



## Release Notes

### RM024 C Library Release Notes for Version 1.0-0

January 2013

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Embedded systems are becoming more powerful and there is a growing need to make these systems portable and wireless. The RM024 Wireless Serial Device is a great solution for ridding your embedded system of wires.

In order to facilitate the integration of the RM024 Wireless Serial Device with an embedded system, a C library was created. This library conveniently defines device commands and automatically handles device responses.

The RM024 C Library was designed to be easy to use.

The library is comprised of five functions. A read and write function for flash memory commands, a read and write function for EEPROM commands, and a function to easily calculate sleep time codes.

#### **TYPEDEF**

BYTE – (unsigned char) Used for all RM024 device communications data.

#### **ENUMERATIONS**

STATE – These values can be used as extra parameters for a command.

TIMEBASE – Used for selecting a time base for the FormatSleepTime() function. Milliseconds, seconds, minutes, or hours.

COMMAND – These are keywords that represent RM024 0xCC commands other than EEPROM commands.

EEPROM – These are keywords that represent RM024 EEPROM 0xCC commands.

ERR – These represent error codes.

#### **FUNCTIONS**

WriteRM024(HANDLE,COMMAND,...) – This function writes a COMMAND to an RM024 device specified by its HANDLE. If the command requires extra arguments a pointer or an array of arguments can be supplied after the COMMAND. This function returns an ERR code.

ReadRM024(BYTE\*,HANDLE,COMMAND, ...) – This function reads the value of COMMAND from a device specified by HANDLE and stores it in the specified BYTE pointer. If the command requires extra arguments a pointer or an array of arguments can be supplied after the COMMAND. This function returns an ERR code.

WriteRM024\_EEPROM(HANDLE,EEPROM,...) – This function writes an EEPROM command to an RM024 device specified by its HANDLE. If the command requires extra arguments a pointer or an array of arguments can be supplied after the COMMAND. This function returns an ERR code.

ReadRM024\_EEPROM(BYTE\*,HANDLE,EEPROM, ...) – This function reads the value of an EEPROM command from a device specified by HANDLE and stores it in the specified BYTE pointer. If the command requires extra arguments a pointer or an array of arguments can be supplied after the COMMAND. This function returns an ERR code.

FormatSleepTime(unsigned int,TIMEBASE, BYTE\*) – This function will format the time given by unsigned int with a particular TIMEBASE and populate the BYTE pointer with the proper arguments for sleeping an RM024 device with the SLEEP\_W\_TIMER command. This function returns an ERR code.

## EXAMPLES

Assumptions: **device** is of type HANDLE that represents an RM024 device on COM3. **errorCode** is of type ERR. **returnValue, parameters** are BYTE pointers with the proper amount of allocated memory.

```
// Enter command mode
errorCode = WriteRM024(device,ENTER_COMMAND_MODE);
    if (errorCode != NO_ERRORS)
        printf("Error CHECK_STATUS_REG Code: %d\n",errorCode);
// Read IRAM at location 0x41
parameters = 0x41;
errorCode = ReadRM024(returnValue,device,READ_IRAM,parameters);
    if (errorCode != NO_ERRORS)
        printf("Error READ_IRAM Code: %d\n",errorCode);
    else
        printf("Read IRAM is %02X\n",*returnValue);
// Set RF mode in EEPROM
errorCode = WriteRM024_EEPROM(device,EEPROM_RF_280_43_FCC);
    if (errorCode != NO_ERRORS)
        printf("Error setting Client RF mode Code: %d\n",errorCode);
    else
        printf("Client RF Mode successful\n");
// Read MAC address from EEPROM
errorCode = ReadRM024_EEPROM(returnValue,device,EEPROM_MAC_ADDRESS);
    if (errorCode != NO_ERRORS)
        printf("Error EEPROM_MAC_ADDRESS Code: %d\n",errorCode);
    else
        printf("Read EEPROM_MAC_ADDRESS\n");

// Get arguments for a 12 second sleep time
errorCode = FormatSleepTime(12,S,parameters);
    if (errorCode != NO_ERRORS)
        printf("Error! Code: %d\n",errorCode);
```

## DETAILED COMMANDS LIST

COMMAND	READ/WRITE	ARG1	ARG2	ARG3	ARG4	ARG5	BYTES RETURNED
ENTER_COMMAND_MODE	w	none					0
EXIT_COMMAND_MODE	w	none					0
ENTER_SLEEP	w	mode [0x02-0x03]	resolution [0x00-0x03]	timer high byte [0x00-0xFF]	timer low byte [0x00-0xFF]		0
SLEEP_W_INTERRUPT	w	none					0
SLEEP_W_TIMER	w	resolution [0x00-0x03]	timer high byte [0x00-0xFF]	timer low byte [0x00-0xFF]			0
SOFT_RESET	w	none					0
RESTORE_RESET	w	none					0
STATUS_REQUEST	r	none					2
CHECK_STATUS_REG	r	none					4
CHECK_FIRMWARE_STATUS	r	none					2
BIN_ANALYZER	w	control [ENABLE/DISABLE]	number of runs (optional) [0x00-0xFF]				0
READ_TEMPERATURE	r	none					1
CHANGE_CHANNEL	w	channel [0x00-0x4E] or [0x00-0x2A]					0
SET_SERVER_CLIENT	w	control [0x02-0x03]					0
SET_TO_CLIENT	w	none					0
SET_TO_SERVER	w	none					0
SET_BROADCAST_MODE	w	control [ENABLE/DISABLE]					0
READ_IRAM	r	location [see manual]					1
WRITE_IRAM	w	location [see manual]	value [0x00-0xFF]				0
IRAM_RANGE_REFRESH	r/w	value (write) [0x00-0xFF]					1
IRAM_RF_CHANNEL	r/w	value (write) [0x00-0xFF]					1
IRAM_INTERFACE_TIMEOUT	r/w	value (write) [0x00-0xFF]					1
IRAM_RF_PACKET_SIZE	r/w	value (write) [0x00-0xFF]					1
IRAM_CTS_ON_HIGH	r/w	value (write) [0x00-0xFF]					1
IRAM_CTS_ON_LOW	r/w	value (write) [0x00-0xFF]					1
IRAM_CTS_OFF_HIGH	r/w	value (write) [0x00-0xFF]					1
IRAM_CTS_OFF_LOW	r/w	value (write) [0x00-0xFF]					1
IRAM_MAX_POWER	r/w	value (write) [0x00-0xFF]					1
IRAM_DEST_ADDR_3	r/w	value (write) [0x00-0xFF]					1
IRAM_DEST_ADDR_2	r/w	value (write) [0x00-0xFF]					1
IRAM_DEST_ADDR_1	r/w	value (write) [0x00-0xFF]					1
IRAM_DEST_ADDR_0	r/w	value (write) [0x00-0xFF]					1
IRAM_SYSTEM_ID	r/w	value (write) [0x00-0xFF]					1
WRITE_DEST_ADDR	w	mac3 [0x00-0xFF]	mac4 [0x00-0xFF]	mac5 [0x00-0xFF]			0
READ_DEST_ADDR	r	none					3
AUTO_DEST_CHANNEL	r/w	control [bits 0,1,4,5]					1
AUTO_CHANNEL	r/w	control (write) [ENABLE/DISABLE]					1
AUTO_DESTINATION	r/w	control (write) [ENABLE/DISABLE]					1
READ_API_CONTROL	r	none					1
WRITE_API_CONTROL	w	control [bits 0-2]					0
API_SEND_DATA_COMPLETE	r/w	control (write) [ENABLE/DISABLE]					1 bit [ON/OFF]
API_TRANSMIT	r/w	control (write) [ENABLE/DISABLE]					1 bit [ON/OFF]
API_RECEIVE	r/w	control (write) [ENABLE/DISABLE]					1 bit [ON/OFF]
READ_ADC	r	none					2
GET_LAST_RSSI	r	none					1
READ_DIGITAL_INPUT	r	none					1
WRITE_DIGITAL_OUT	w	control [bits 0-1]					0
DIGITAL_IO_0	r/w	control (write) [ON/OFF]					1 bit [ON/OFF]
DIGITAL_IO_1	r/w	control (write) [ON/OFF]					1 bit [ON/OFF]
WRITE_PWM	w	ratio [0x00-0xFF]					0
SET_POWER_CONTROL	w	control [0x00-0x04]					0
SET_POWER_FULL	w	none					0
SET_POWER_HALF	w	none					0
SET_POWER_QUARTER	w	none					0
SET_POWER_LOW	w	none					0
ANTENNA_SELECT	w	port select [0x00-0x01]					0
INTEGRATED_ANTENNA	w	none					0
UFL_PORT_ANTENNA	w	none					0
DECRYPT_NEW_IMAGE	w	none					0
ERASE_FLASH	w	none					0
READ_FLASH	r	start high [0x00-0xFF]	start low [0x00-0xFF]	length high [0x00-0xFF]	length low [0x00-0xFF]		length
WRITE_FLASH	w	start high [0x00-0xFF]	start low [0x00-0xFF]	length high [0x00-0xFF]	length low [0x00-0xFF]	data [0x00-0xFF]	0
SET_VENDOR_ID	w	id high [0x00-0xFF]	id low [0x00-0xFF]				0
CHECK_VENDOR_ID	r	none					2

EEPROM	Byte	Access	Start	Length	Data	...	...	Length
EEPROM_BYTE_READ	r	start	[0x00-0xFF]	length	[0x00-0xFF]			length
EEPROM_BYTE_WRITE	w	start	[0x00-0xFF]	length	[0x00-0xFF]	data	[0x00-0xFF]	0
EEPROM_PRODUCT_ID	r	none						35
EEPROM_RANGE_REFRESH	r/w	range (write)	[0x01-0xFF]					1
EEPROM_CHANNEL_NUMBER	r/w	channel (write)	[0x00-0x4E] or [0x00-0x2A]					1
EEPROM_SERVER_CLIENT	r/w	control (write)	[0x01-0x02]					1
EEPROM_SET_SERVER	w	none						0
EEPROM_SET_CLIENT	w	none						0
EEPROM_BAUD_RATE	r/w	baud (write)	[0x00-0x0A,0xE3]					1
EEPROM_CUSTOM_BAUD	w	none						0
EEPROM_BAUD_M	r/w	baud (write)	[0x00-0xFF]					1
EEPROM_BAUD_E	r/w	baud (write)	[0x00-0xFF]					1
EEPROM_CONTROL_0	r/w	bit adjustable (write)						1
EEPROM_SLEEP_INDICATOR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_AUTO_SYSTEM_ID	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_CMDDATA_RCV_DISABLE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_LEGACY_RSSI	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_SNIFF_REPORT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_SNIFF_PERMIT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_TRANSMIT_RETRIES	r/w	retries (write)	[0x00-0xFF]					1
EEPROM_BROADCAST_ATTEMPTS	r/w	attempts (write)	[0x00-0xFF]					1
EEPROM_UTILITY_RETRIES	r/w	retries (write)	[0x00-0xFF]					1
EEPROM_RF_PROFILE	r/w	profile (write)	[0x00-0x03]					1
EEPROM_RF_500_43	w	none						0
EEPROM_RF_280_79_FCC	w	none						0
EEPROM_RF_280_43_FCC	w	none						0
EEPROM_RF_280_43	w	none						0
EEPROM_CONTROL_1	r/w	bit adjustable (write)						1
EEPROM_AUTO_DEST_ON_BEACONS	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_DISABLE_HOP_FRAME	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_AUTO_DESTINATION	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_CLIENT_AUTO_CHANNEL	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_RTS_HANDSHAKING	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_FULL_DUPLEX	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_AUTO_CONFIG	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_CONTROL_2	r/w	bit adjustable (write)						1
EEPROM_DISCARD_FRAMING_ERRORS	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_HOP_PACKET_DELINEATION	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_OVERRIDE_485_TIMING	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_REMOTE_ANALOG_ENABLE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_REMOTE_IO_MODE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_RS485_DATA_ENABLE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_NINE_BIT_MODE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_9600_BOOT_OPTION	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_INTERFACE_TIMEOUT	r/w	timeout (write)	[0x02-0xFF]					1
EEPROM_ANTENNA_OVERRIDE	r/w	control (write)	[ENABLE/DISABLE]					1
EEPROM_RF_PACKET_SIZE	r/w	size (write)	[see manual]					1
EEPROM_CTS_ON	r/w	size high (write)	[0x00-0x1F]	size low (write)	[0x00-0xFF]			2
EEPROM_CTS_OFF	r/w	size high (write)	[0x00-0x01]	size low (write)	[0x00-0xFE]			2
EEPROM_REMOTE_IO_CONTROL	r/w	bit adjustable (write)						1
EEPROM_USE_PAIRS	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_ALL_INPUTS	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_RXD_TXD_PAIR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_RTS_CTS_PAIR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_CMD_DATA_GIO2_PAIR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO7_GIO3_PAIR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO8_GIO1_PAIR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO4_GIO0_PAIR	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_SLEEP_CONTROL	r/w	bit adjustable (write)						1
EEPROM_CYCLIC_SLEEP	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_MAX_POWER	r/w	power (write)	[0x00-0x03]					1
EEPROM_FULL_POWER	w	none						0
EEPROM_HALF_POWER	w	none						0
EEPROM_QUARTER_POWER	w	none						0
EEPROM_LOW_POWER	w	none						0
EEPROM_RSSI_THRESHOLD_HIGH	r/w	threshold (write)	[0x00-0xFF]					1
EEPROM_RSSI_THRESHOLD_LOW	r/w	threshold (write)	[0x00-0xFF]					1
EEPROM_RSSI_LAG	r/w	rate (write)	[0x00-0xFF]					1
EEPROM_RSSI_CONTROL	r/w	bit adjustable (write)						1
EEPROM_PWM_OUTPORT_HIGH	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_PWM_OUTPORT_LOW	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_USE_AVERAGE_RSSI	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_INVERT_REPORT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_UNINTENDED_REPORT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_BROADCAST_REPORT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_ADDRESSED_REPORT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_BEACON_REPORT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_BEACON_SKIP	r/w	hops (write)	[0x00-0xFF]					1
EEPROM_DEST_MAC_ADDRESS	r/w	mac0 (write)	[0x00-0xFF]	mac1 (write)	[0x00-0xFF]	mac2...	...	6
EEPROM_SYSTEM_ID	r/w	id (write)	[0x00-0xFF]					1
EEPROM_MAC_ADDRESS	r/w	mac0 (write)	[0x00-0xFF]	mac1 (write)	[0x00-0xFF]	mac2...	...	6
EEPROM_PART_NUMBERS	r	none						16
EEPROM_USER_MEMORY	r/w	byte0 (write)	[0x00-0xFF]	byte1 (write)	[0x00-0xFF]	byte2...	...	16
EEPROM_API_CONTROL	r/w	bit adjustable (write)						1
EEPROM_BROADCAST_MODE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_INRANGE_HIGH_ON_WAKE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_ANTENNA_SELECT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_DISABLE_STATUS_BIN	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_UNICAST_ONLY	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_API_SEND_DATA_COMPLETE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_API_TRANSMIT	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_API_RECEIVE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_RANDOM_BACKOFF	r/w	range (write)	[0x00-0xFF]					1
EEPROM_PWM_INITIALIZE	r/w	value (write)	[0x00-0xFF]					1
EEPROM_REMOTE_IO_INIT_HIGH	r/w	bit adjustable (write)						1
EEPROM_RXD_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_RTS_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_CMD_DATA_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO7_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO8_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO4_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_REMOTE_IO_INIT_LOW	r/w	bit adjustable (write)						1
EEPROM_TXD_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_CTS_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO2_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO3_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO1_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_GIO0_INITIALIZE	r/w	control (write)	[ENABLE/DISABLE]					1 bit [ON/OFF]
EEPROM_SLEEP_TIME_HIGH	r/w	value (write)	[0x00-0xFF]					1
EEPROM_SLEEP_TIME_LOW	r/w	value (write)	[0x00-0xFF]					1
EEPROM_WAKE_COUNT	r/w	value (write)	[0x00-0xFF]					1
EEPROM_DATE_OF_BIRTH	r	none						4



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