



- ← **Module Model Number:**  
 0x27 = LS27B Dual Channel Receiver.
- ← **Module Address:**  
 0x00 Reserved for RS232.
- ← **Module Message Body Size in Bytes:**  
 0x0000 through 0xFFFF are possibly valid, depending on message.
- ← **Module Message Body Size in Bytes:**  
 The number of bytes in the Message Body. 0x0000 through 0xFFFF are possibly valid, depending on message.
- ← **Module Message Body**  
 Bytes 0 to N.

**LS27B3 Command and Status Messages:**

**Ping Command Content (Message ID = 0x0000)**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x00 or 0x27
1	Device Address								0x00
2	Command Op Code LSB								0x00
3	Command Op Code MSB								0x00
4	Bytes to Follow LSB								0x00
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
(none)									

**Ping Command Response**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x00
3	Command Op Code MSB								0x00
4	Bytes to Follow LSB								0x00
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
(none)									

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**Setup Command Content (Message ID = 0x1000)**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x00
3	Command Op Code MSB								0x10
4	Bytes to Follow LSB								0x08
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	6	-	XDOUT	POLARITY	SNUM			DCx	
1	7	INTREF	-	-	-	ID3	ID2	ID1	ID0
2	8	LIM	AGCZERO	BANDOFFPREF		FRZ	AGCTC		
3	9	-	IFBW		DEEMPHFIL	VFLT			
4	10	AMINV	-	-	AMFIL				
5	11	TUNE1 (Fc mod 1MHz / 10kHz)							
6	12	TUNE2 (Fc mod 256MHz / 1MHz)							
7	13	TUNE3 (Fc / 256MHz)							

**Setup Command Response**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x00
3	Command Op Code MSB								0x10
4	Bytes to Follow LSB								0x00
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
(none)									

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Command Mnemonic	Description/Definition	Logic State/Explanation
DCx	Radio Selection Number	0=Radio 1 or Down Converter 1, 1=Radio 2 or Down Converter 2
ID0-ID3	Motherboard Identification LED Controls	1 = Illuminated, 0 = Extinguished. Only for LS27P3 SCIA Port.
INTREF	Internal/External Reference Clock Selection	0=Select External Reference Clock, 1=Select Internal Reference Clock
XDOU	External Discrete Output (for RF FE Switch)	1 = RF Input A, 0 = RF Input B
POLARITY	FM Demodulator Output Polarity	0=Normal Polarity, 1=Inverse Polarity. Not available in LS27P3 SCIA Port.
LIM	Hardware Limited Mode	0=LIM mode is off, 1=LIM mode is on.
AGCZERO	AGC Zero Mode	0=AGC Zero mode is off, 1=AGC Zero mode is on.
BANDOPREF	Band Of Preference	Selects the band to start looking for the Center Frequency.
FRZ	AGC Freeze	0=Freeze AGC (infinite AGCTC), 1=Use selected AGCTC.
AGCTC	AGC Time Constant Selection	0=0.1 msec, 1=1 msec, 2=10 msec, 3=100 msec, 4=1 sec, 5=CustomTC1, 6=CustomTC2, 7=CustomTC3
IFBW	IFBW Filter Selection	0=Filter 1, 1=Filter 2, 2=Filter 3, 3=Filter 4, 4=Filter 5, 5=Filter 6, 6=Filter 7, 7=Filter 8
VFLT	Video Filter Selection	0=Filter 1, 1=Filter 2, 2=Filter 3, 3=Filter 4, 4=Filter 5, 5=Filter 6, 6=Filter 7, 7=Filter 8. Not available in LS27P3 SCIA Port.
DEEMPHFIL	DeEmphasis Filter Selection	0=Don't use DeEmphasis Filter, 1=Use DeEmphasis Filter. Not available in LS27P3 SCIA Port.
AMINV	AM Inverse	0=AM is normal, 1=AM is inverted.
AMFIL	AM Filter Selection	0=50, 1=100, 2=200, 3=300, 4=400, 5=500, 6=600, 7=700, 8=800, 9=900, 10=1000, 11=1100, 12=1200, 13=1300, 14=1400, 15=1500, 16=1600, 17=1700, 18=1800, 19=1900, 20=2000, 21=3000, 22=4000, 23=5000, 24=6000, 25=7000, 26=8000, 27=9000, 28=10000, 29=15000, 30=20000, 31=50000
TUNE1	Receiver Tune Center Frequency Wd 1	Wd1 Receiver Center Frequency (MHz) (Fc mod 1MHz)/10kHz
TUNE2	Receiver Tune Center Frequency Wd 2	Wd2 Receiver Center Frequency (MHz) (Fc mod 256MHz)/1MHz
TUNE3	Receiver Tune Center Frequency Wd 3	Wd3 Receiver Center Frequency (MHz) Fc/256MHz
SNUM	Setup Number	Save the current setup to one of 16 possible storage locations. Not available in LS27P3 SCIA Port.

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**Mode Command Content (Message ID = 0x1001)**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x01
3	Command Op Code MSB								0x10
4	Bytes to Follow LSB								0x04
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	6	MODE				-	-	DCx	
1	7	CMD1							
2	8	CMD2							
3	9	CMD3							

**Mode Command Response**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x01
3	Command Op Code MSB								0x10
4	Bytes to Follow LSB								0x04
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	6	MODE				-	-	DCx	
1	7	STAT1							
2	8	STAT2							
3	9	STAT3							

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**Mode Commands:**

Mode	Definition	CMD1	CMD2	CMD3
0x01	1 <sup>st</sup> IF Tune Mode	(Unused)	8 LSBs of 1st IF Frequency in MHz	8 MSBs of 1st IF Frequency in MHz
0x02	EEPROM Mode	EEPROM Sub Mode: 000pppppb = PROM Page No. 01aaaaaab = RD Offset Pg Address (LSB is returned on STAT2, MSB is returned on STAT3).	(Unused) (Unused)	(Unused) (Unused)
0x03	Tune Mode	Fc Mod 1MHz/10Khz	Fc MOD 256MHz/1MHz	Fc/256MHz
0x04	DAGC Control Mode	0x00 = LINEAR 0x01 = LIMITED 0x02 = COMBINER (Not implemented) 0x03 = RESERVED (Not implemented)	(Unused)	(Unused)
0x05	Read 1 <sup>st</sup> IF Tune Freq	(Unused)	(Unused)	(Unused)
0x06	Read AM LPF Table	(Unused)	Table Index (0 to 31)	(Unused)
0x07	Read AM Freq Value	(Unused)	(Unused)	(Unused)
0x08	Program Ext Ref Freq	(Unused)	Allowable: 5, 10, 20, 25 MHz	(Unused)
0x09	Read SW2 Mode Cmd	(Unused)	(Unused)	(Unused)
0x0A	Program Custom Time Constants	Custom Time Constant Number (Values between 1 and 3)	8 LSBs of 100uSec TConstant Multiple	8 MSBs of 100uSec TConstant Multiple
0x0B	Select AGC Out Range	(Unused)	0x00 = -4V to 0V, 0x08 = 0V to -4V, 0x01 = -2V to 0V, 0x09 = 0V to -2V, 0x02 = 0V to +2V, 0x0A = 2V to 0V, 0x03 = 0V to +4V, 0x0B = 4V to 0V, 0x04 = -2V to +2V, 0x0C = 2V to -2V, 0x05 = -4V to +4V, 0x0D = 4V to -4V, All others undefined.	(Unused)
0x0D	Program Digipot Mode	Digipot Instruction: 0x01 = Decrement Digipot 0x02 = Increment Digipot 0x03 = Set Digipot to Preset Value 0x04 = Query Digipot Setting 0x05 = Set Digipot to Default Value	Digipot Preset Value: 0-99	Digipot Select: 0x00 = AM Gain
0x0E	Programmable AGC Out dBm Range	Lower dBm value in 2's complement format. Valid range is from -110 to 10. Granularity is 1 dBm.	Upper dBm value in 2's complement format. Valid range is from -110 to 10. Granularity is 1 dBm.	(Unused)
0x0F	Programmable AGC Out Voltage Range	Starting voltage value * 10 in 2's complement format. Valid range is from 40 (4.0 V) to -40 (-4.0 V). Granularity is 0.1 V.	Ending voltage value * 10 in 2's complement format. Valid range is from 40 (4.0 V) to -40 (-4.0 V). Granularity is 0.1 V.	(Unused)
0x10	DAC Adjust Mode	DAC Selection: 0x01 = Video Output Adjust	8 LSBs of DAC Setting	6 MSBs of DAC Setting
0x12	Get Setup Info Mode	0x00 = Get DCxCTRL124 Submode. 0x01 = Get Tune Freq Submode. 0x02 = Get DAGC Values Submode. 0x03 = Get AGC Out dBm Range. 0x04 = Get AGC Out Voltage Range. 0x05 = Get Miscellaneous Values.	(Unused)	(Unused)
0x13	DSP Flash Update Mode	DSP Flash Update SubMode: 0x00 = Append Flash Value 0xFF = Write Stored Values	LSB of Flash Value Word (Unused)	MSB of Flash Value Word (Unused)

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0x14	External Values Mode	External Values Submode: 0x00 = RSSI Correction Submode. 0x01 = Compression Point Submode.	RSSI Correction MSB Compression Point MSB	RSSI Correction LSB Compression Point MSB
0x1F	Serial Channel Control Mode	0x00 = Serial Baudrate Select Submode.	8 LSBits of (BAUD Rate/100).	3 MSBits of (BAUD Rate/100).

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**Mode Command Responses:**

Mode	Functional Mode	STAT1	STAT2	STAT3
0x01	1 <sup>st</sup> IF Tune Mode	(Unused = 0)	8 LSBs of 1 <sup>st</sup> IF Frequency in MHz	8 MSBs of 1 <sup>st</sup> IF Frequency in MHz
0x02	EEPROM Mode: Read	Page Offset	8 LSBs of EEPROM Read Value	8 MSBs of EEPROM Read Value
0x02	EEPROM Mode: Pg Set	Page Number	(Unused = 0)	(Unused = 0)
0x03	Tune Mode	Fc Mod 1MHz/10Khz	Fc MOD 256MHz/1MHz	Fc/256MHz
0x04	DAGC Control Mode	DAGC Control Mode Commanded	(Unused = 0)	(Unused = 0)
0x05	Read 1 <sup>st</sup> IF Tune Freq	(Unused = 0)	8 LSBs of 1 <sup>st</sup> IF Tune Frequency	8 MSBs of 1 <sup>st</sup> IF Tune Frequency
0x06	Read AM LPF Table	Index Value	8 LSBs of AM LPF Fc Frequency	8 MSBs of AM LPF Fc Frequency
0x07	Read AM Freq Counter	8 LSBs of AM Counter Frequency	8 Mid-SBs of AM Counter Frequency	1 MSB of AM Counter Frequency
0x08	Program Ext Ref Freq	(Unused = 0)	Ext Ref Frequency in MHz (5,10,20,25)	(Unused = 0)
0x09	Read SW2	0x00=LS27B3 0x80=LS27P3	LS27B3: SW2 Values (0x00 to 0xFF) LS27P3: SW2 Values (0x00 to 0x0F)	LS27B3: Ext. Disc. Lines (0x00-0x1F) LS27P3: Unused, 0x00
0x0A	Program Custom Time Constants	Custom Time Constant Number (Values between 1 and 3)	8 LSBs of 100 µsec Tconstant Multiple	8 MSBs of 100 µsec Tconstant Multiple
0x0B	Select AGC Output Range	(Unused = 0)	0x00 = -4V to 0V, 0x08 = 0V to -4V, 0x01 = -2V to 0V, 0x09 = 0V to -2V, 0x02 = 0V to +2V, 0x0A = 2V to 0V, 0x03 = 0V to +4V, 0x0B = 4V to 0V, 0x04 = -2V to +2V, 0x0C = 2V to -2V, 0x05 = -4V to +4V, 0x0D = 4V to -4V, All others undefined.	(Unused = 0)
0x0D	Program Digipot Mode		Current Digipot Setting (0 – 99)	
0x0E	Programmable AGC Out dBm Range	Lower dBm value in 2's complement format.	Upper dBm value in 2's complement format.	(Unused = 0)
0x0F	Programmable AGC Out Voltage Range	Starting voltage value * 10 in 2's complement value.	Ending voltage value * 10 in 2's complement format.	(Unused = 0)
0x10	DAC Adjust Mode	DAC Selection Value	8 LSBs of the DAC Setting	6 MSBs of the DAC Setting
0x12	Get Setup Info Submodes: 0x00=Get DCxCTRL124 Submode. 0x01=Get Tune Freq Submode. 0x02=Get DAGC Values Submode. 0x03=Get AGC Out dBm Range. 0x04=Get AGC Out Voltage Range. 0x05=Get Miscellaneous Values. 0x06=Get External RSSI Correction 0x07=Get External Compression Pt.	7   6   5 4  3  2 1  0    LIM AGCZERO - - FRZ - -  -   Fc Mod 1MHz/10Khz DAGC Time Const in µsec LSB Lower dBm value in 2's comp format Start voltage value * 10 in 2's comp   -   -   - -  VFIL  CAL  External RSSI Correction MSB External Compression Point MSB	7 6 5 4  3  2  1   0    -  IFBW DEEMP - BANDOF PREF  Fc MOD 256MHz/1MHz DAGC Time Const in µsec MSB Upper dBm value in 2's comp format End voltage * 10 in 2's comp format Number of RSSI Samples MSB External RSSI Correction LSB External Compression Point LSB	7   6 5 4 3 2 1 0   AMINV - -  AMFLT   Fc/256MHz DAGC Control Mode (Unused = 0) (Unused = 0) Number of RSSI Samples LSB (Unused = 0) (Unused = 0)
0x13	DSP Flash Update Mode	If Submode=0x00, STAT1=0 If Submode=0xFF DSP will reboot.	If Submode=0x00, STAT2=0 If Submode=0xFF DSP will reboot.	If Submode=0x00, STAT3=0 If Submode=0xFF DSP will reboot.
0x14	External Values Mode	(Unused = 0)	(Unused = 0)	(Unused = 0)
0x1F	Serial Channel Control Mode	(Unused = 0)	(Unused = 0)	(Unused = 0)



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**Get Setup Info Mode Table:**

Get DCxCTRL124 Values		7	6	5	4	3	2	1	0	
Submode= 0x00	STAT1	LIM	AGCZERO	-	-	FRZ	-	-		
	STAT2	-	-	IFBW	-	DEEMP	-	BANDOFFPREF		
	STAT3	AMINV	-	-	-	-	AMFIL	-		
Get Tune Frequency		7	6	5	4	3	2	1	0	
Submode= 0x01	STAT1	Fc MOD 1MHz/10KHz								
	STAT2	Fc MOD 256MHz/1MHz								
	STAT3	Fc / 256MHz								
Get DAGC Values		7	6	5	4	3	2	1	0	
Submode= 0x02	STAT1	AGCTC LSB								
	STAT2	AGCTC MSB								
	STAT3								DAGC CTRL MODE	
Get AGC Out dBm Range		7	6	5	4	3	2	1	0	
Submode= 0x03	STAT1	Lower dBm Value								
	STAT2	Upper dBm Value								
	STAT3	-								
Get AGC Out Voltage Range		7	6	5	4	3	2	1	0	
Submode= 0x04	STAT1	Lower Voltage Value (x10)								
	STAT2	Upper Voltage Value (x10)								
	STAT3	-								
Get Miscellaneous Values		7	6	5	4	3	2	1	0	
Submode= 0x05	STAT1							VFIL		DAGC Cal Mode
	STAT2	-								
	STAT3	-								
Get External RSSI Correction		7	6	5	4	3	2	1	0	
Submode= 0x06	STAT1	External RSSI Correction MSB								
	STAT2	External RSSI Correction LSB								
	STAT3	-								
Get Ext. Compression Point		7	6	5	4	3	2	1	0	
Submode= 0x07	STAT1	External Compression Point MSB								
	STAT2	External Compression Point LSB								
	STAT3	-								

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**Append Flash File Section Command Content (Message ID = 0x1020)**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:	
0	Device ID								0x27	
1	Device Address								0x00	
2	Command Op Code LSB								0x20	
3	Command Op Code MSB								0x10	
4	Bytes to Follow LSB								0x02-0x80	
5	Bytes to Follow MSB									
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:	
0	6	Flash File Section Byte 0								
1	7	Flash File Section Byte 1								
2	8	Flash File Section Byte 2								
3	9	Flash File Section Byte 3								
4	10	Flash File Section Byte 4								
5	11	Flash File Section Byte 5								
6..121	12..127	Flash File Section Bytes 6..121								
122	128	Flash File Section Byte 122								
123	129	Flash File Section Byte 123								
124	130	Flash File Section Byte 124								
125	131	Flash File Section Byte 125								
126	132	Flash File Section Byte 126								
127	133	Flash File Section Byte 127								

Note: The length of a Flash File Section may be from 2 to 128 bytes long, and is always even. This length is placed into the Bytes to Follow LSB and MSB locations in the Header.

**Append Flash File Section Command Response**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x20
3	Command Op Code MSB								0x10
4	Bytes to Follow LSB								0x00
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
(none)									

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**General Status Command Content (Message ID = 0x2000)**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x00
3	Command Op Code MSB								0x20
4	Bytes to Follow LSB								0x00
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
(none)									

**General Status Command Response**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:		
0	Device ID								0x27		
1	Device Address								0x00		
2	Command Op Code LSB								0x00		
3	Command Op Code MSB								0x20		
4	Bytes to Follow LSB								0x09		
5	Bytes to Follow MSB								0x00		
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:		
0	6	REFSTATE	PLLSYNC	-	-	ID3	ID2	ID1	ID0		
1	7	DC1RSSILO									
2	8	DC1COMPWARN	DC1ZEROSTAT	DC1LO2STAT	DC1LO1STAT	DC1RSSIHI					
3	9	DC1XDIN					DC1AMINDX				
4	10	-					DC1FMDEV				
5	11	DC2RSSILO									
6	12	DC2COMPWARN	DC2ZEROSTAT	DC2LO2STAT	DC2LO1STAT	DC2RSSIHI					
7	13	DC2XDIN					DC2AMINDX				
8	14	-					DC2FMDEV				

Response Mnemonic	Description/Definition	Logic State/Explanation
REFSTATE	Present state of the Internal/External Reference Select	1 = Internal Reference Selected, 0 = External Reference Selected
PLLSYNC	Internal Synthesizer Reference Synchronization Status	1 = PLL Synchronized, 0 = PLL Unsynchronized
ID0-ID3	Motherboard Identification LED Status	1 = Illuminated, 0 = Extinguished. Only for LS27P3 SCIA Port.
DCxRSSILO	DCx Received Signal Strength (8 LSBs)	Lower 8 bits of RSSI level
DCxRSSIHI	DCx Received Signal Strength (4 MSBs)	Upper 4 bits of RSSI level
DCxCOMPWARN	DCx Compression Warning	0 = Not in compression, 1 = May be in compression.
DCxAMINDX	DCx Measured AM Index	AM Index Measurement (Range 0-127)
DCxLO1STAT	DCx LO1 Status	1 = Locked, 0 = Unlocked
DcxLO2STAT	DCx LO2 Status	1 = Locked, 0 = Unlocked
DCxXDIN	DCx External Discrete Input (PIN4)	1 = Logic High State, 0 = Logic Low State
DCxFMDEV	DCx FM Deviation in Percent	Valid range is from 0% - 127%.
DCxZEROSTAT	DCx AGC Zero State	1=In AGC Zero Mode, 0=Not in AGC Zero Mode.

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**EEPROM Page Status Command Content (Message ID = 0x2009)**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x09
3	Command Op Code MSB								0x20
4	Bytes to Follow LSB								0x02
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	6	-	-	-	-	-	-	DCx	
1	7	-	-	-	PAGE				

**EEPROM Page Status Command Response**

Header Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	Device ID								0x27
1	Device Address								0x00
2	Command Op Code LSB								0x09
3	Command Op Code MSB								0x20
4	Bytes to Follow LSB								0x80
5	Bytes to Follow MSB								0x00
Body Byte	D7	D6	D5	D4	D3	D2	D1	D0	Notes:
0	6	LOC0_LSB							
1	7	LOC0_MSB							
2-125	8-131	...							
126	132	LOC63_LSB							
127	133	LOC63_MSB							

Command Mnemonic	Description/Definition	Logic State/Explanation
DCx	Radio Selection Number	0=Radio 1 or Down Converter 1, 1=Radio 2 or Down Converter 2
PAGE	EEPROM Page Number Selection	0 – 31 are valid page numbers.