870 IC data sheet, Sections 3.1 and 3.2, filename: dat_DM870_16_datasheet.pdf, or later version.

Revision Control

Revision	Date / Author	Remarks
V2.14	June 10, 2010 / SHs	<ul style="list-style-type: none"> Updated Frequency Band entry in "WiFi Specification" table
V2.13	June 6, 2010 / SHs	<ul style="list-style-type: none"> Updated "Ordering Guide" table
V2.12	May 27, 2010 / SHs	<ul style="list-style-type: none"> Updated TX EVM entry in "WiFi Specifications" table Updated Power Consumption entries in "Electrical Specifications" table Added Note to "Electrical Specifications" table Removed box from "Bottom View of CR870-2C version" photo Updated "Bottom View of CR870-2C version" title to "Bottom View of CR870-2B, CR870-2C, CR870-2G versions" Added "Top View of CR870-2G version" photo Updated "Top View" title to "Top View of CR870-2A version" Updated "Bottom View" to "Bottom View of CR870-2A version" Updated Notes in Board Dimensions section Added "Top and Side View of CR870-2G" drawings Updated Module Weight titles
V2.11	April 25, 2010 / SHs	<ul style="list-style-type: none"> Updated Power Consumption/WLAN Operating entry in "Electrical Specifications" table
V2.10	April 10, 2010 / SHs	<ul style="list-style-type: none"> Corrected "Module Connectors" section text to say "female board-to-board connectors" Updated Module Connectors table with correct "Male" Mating Connector Part Numbers
V2.9	March 22, 2010 / SHs	<ul style="list-style-type: none"> Renamed "WLAN Antenna Connectors" section to "WLAN UFL Antenna Connector" In the "WLAN Antenna Connectors" table, "receptible" became "receptacle" CR870-2G option and External Antenna UFL connector column added to Ordering Guide Power Consumption values added to Electrical Specifications table Added Absolute Maximum Ratings table Added Application Notes section NREST became NRESET_MOD for Pin 34 in Key Connections table SPI_REQ row added to Key Connections table SPI_REQ added to Function column of Pin 64 in J2-Media Connector table
V2.8	Feb. 24, 2010 / SHs	<ul style="list-style-type: none"> Added "Bottom View of CR870-2C version" image to "Overview" section
V2.7	Feb. 16, 2010 / SHs	<ul style="list-style-type: none"> Updated "Module Connectors" table
V2.6	Feb. 15, 2010 / SHs	<ul style="list-style-type: none"> Updated "Ordering Guide" table
V2.5	Feb. 10, 2010 / SHs	<ul style="list-style-type: none"> Updated "Ordering Guide" table Added new coaxial text in "WLAN Antenna Connectors" section Added manufacturer name to "Module Connectors" table
V2.4	Feb. 08, 2010 / SHs	<ul style="list-style-type: none"> Updated Rx Sensitivity description in "WiFi Specification" table
V2.3	Feb. 03, 2010 / SHs	<ul style="list-style-type: none"> "Key Connectors" table title changed to "Key Connections" Updated entries in "Key Connections" table Updated pins 1, 2, 25, 27, 58 & 60 in "J2 - Media Connector" table

V2.2	Feb. 02, 2010 / SHs	<ul style="list-style-type: none"> Added new items to "WiFi Specification" table Amended Block Diagram to show input of 1.2V instead of 1.8V
V2.1	Jan. 04, 2010 / SHs	<ul style="list-style-type: none"> Updated header layout Removed "CR860/CR870" from data sheet title Left justified Key Features list on front page New Ordering Guide table Updated Module Weights
V2.0	Jan. 02, 2010 / JWs and SHs	<ul style="list-style-type: none"> New header and footer layout Fit front and back Overview images onto one page Bulletise Revision Control table
V1.1	Dec. 18, 2009 / SHs	<ul style="list-style-type: none"> Changed Core Module name to "JukeBlox Networked Media Module(CR Series)" Front page revisions: removed front and back images of board; inserted angled image of board; moved Key Features list to front page Moved Disclaimers page to end of document Replaced previous board images (front and back) in Overview section with better quality images Added box and label to BridgeCo processor in Overview images Revised Ordering Guide Reduced Board Dimension drawings to fit on one page Added mating connector part numbers to Module Connectors section.
V1.0	Dec. 9, 2009 / SHs	Initial version

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Module Revision History

To be determined.

FEDERAL COMMUNICATIONS COMMISSION

INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning

"Industry Canada regulatory information Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. ""The user is cautioned that this device should be used only as specified within this manual to meet RF exposure requirements. Use of this device in a manner inconsistent with this manual could lead to excessive RF exposure conditions."

IMPORTANT NOTE: FCC Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This device is intended only for OEM integrators under the following conditions:

- The antenna must be installed such that 20 cm is maintained between the antenna and users.

Information To Be Supplied to the End User by the OEM or Integrator

The following regulatory and safety notices must be published in documentation supplied to the end user of the product or system incorporating an adapter in compliance with local regulations. Host system

must be labeled with "Contains FCCID:PPQ-CR8702K", FCC ID displayed on label.