6.2.4 Register 3: Reference Control and Linearization Register (Read/Write, Address Pointer = 00011)

Bit #	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Bit Name	RFB	RFB	RFB	RFB	EXS	EXEN	RS	REN	LD7	LD6	LD5	LD4	LD3	LD2	LD1	LD0
POR Value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Bit Descriptions:

RFB: **Reserved Factory Bit: Set to zero for proper operation**

EXS: **Linearization Adjust and Excitation Voltage (V_{EXC}) Gain Select (Range1 or Range2)**
0 = Range 1 ($-0.166V_{FB}$ < Linearization DAC Range < $+0.166V_{FB}$, V_{EXC} Gain = $0.83V_{REF}$)
1 = Range 2 ($-0.124V_{FB}$ < Linearization DAC Range < $+0.124V_{FB}$, V_{EXC} Gain = $0.52V_{REF}$)

EXEN: **V_{EXC} Enable**
1 = Enable V_{EXC}
0 = Disable V_{EXC}

RS: **Internal V_{REF} Select (2.5V or 4.096V)**
0 = 4.096V
1 = 2.5V

REN: **Enable/Disable Internal V_{REF} (disable for external V_{REF}—connect external V_{REF} to REF_{IN}/REF_{OUT} pin)**
0 = External Reference (disable internal reference)
1 = Internal Reference (enable internal reference)

LD[7:0]: Linearization DAC setting, 7-bit + sign

Table 6−6. Linearization DAC—Data Format Example
(Range 1: −0.166V_{FB} < Linearization DAC Range < +0.166V_{FB})

Digital Input (Hex)	Digital Input LD7……LD0	Linearization Adjust
FF	1111 1111	$-0.166\ V_{FB}$
E0	1110 0000	$-0.12548\ V_{FB}$
C0	1100 0000	$-0.08365\ V_{FB}$
A0	1010 0000	$-0.04183\ V_{FB}$
81	1000 0001	$-0.00131\ V_{FB}$
80	1000 0000	$0\ V_{FB}$
00	0000 0000	$0\ V_{FB}$
01	0000 0001	$+0.00131\ V_{FB}$
20	0010 0000	$+0.04183\ V_{FB}$
40	0100 0000	$+0.08365\ V_{FB}$
60	0110 0000	$+0.12548\ V_{FB}$
7F	0111 1111	$+0.166\ V_{FB}$

Linearization DAC Equation:
Decimal # Counts = |Desired V_{FB} Ratio| / (Full-Scale Ratio/127)

Linearization DAC Example:
Given: (Range 1: −0.166V_{FB} < Linearization DAC Range < +0.166V_{FB})
Want: V_{FB} Ratio = −0.082
Decimal # Counts = 0.082/(0.166/127) = 62.7349
Use 63 counts → 0x3F → 0011 1111
Add a '1' in the Sign Bit (MSB, bit 7) to denote the negative ratio:
Final Linearization DAC Setting: 1011 1111 → BFh