July 22, 2011
Asahi Kasei Microdevices Corporation
Marketing & Sales Center
Data Converters

AK4678 Register Setting

1. Handset Call (MIC/Receiver)
   1-1. Phone Call
   1-2. Phone Call & Recording
   1-3. Automatic Response
   1-4. Voice Message

2. Handsfree Call (MIC/Speaker)
   2-1. Phone Call
   2-2. Phone Call & Recording

3. Headset Call (MIC/Headphone)
   3-1. Phone Call
   3-2. Phone Call & Recording

4. Bluetooth Headset Call (PORTA/PORTB)
   4-1. Phone Call
   4-2. Phone Call & Recording

5. Music Playback
   5-1. Headphone
   5-2. Speaker
   5-3. Bluetooth

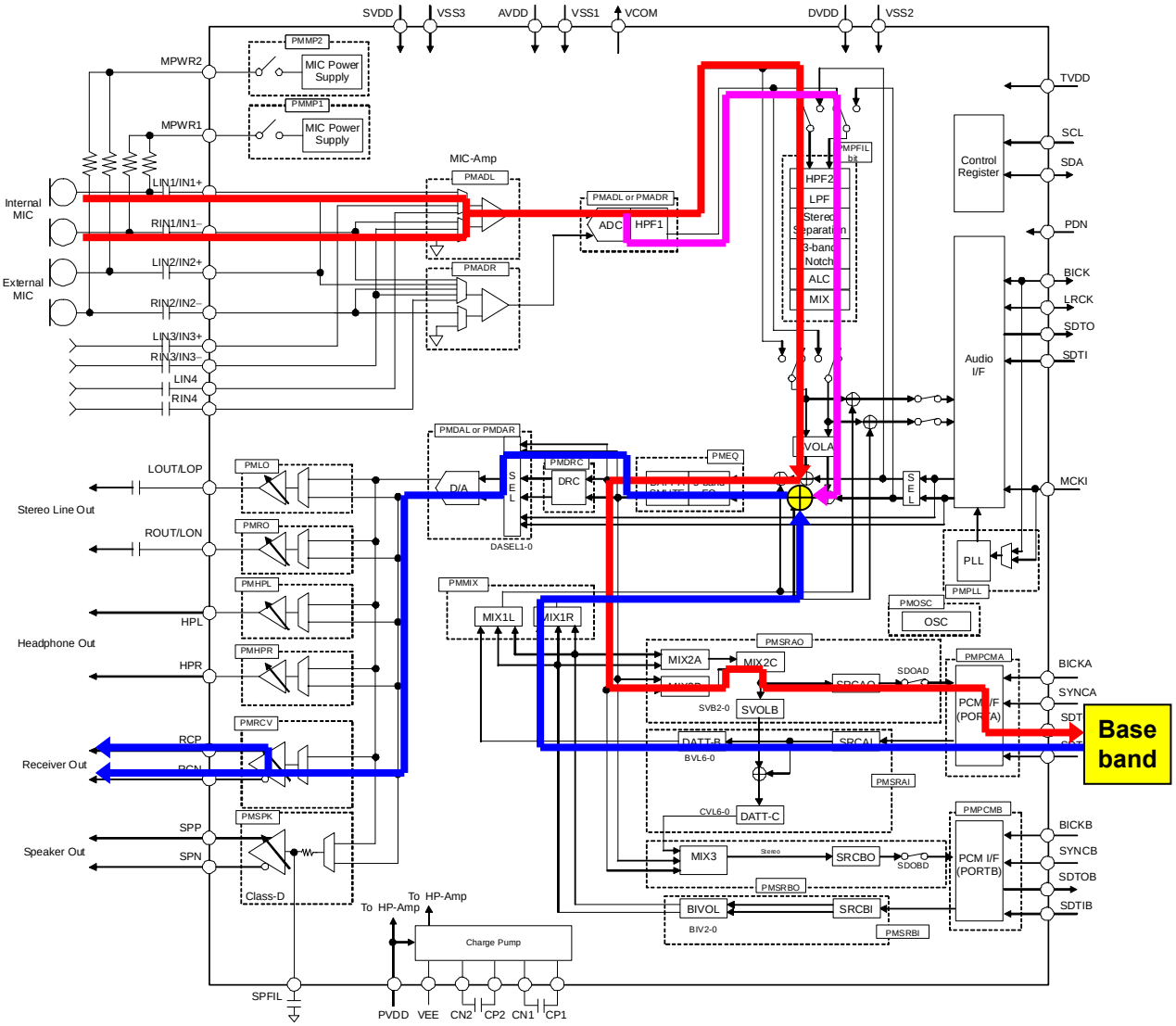
6. FM Radio Playback & Recording
   6-1. Headphone
   6-2. Speaker
   6-3. Bluetooth

[Common Condition]

- Mono Full-differential Handset MIC: MIC Power1 ON (2.5V), Gain=+18dB
- Mono Pseudo Full-differential Headset MIC: MIC Power2 ON (2.5V), Gain=+18dB
- LIN4/RIN4: MIC Gain=0dB
- Receiver: Gain=0dB
- Stereo Headphone: Gain=–20dB
- Speaker: Gain=–6dB
- CODEC: PLL Master Mode (MCKI=19.2MHz, BICK=64fs), fs=48kHz, I^2S
- PCM I/F A: I^2S, Linear, fs2=8kHz
- PCM I/F B: I^2S, Linear, Stereo, fs3=16kHz
- Side Tone Volume: –12dB

1. Handset Call (Mono Differential MIC/Receiver)

1-1. Phone Call



TX: IN+/–(Mono) → ADC → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR → DATT-A(Rch) → DAC(Rch) → Receiver
Side tone: IN+/–(Mono) → ADC → Notch → ALC → SVOLA(Rch) → SRMXR → DATT-A(Rch) → DAC(Rch) → Receiver

<Sequence>

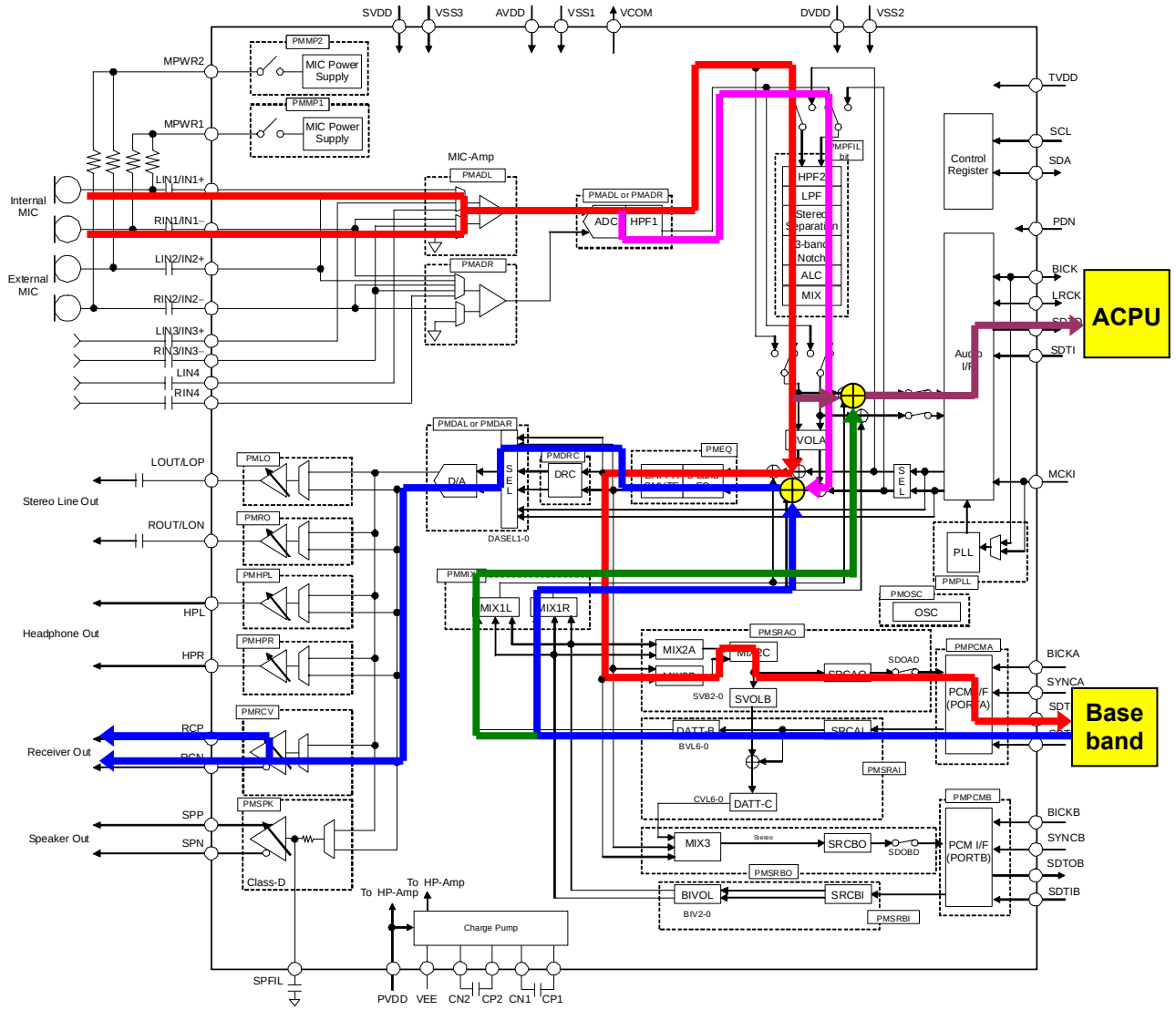
1. Power Supply
2. Wait 1μs
3. PDN pin: "L" → "H"
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. MCKI Clock Input
8. Address=00H, Data=01H (VCOM & PLL Power-up)
9. Wait 11ms (VCOM power-Up + PLL Lock Time)
10. Address=06H, Data=14H (MIC-Amp Lch IN1+/-)
11. Address=07H, Data=BBH (MGAIN = +18dB)
12. Address=14H, Data=85H (PFMXL/R1-0 bits="01", SRMXL1-0 bits="00", SRMXR1-0 bits="10")
13. Address=19H, Data=12H (PFSEL bit = "0", PFSDO bit = "1", DASEL1-0 bits = "00")
14. Address=1CH, Data=20H (SVAL2-0 bits = "000"(0dB), SVAR2-0 bits = "010"(-12dB))
15. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
16. Address=25H, Data=00H (MX1R2-0 bits = "000")
17. Address=26H, Data=10H (MX2B1-0 bits = "00", MX2C1-0 bits = "01")
18. Address=09H, Data=20H (DACRR bit = "1")
19. Address=10H, Data=BBH (RCVG = 0dB)

(If needed, programmable filter (ALC, IVOL/R, HPF, EQ and etc) and 5-band equalyzer are set up.)

20. SYNCA/BICKA clock input
21. Address=02H, Data=01H (MIC Power 1 on)
22. Address=00H, Data=13H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Up)
23. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
24. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
25. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(19.5ms=156/fs2@fs2=8kHz))
26. Phone Call
27. Address=0DH, Data=02H (RCVPS bit = "1")
28. Address=0DH, Data=03H (Receiver Power-Up)
29. Wait 1ms
30. Address=0DH, Data=01H (RCVPS bit = "0"; Release Power-save)
31. Playback from Receiver

32. Address=0DH, Data=03H (RCVPS bit = "1"; Receiver Power-save)
33. Address=0DH, Data=00H (Receiver Power-Down & Release Power-save)
34. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
35. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
36. Address=00H, Data=01H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Down)
37. Address=02H, Data=00H (MIC Power 1 off)
38. Address=04H, Data=22H (PLL Power-Down)
39. Address=00H, Data=00H (VCOM Power-Down)
40. PDN pin: "H" → "L"
41. Clock Stop
42. Stop Power Supply

1-2. Phone Call & Recording



TX: IN+/–(Mono) → ADC → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
TX Recording: IN+/–(Mono) → ADC → Notch → ALC → SDOL → SDTO
Side tone: IN+/–(Mono) → ADC → Notch → ALC → SVOLA(Rch) → SRMXR → DATT-A(Rch) → DAC(Rch) → Receiver
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR →DATT-A(Rch) → DAC(Rch) → Receiver
RX Recording: SDTIA → SRCAI → DATT-B → MIX1L → SDOL → SDTO

<Sequence>

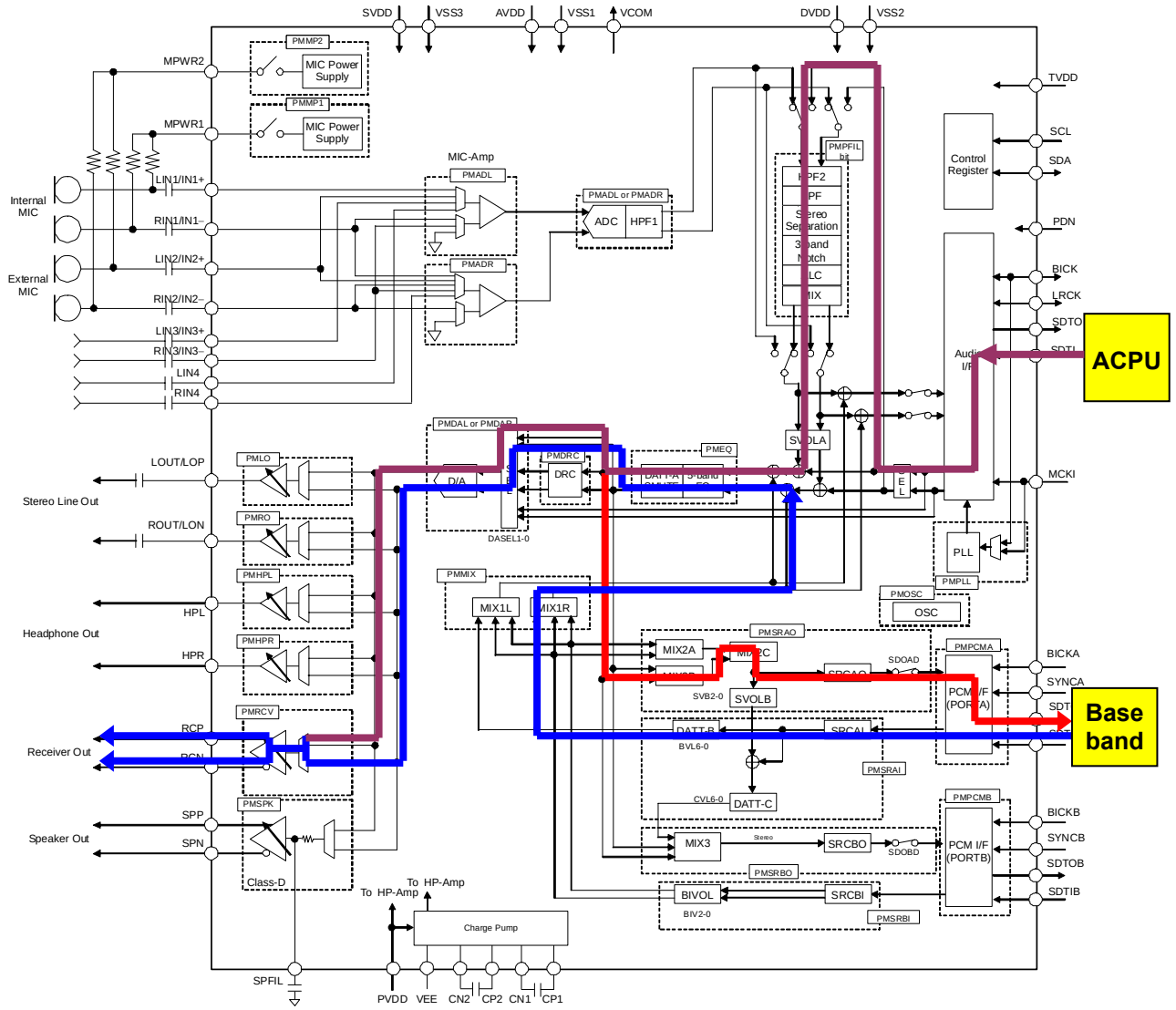
1. Power Supply
2. Wait 1μs
3. PDN pin: "L" → "H"
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = "0", I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=06H, Data=14H (MIC-Amp Lch IN1+/-)
12. Address=07H, Data=BBH (MGAIN = +18dB)
13. Address=14H, Data=85H (PFMXL/R1-0 bits="01", SRMXL1-0 bits="00", SRMXR1-0 bits="10")
14. Address=19H, Data=12H (PFSEL bit = "0", PFSDO bit = "1", DASEL1-0 bits = "00")
15. Address=1CH, Data=20H (SVAL2-0 bits = "000"(0dB), SVAR2-0 bits = "010"(-12dB))
16. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
17. Address=25H, Data=00H (MX1L2-0 bits = "000", MX1R2-0 bits = "000")
18. Address=26H, Data=10H (MX2B1-0 bits = "00", MX2C1-0 bits = "01")
19. Address=28H, Data=30H (SDOL1-0 bits = "11")
20. Address=09H, Data=20H (DACRR bit = "1")
21. Address=10H, Data=BBH (RCVG = 0dB)

(If needed, programmable filter (ALC, IVOL/R, HPF, EQ and etc) and 5-band equalyzer are set-up.)

22. SYNCA/BICKA clock input
23. Address=02H, Data=01H (MIC Power 1 on)
24. Address=00H, Data=13H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Up)
25. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
26. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
27. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(19.5ms=156/fs2@fs2=8kHz))
28. Phone Call & Recording
29. Address=0DH, Data=02H (RCVPS bit = "1")
30. Address=0DH, Data=03H (Receiver Power-Up)
31. Wait 1ms
32. Address=0DH, Data=01H (RCVPS bit = "0"; Release Power-save)
33. Playback from Receiver

34. Address=0DH, Data=03H (RCVPS bit = "1"; Receiver Power-save)
35. Address=0DH, Data=00H (Receiver Power-Down & Release Power-save)
36. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
37. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
38. Address=00H, Data=01H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Down)
39. Address=02H, Data=00H (MIC Power 1 off)
40. Address=04H, Data=22H (PLL Power-Down)
41. Address=00H, Data=00H (VCOM Power-Down)
42. PDN pin: "H" → "L"
43. Clock Stop
44. Stop Power Supply

1-3. Automatic Response



TX: SDTI → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
TX Playback: SDTI → Notch → ALC → DATT-A(Lch) → DAC(Lch) → Receiver
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR → DATT-A(Rch) → DAC(Rch) → Receiver

<Sequence>

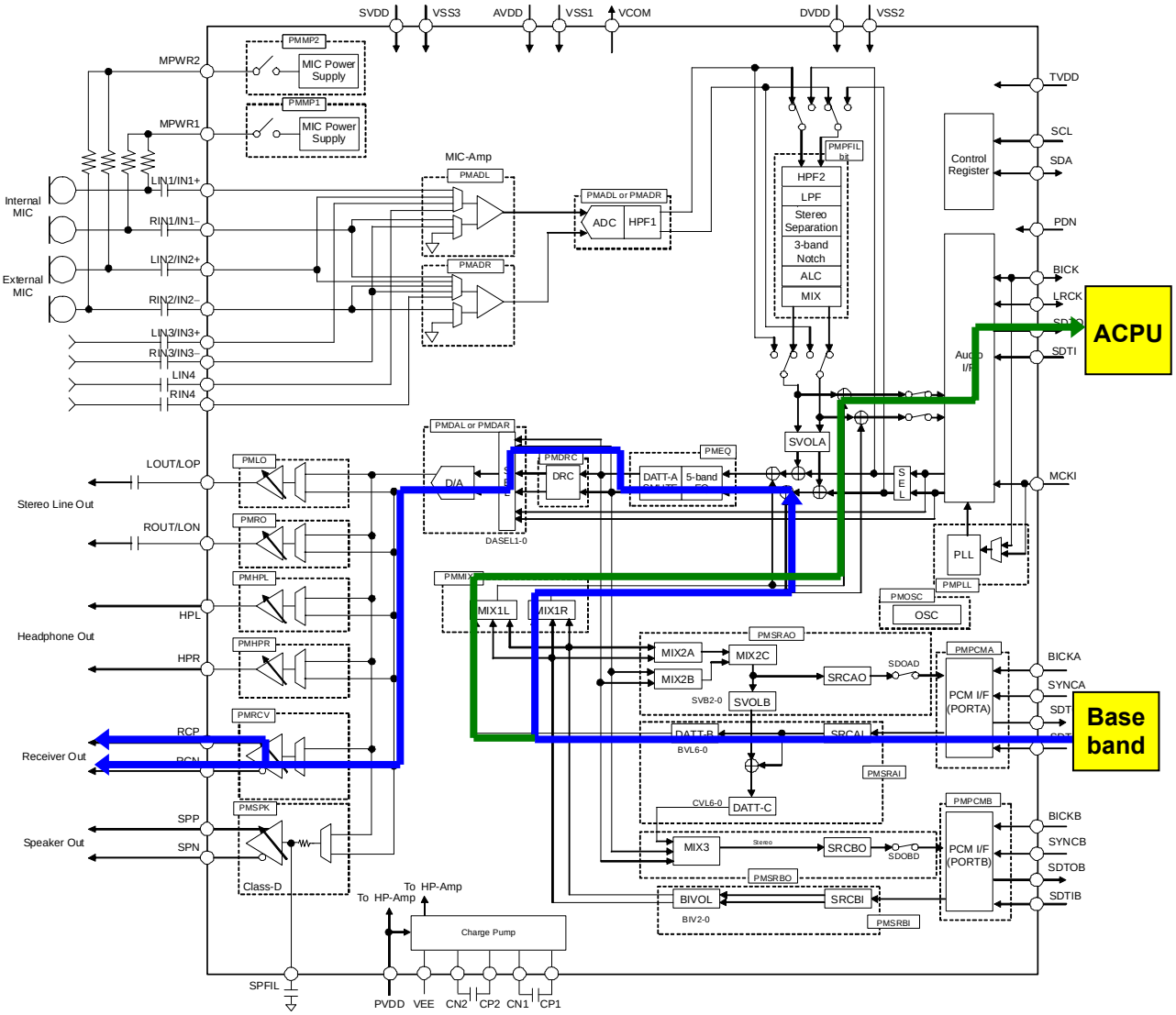
1. Power Supply
2. Wait 1μs
3. PDN pin: "L" → "H"
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=14H, Data=41H (PFMXL1-0 bits="01", SRMXL1-0 bits="00", SRMXR1-0 bits="01")
12. Address=19H, Data=13H (PFSEL = PFSDO bits = "1", DASEL1-0 bits = "00")
13. Address=1CH, Data=20H (SVAL2-0 bits = "000"(0dB))
14. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
15. Address=25H, Data=00H (MX1R2-0 bits = "000")
16. Address=26H, Data=10H (MX2B1-0 bits = "00", MX2C1-0 bits = "01")
17. Address=09H, Data=30H (DACRL = DACRR bits = "1")
18. Address=10H, Data=BBH (RCVG = 0dB)

(If needed, programmable filter (ALC, IVOL, HPF, EQ and etc) and 5-band equalyzer are set-up.)

19. SYNCA/BICKA clock input
20. Address=00H, Data=03H (Programmable Filter Power-Up)
21. Address=01H, Data=0DH (5-band EQ, DAC L/Rch Power-Up)
22. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
23. Wait 19.5ms (SRC intial time(19.5ms=156/fs2@fs2=8kHz))
24. Automatic Response
25. Address=0DH, Data=02H (RCVPS bit = "1")
26. Address=0DH, Data=03H (Receiver Power-Up)
27. Wait 1ms
28. Address=0DH, Data=01H (RCVPS bit = "0"; Release Power-save)
29. Playback from Receiver

30. Address=0DH, Data=03H (RCVPS bit = "1"; Receiver Power-save)
31. Address=0DH, Data=00H (Receiver Power-Down & Release Power-save)
32. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
33. Address=01H, Data=00H (5-band EQ, DAC L/Rch Power-Down)
34. Address=00H, Data=01H (Programmable Filter Power-Down)
35. Address=04H, Data=22H (PLL Power-Down)
36. Address=00H, Data=00H (VCOM Power-Down)
37. PDN pin: "H" → "L"
38. Clock Stop
39. Stop Power Supply

1-4. Voice Message



RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR → DATT-A → DAC(Rch) → MIX → Receiver
RX Recording: SDTIA → SRCAI → DATT-B → MIX1L → SDOL → SDTO

<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = “0”, I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=14H, Data=40H (SRMXR1-0 bits=“01”)
12. Address=19H, Data=12H (DASEL1-0 bits = “00”)
13. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
14. Address=25H, Data=00H (MX1L2-0 bits = “000”, MX1R2-0 bits = “000”)
15. Address=28H, Data=10H (SDOL1-0 bits = “01”)
16. Address=09H, Data=20H (DACRR bit = “1”)
17. Address=10H, Data=BBH (RCVG = 0dB)

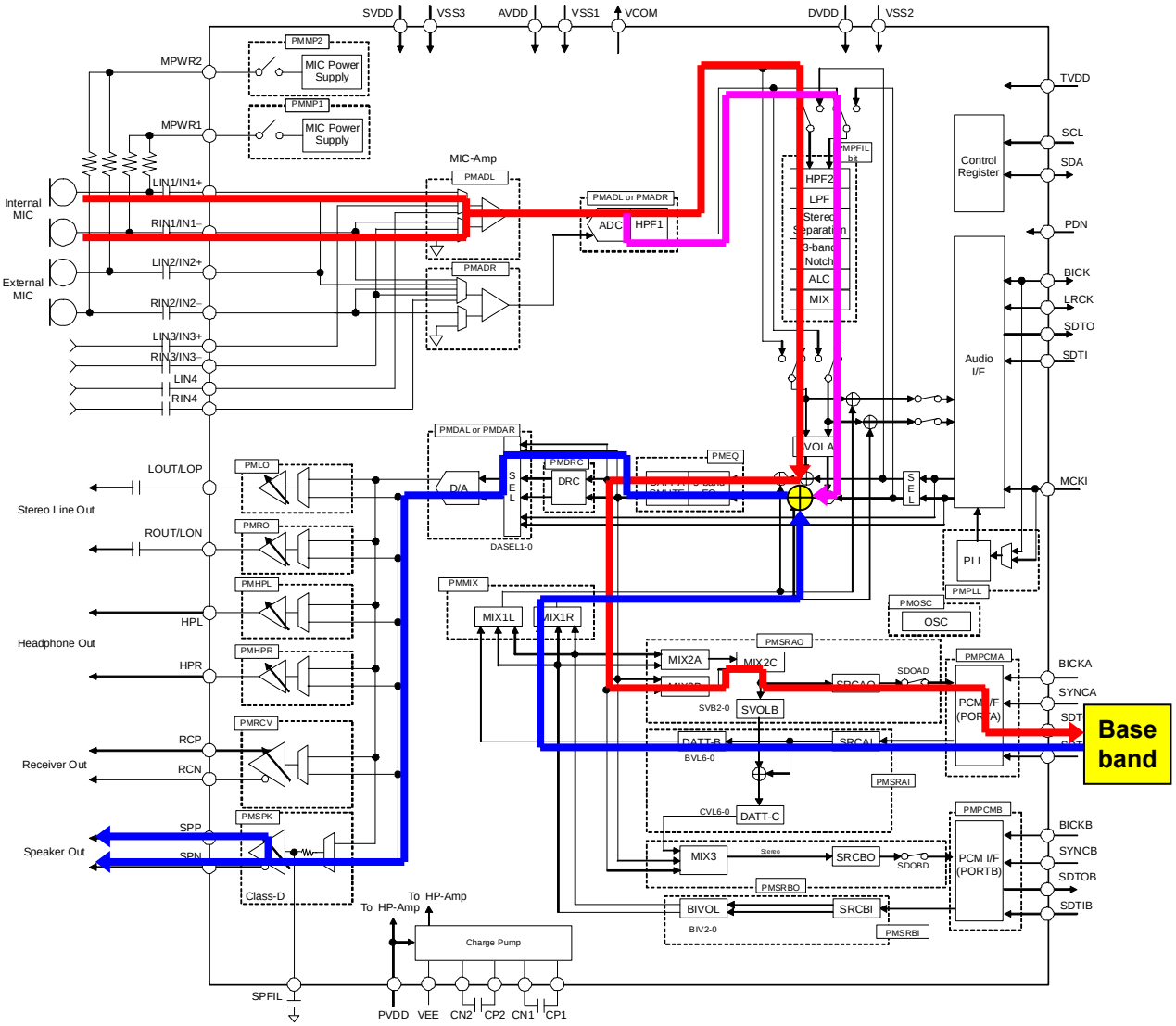
(If needed, 5-band equalyzer is set-up.)

18. SYNCA/BICKA clock input
19. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
20. Address=1FH, Data=8BH (MIX1 block, Oscillator, SRCAI, PCM I/F A Power-Up)
21. Wait 19.5ms (SRC intial time(19.5ms=156/fs2@fs2=8kHz))
22. Absence Recording
23. Address=0DH, Data=02H (RCVPS bit = “1”)
24. Address=0DH, Data=03H (Receiver Power-Up)
25. Wait 1ms
26. Address=0DH, Data=01H (RCVPS bit = “0”; Release Power-save)
27. Playback from Receiver

28. Address=0DH, Data=03H (RCVPS bit = “1”; Receiver Power-save)
29. Address=0DH, Data=00H (Receiver Power-Down & Release Power-save)
30. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI, PCM I/F A Power-Down)
31. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
32. Address=04H, Data=22H (PLL Power-Down)
33. Address=00H, Data=00H (VCOM Power-Down)
34. PDN pin: “H” → “L”
35. Clock Stop
36. Stop Power Supply

2. Handsfree Call (Mono Differential MIC/Receiver)

2-1. Phone Call



TX: IN+/–(Mono) → ADC → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR →DATT-A(Rch) → DAC(Rch) → Speaker
Side tone: IN+/–(Mono) → ADC → Notch → ALC → SVOLA(Rch) → SRMXR → DATT-A(Rch) → DAC(Rch) → Speaker

<Sequence>

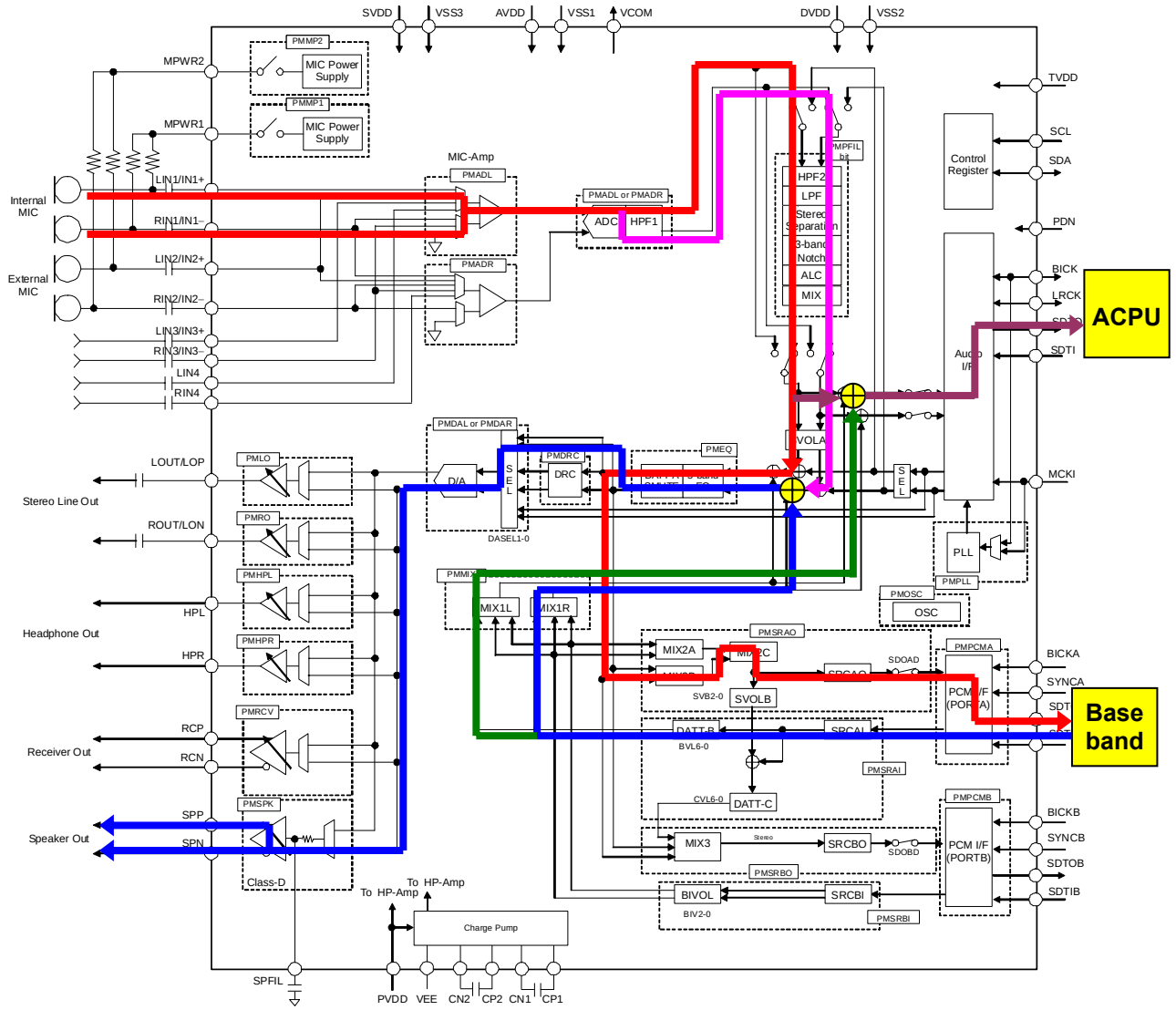
1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. MCKI Clock Input
8. Address=00H, Data=01H (VCOM & PLL Power-up)
9. Wait 11ms (VCOM power-Up + PLL Lock Time)
10. Address=06H, Data=14H (MIC-Amp Lch IN1+/-)
11. Address=07H, Data=BBH (MGAIN = +18dB)
12. Address=14H, Data=85H (PFMXL/R1-0 bits=“01”, SRMXL1-0 bits=“00”, SRMXR1-0 bits=“10”)
13. Address=19H, Data=12H (PFSEL bit = “0”, PFSDO bit = “1”, DASEL1-0 bits = “00”)
14. Address=1CH, Data=20H (SVAL2-0 bits = “000”(0dB), SVAR2-0 bits = “010”(-12dB))
15. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
16. Address=25H, Data=00H (MX1R2-0 bits = “000”)
17. Address=26H, Data=10H (MX2B1-0 bits = “00”, MX2C1-0 bits = “01”)
18. Address=09H, Data=80H (DACSR bit = “1”)
19. Address=10H, Data=B9H (SPKG = -6dB)

(If needed, programmable filter (ALC, IVOL/R, HPF, EQ and etc) and 5-band equalyzer are set-up.)

20. SYNCA/BICKA clock input
21. Address=02H, Data=01H (MIC Power 1 on)
22. Address=00H, Data=13H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Up)
23. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
24. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
25. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(19.5ms=156/fs2@fs2=8kHz))
26. Phone Call
27. Address=0DH, Data=10H (Speaker Power-Up)
28. Wait 32ms
29. Playback from Speaker

30. Address=0DH, Data=00H (Speaker Power-Down)
31. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
32. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
33. Address=00H, Data=01H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Down)
34. Address=02H, Data=00H (MIC Power 1 off)
35. Address=04H, Data=22H (PLL Power-Down)
36. Address=00H, Data=00H (VCOM Power-Down)
37. PDN pin: “H” → “L”
38. Clock Stop
39. Stop Power Supply

2-2.Phone Call & Recording



TX: IN+/–(Mono) → ADC → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
TX Recording: IN+/–(Mono) → ADC → Notch → ALC → SDOL → SDTO
Side tone: IN+/–(Mono) → ADC → Notch → ALC → SVOLA(Rch) → SRMXR → DATT-A(Rch) → DAC(Rch) → Speaker
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR →DATT-A(Rch) → DAC(Rch) → Speaker
RX Recording: SDTIA → SRCAI → DATT-B → MIX1L → SDOL → SDTO

<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = “0”, I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=06H, Data=14H (MIC-Amp Lch IN1+/-)
12. Address=07H, Data=BBH (MGAIN = +18dB)
13. Address=14H, Data=85H (PFMXL/R1-0 bits=“01”, SRMXL1-0 bits=“00”, SRMXR1-0 bits=“10”)
14. Address=19H, Data=12H (PFSEL bit = “0”, PFSDO bit = “1”, DASEL1-0 bits = “00”)
15. Address=1CH, Data=20H (SVAL2-0 bits = “000”(0dB), SVAR2-0 bits = “010”(-12dB))
16. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
17. Address=25H, Data=00H (MX1L2-0 bits = “000”, MX1R2-0 bits = “000”)
18. Address=26H, Data=10H (MX2B1-0 bits = “00”, MX2C1-0 bits = “01”)
19. Address=28H, Data=30H (SDOL1-0 bits = “11”)
20. Address=09H, Data=80H (DACSR bit = “1”)
21. Address=10H, Data=B9H (SPKG = -6dB)

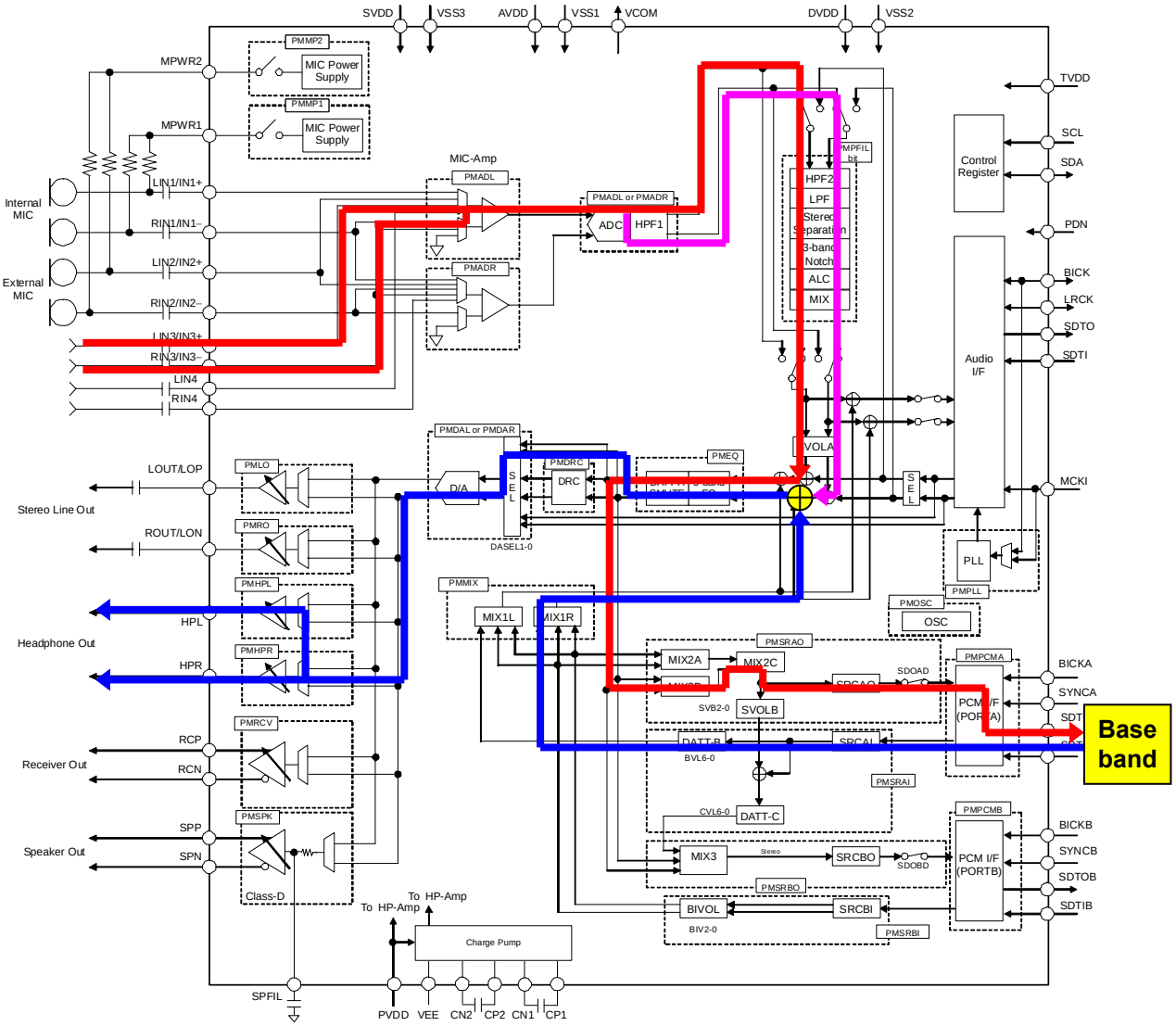
(If needed, programmable filter (ALC, IVOL/R, HPF, EQ and etc) and 5-band equalyzer are set-up.)

22. SYNCA/BICKA clock input
23. Address=02H, Data=01H (MIC Power 1 on)
24. Address=00H, Data=13H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Up)
25. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
26. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
27. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(19.5ms=156/fs2@fs2=8kHz))
28. Phone Call & Recording
29. Address=0DH, Data=10H (Speaker Power-Up)
30. Wait 32ms
31. Playback from Speaker

32. Address=0DH, Data=00H (Speaker Power-Down)
33. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
34. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
35. Address=00H, Data=01H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Down)
36. Address=02H, Data=00H (MIC Power 1 off)
37. Address=04H, Data=22H (PLL Power-Down)
38. Address=00H, Data=00H (VCOM Power-Down)
39. PDN pin: “H” → “L”
40. Clock Stop
41. Stop Power Supply

3. Headset Call (Mono Differential MIC/Receiver)

3-1. Phone Call



TX: IN3+/-(Mono) → ADC → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR →DATT-A(Rch) → DAC(Rch) → Headphone
Side tone: LIN3 → ADC → Notch → ALC → SVOLA(Rch) → SRMXR → DATT-A(Rch) → DAC(Rch) → Headphone

<Sequence>

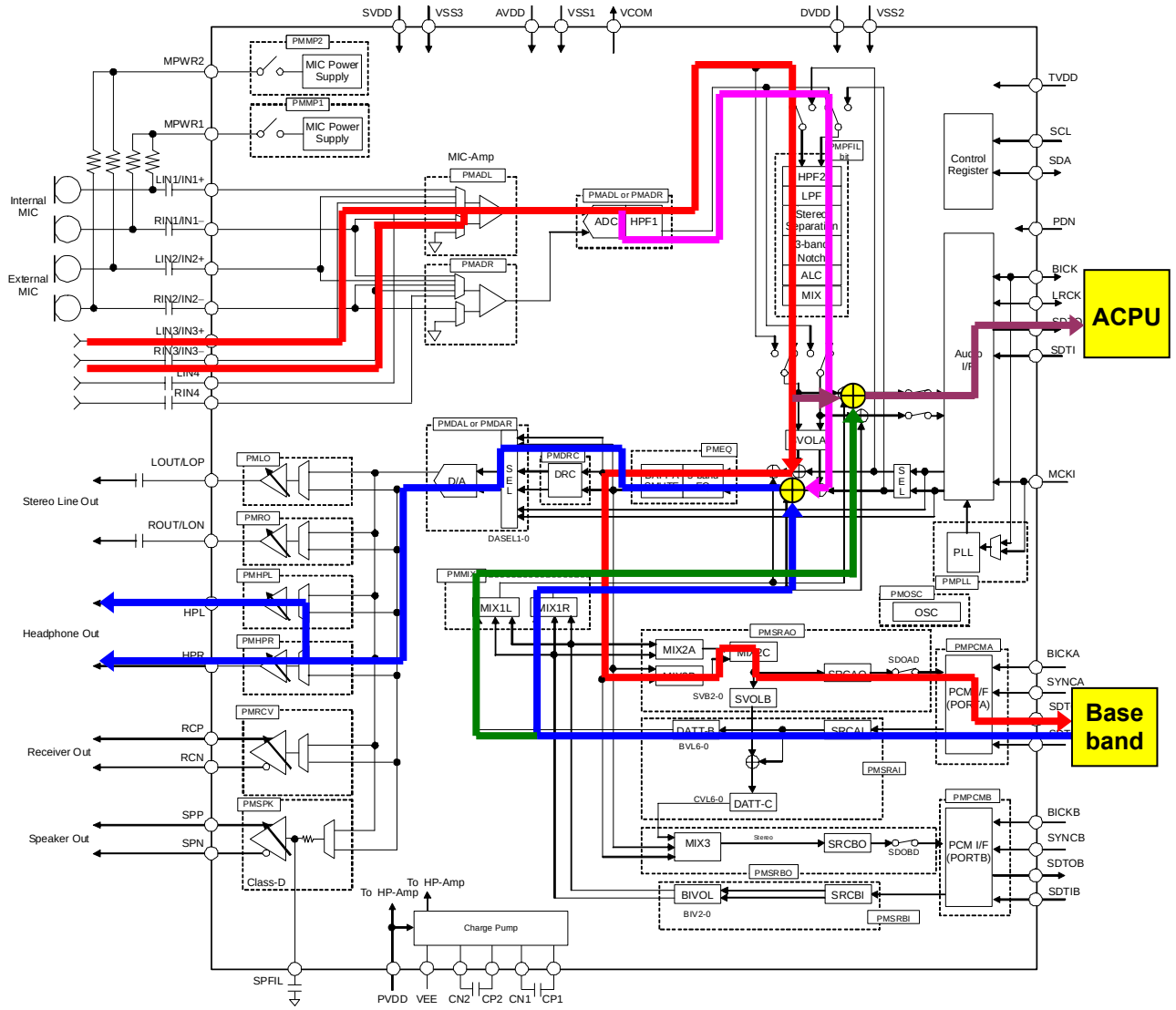
1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. MCKI Clock Input
8. Address=00H, Data=01H (VCOM & PLL Power-up)
9. Wait 11ms (VCOM power-Up + PLL Lock Time)
10. Address=06H, Data=42H (MIC-Amp Lch IN3+/-)
11. Address=07H, Data=BBH (MGAIN = +18dB)
12. Address=14H, Data=85H (PFMXL/R1-0 bits=“01”, SRMXL1-0 bits=“00”, SRMXR1-0 bits=“10”)
13. Address=19H, Data=12H (PFSEL bit = “0”, PFSDO bit = “1”, DASEL1-0 bits = “00”)
14. Address=1CH, Data=20H (SVAL2-0 bits = “000”(0dB), SVAR2-0 bits = “010”(-12dB))
15. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
16. Address=25H, Data=00H (MX1R2-0 bits = “000”)
17. Address=26H, Data=10H (MX2B1-0 bits = “00”, MX2C1-0 bits = “01”)
18. Address=0BH, Data=08H (LOMH bit = “1”)
19. Address=0FH, Data=19H (HPG = -20dB)

(If needed, programmable filter (ALC, IVOL/R, HPF, EQ and etc) and 5-band equalyzer are set-up.)

20. SYNCA/BICKA clock input
21. Address=02H, Data=01H (MIC Power 1 on)
22. Address=00H, Data=13H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Up)
23. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
24. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
25. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(19.5ms=156/fs2@fs2=8kHz))
26. Phone Call
27. Address=0BH, Data=0BH (Headphone L/Rch Power-Up)
28. Wait 28ms
29. Playback from Headphone

30. Address=0BH, Data=08H (Headphone L/Rch Power-Down)
31. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
32. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
33. Address=00H, Data=01H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Down)
34. Address=02H, Data=00H (MIC Power 1 off)
35. Address=04H, Data=22H (PLL Power-Down)
36. Address=00H, Data=00H (VCOM Power-Down)
37. PDN pin: “H” → “L”
38. Clock Stop
39. Stop Power Supply

3-2.Phone Call & Recording



TX: IN3+/-(Mono) → ADC → Notch → ALC → DATT-A(Lch) → MIX2B → MIX2C → SRCAO → SDTOA
TX Recording: LIN3 → ADC → Notch → ALC → SDOL → SDTO
Side tone: ILN3 → ADC → Notch → ALC → SVOLA(Rch) → SRMXR → DATT-A(Rch) → DAC(Rch) → Headphone
RX: SDTIA → SRCAI → DATT-B → MIX1R → SRMXR →DATT-A(Rch) → DAC(Rch) → Headphone
RX Recording: SDTIA → SRCAI → DATT-B → MIX1L → SDOL → SDTO

<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = “0”, I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=06H, Data=42H (MIC-Amp Lch IN3+/-)
12. Address=07H, Data=BBH (MGAIN = +18dB)
13. Address=14H, Data=85H (PFMXL/R1-0 bits=“01”, SRMXL1-0 bits=“00”, SRMXR1-0 bits=“10”)
14. Address=19H, Data=12H (PFSEL bit = “0”, PFSDO bit = “1”, DASEL1-0 bits = “00”)
15. Address=1CH, Data=20H (SVAL2-0 bits = “000”(0dB), SVAR2-0 bits = “010”(-12dB))
16. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear)
17. Address=25H, Data=00H (MX1L2-0 bits = “000”, MX1R2-0 bits = “000”)
18. Address=26H, Data=10H (MX2B1-0 bits = “00”, MX2C1-0 bits = “01”)
19. Address=28H, Data=30H (SDOL1-0 bits = “11”)
20. Address=0BH, Data=08H (LOMH bit = “1”)
40. Address=0FH, Data=19H (HPG = -20dB)

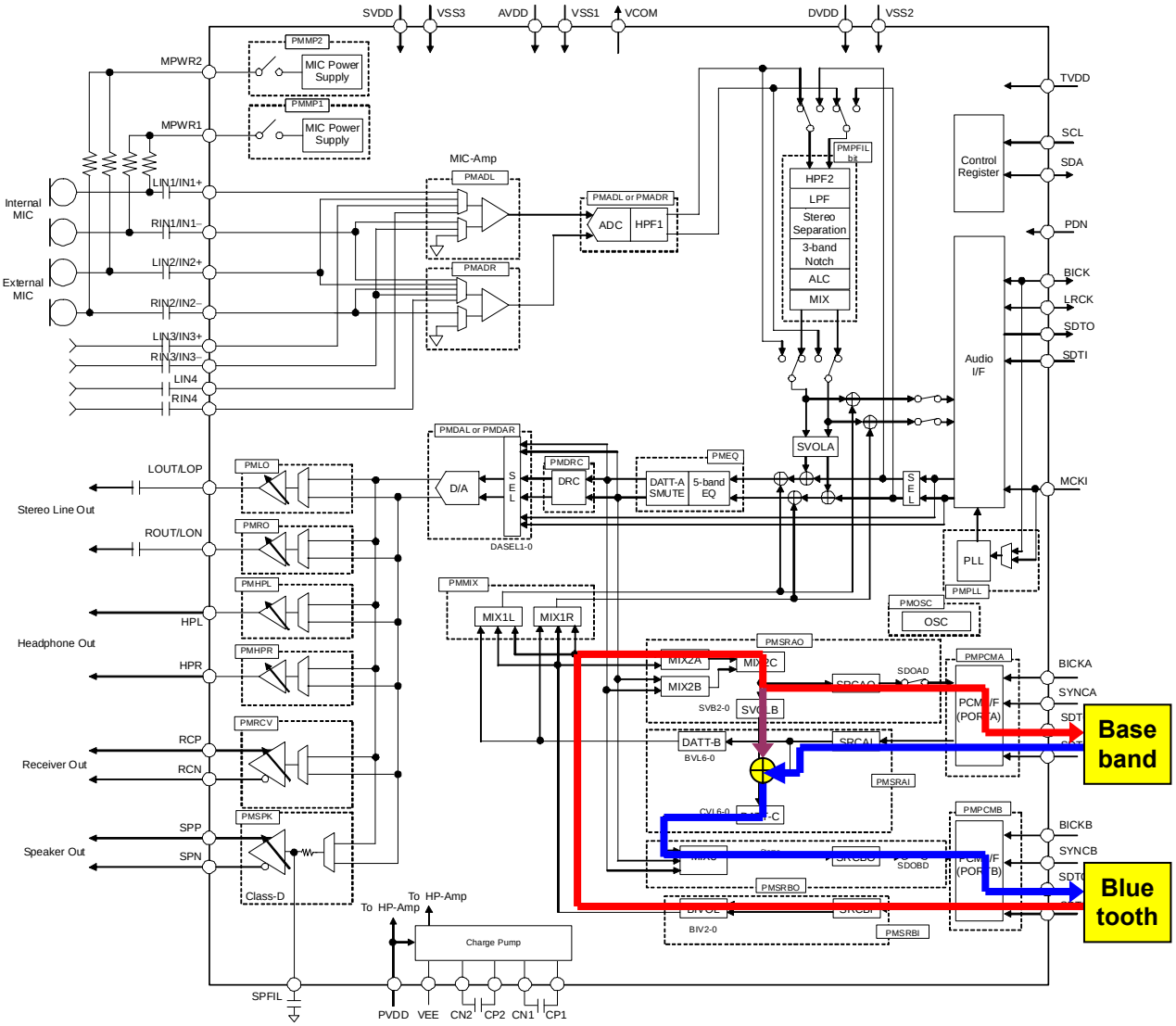
(If needed, programmable filter (ALC, IVOL/R, HPF, EQ and etc) and 5-band equalyzer are set-up.)

21. SYNCA/BICKA clock input
22. Address=02H, Data=01H (MIC Power 1 on)
23. Address=00H, Data=13H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Up)
24. Address=01H, Data=09H (5-band EQ, DAC Rch Power-Up)
25. Address=1FH, Data=8FH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Up)
26. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(19.5ms=156/fs2@fs2=8kHz))
27. Phone Call & Recording
28. Address=0BH, Data=0BH (Headphone L/Rch Power-Up)
29. Wait 28ms
30. Playback from Headphone

31. Address=0BH, Data=08H (Headphone L/Rch Power-Down)
32. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A Power-Down)
33. Address=01H, Data=00H (5-band EQ, DAC Rch Power-Down)
34. Address=00H, Data=01H (Programmable Filter, MIC-Amp Lch and ADC Lch Power-Down)
35. Address=02H, Data=00H (MIC Power 1 off)
36. Address=04H, Data=22H (PLL Power-Down)
37. Address=00H, Data=00H (VCOM Power-Down)
38. PDN pin: “H” → “L”
39. Clock Stop
40. Stop Power Supply

4. Bluetooth Headset Call

4-1. Phone Call



TX: SDTIB → BIVOL → MIX2A → MIX2C → SRCAO → SDTOA

RX: SDTIA → SRCAI → SBMX → DATT-C → MIX3 → SDTOB

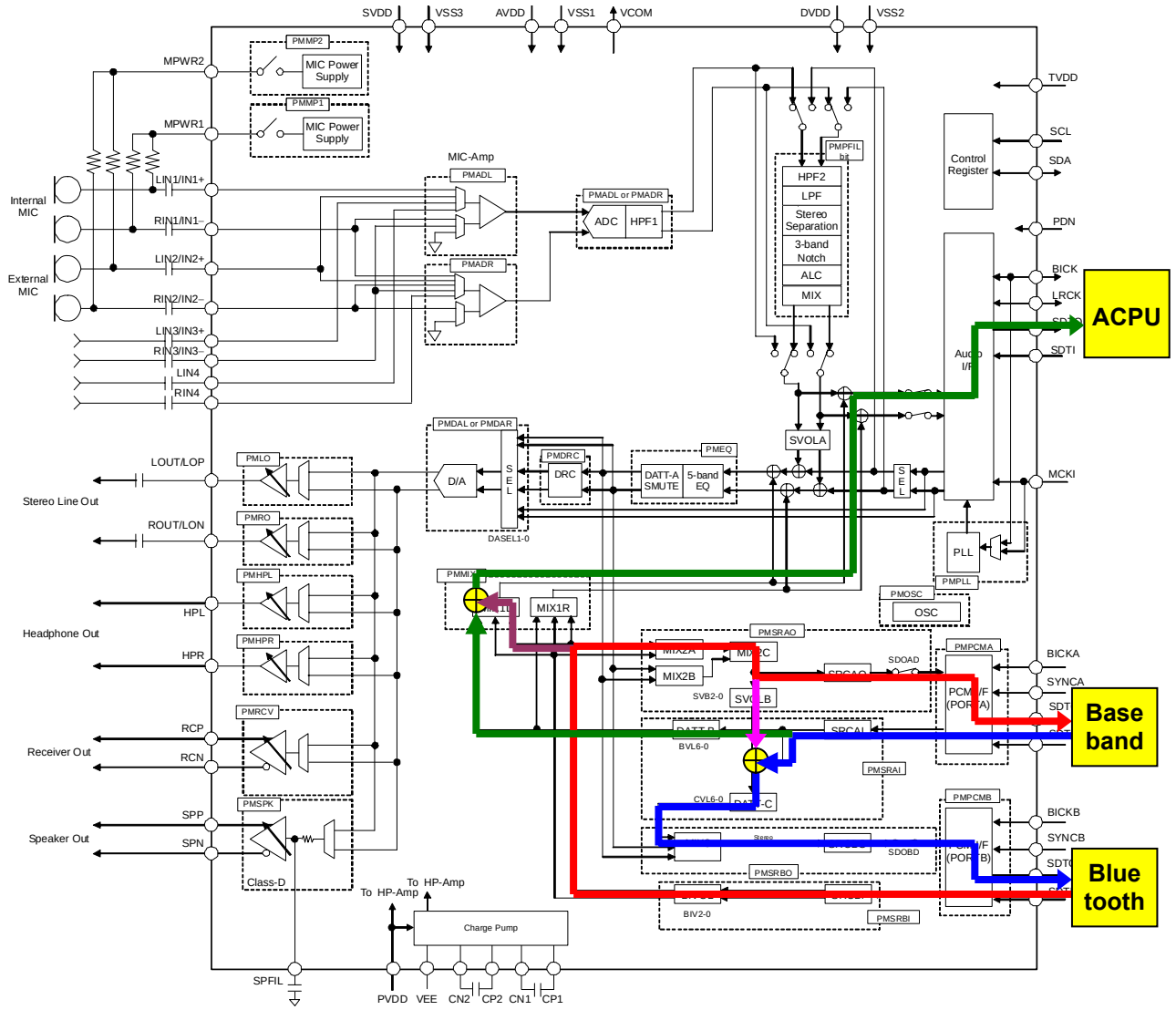
Side tone: SDTIB → BIVOL → MIX2A → MIX2C → SVOLB → SBMX → DATT-C → MIX3 → SDTOB

<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=00H, Data=01H (VCOM Power-up)
6. Wait 1ms
7. Address=18H, Data=00H (BIV2-0 bits = “000” (0dB))
8. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear, SDOAD bits = “0”)
9. Address=21H, Data=03H (PCM I/F B: I2S, 16bit Linear, SDOBD bits = “0”)
10. Address=22H, Data=02H (SVB2-0 bits = “010”(-12dB))
11. Address=24H, Data=00H (CVL6-0 bits = 0CH(0dB))
12. Address=26H, Data=00H (MX2A1-0 bits = “00”, MX2C1-0 bits = “00”)
13. Address=27H, Data=07H (MXSB2-0 bits = “111”)
14. Address=28H, Data=02H (SBMX1-0 bits = “10”)
15. SYNCA/BICKA, SYNCB/BICKB clock input
16. Address=1FH, Data=7FH (Oscillator, SRCAI/O, PCM I/F A, SRCBI/O, PCM I/F B Power-Up)
17. Wait 19.5ms (SRC intial time(19.5ms=156/fs2@fs2=8kHz))
18. Phone Call
19. Playback from Bluetooth

20. Address=1FH, Data=00H (Oscillator, SRCAI/O, PCM I/F A, SRCBI/O, PCM I/F B Power-Down)
21. Address=04H, Data=22H (PLL Power-Down)
22. Address=00H, Data=00H (VCOM Power-Down)
23. PDN pin: “H” → “L”
24. Clock Stop
25. Stop Power Supply

4-2. Phone Call & Recording



TX: SDTIB → BIVOL → MIX2A → MIX2C → SRCAO → SDTOA
TX Recording: SDTIB → BIVOL → MIX1L → SDOL → SDTO
Side tone: SDTIB → BIVOL → MIX2A → MIX2C → SVOLB → SBMX → DATT-C → MIX3 → SDTOB
RX: SDTIA → SRCAI → SBMX → DATT-C → MIX3 → SDTOB
RX Recording: SDTIA → SRCAI → DATT-B → MIX1L → SDOL → SDTO

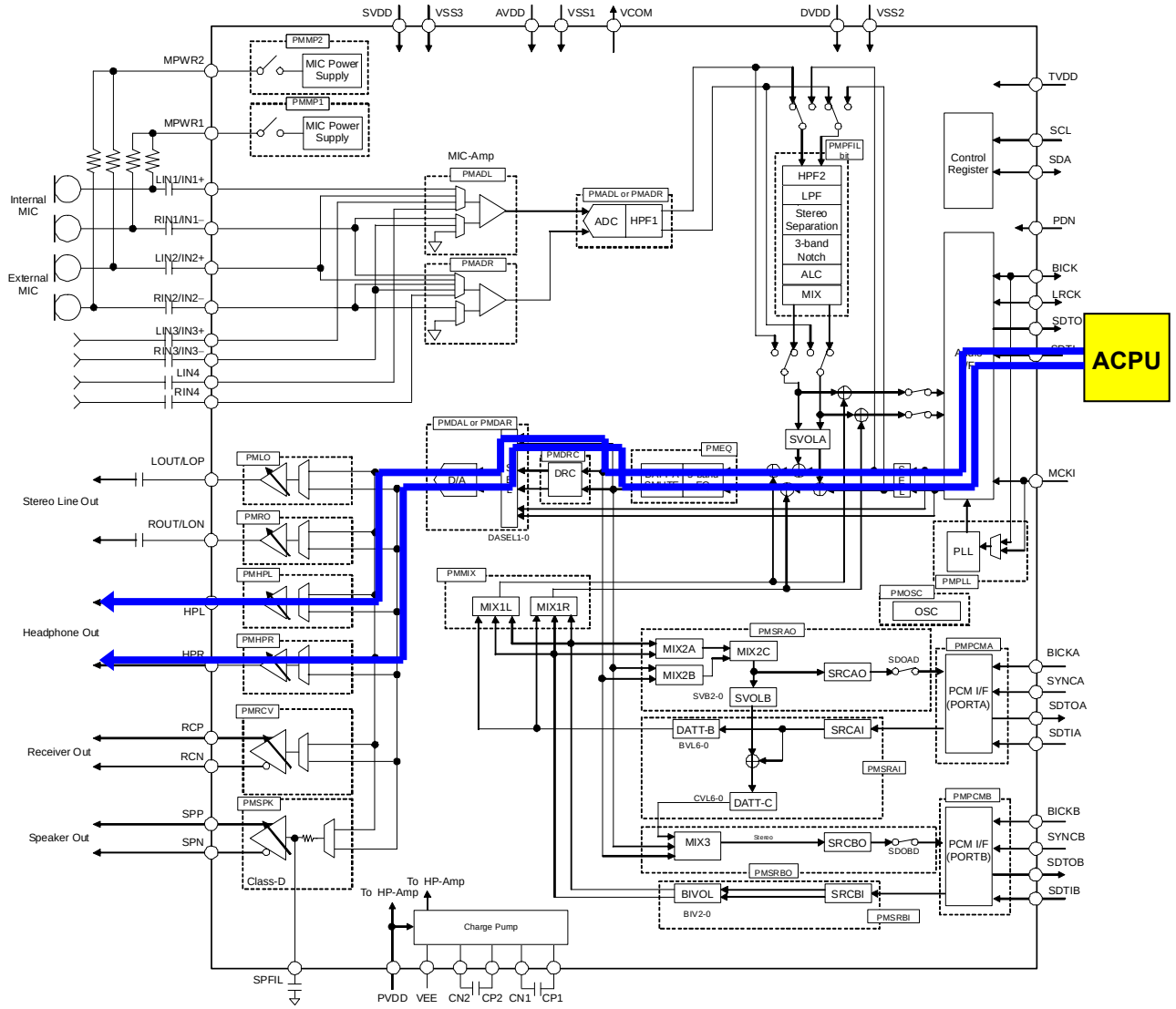
<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = “0”, I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=18H, Data=00H (BIV2-0 bits = “000” (0dB))
12. Address=20H, Data=03H (PCM I/F A: I2S, 16bit Linear, SDOAD bits = “0”)
13. Address=21H, Data=03H (PCM I/F B: I2S, 16bit Linear, SDOBD bits = “0”)
14. Address=22H, Data=02H (SVB2-0 bits = “010”(-12dB))
15. Address=23H, Data=00H (BVL6-0 bits = 0CH(0dB))
16. Address=24H, Data=00H (CVL6-0 bits = 0CH(0dB))
17. Address=25H, Data=04H (MX1L2-0 bits = “100”)
18. Address=26H, Data=00H (MX2A1-0 bits = “00”, MX2C1-0 bits = “00”)
19. Address=27H, Data=07H (MXSB2-0 bits = “111”)
20. Address=28H, Data=12H (SBMX1-0 bits = “10”, SDOL1-0 bits = “01”)
21. SYNCA/BICKA, SYNCB/BICKB clock input
22. Address=1FH, Data=FFH (MIX1 block, Oscillator, SRCAI/O, PCM I/F A, SRCBI/O, PCM I/F B Power-Up)
23. Wait 19.5ms (SRC intial time(19.5ms=156/fs2@fs2=8kHz))
24. Phone Call & Recording
25. Playback from Bluetooth

26. Address=1FH, Data=00H (MIX1 block, Oscillator, SRCAI/O, PCM I/F A, SRCBI/O, PCM I/F B Power-Down)
27. Address=04H, Data=22H (PLL Power-Down)
28. Address=00H, Data=00H (VCOM Power-Down)
29. PDN pin: “H” → “L”
30. Clock Stop
31. Stop Power Supply

5. Music Playback

5-1. Headphone



Audio Playback: SDTI → 5band EQ → DATT-A → DAC → Headphone (Stereo)

<Sequence>

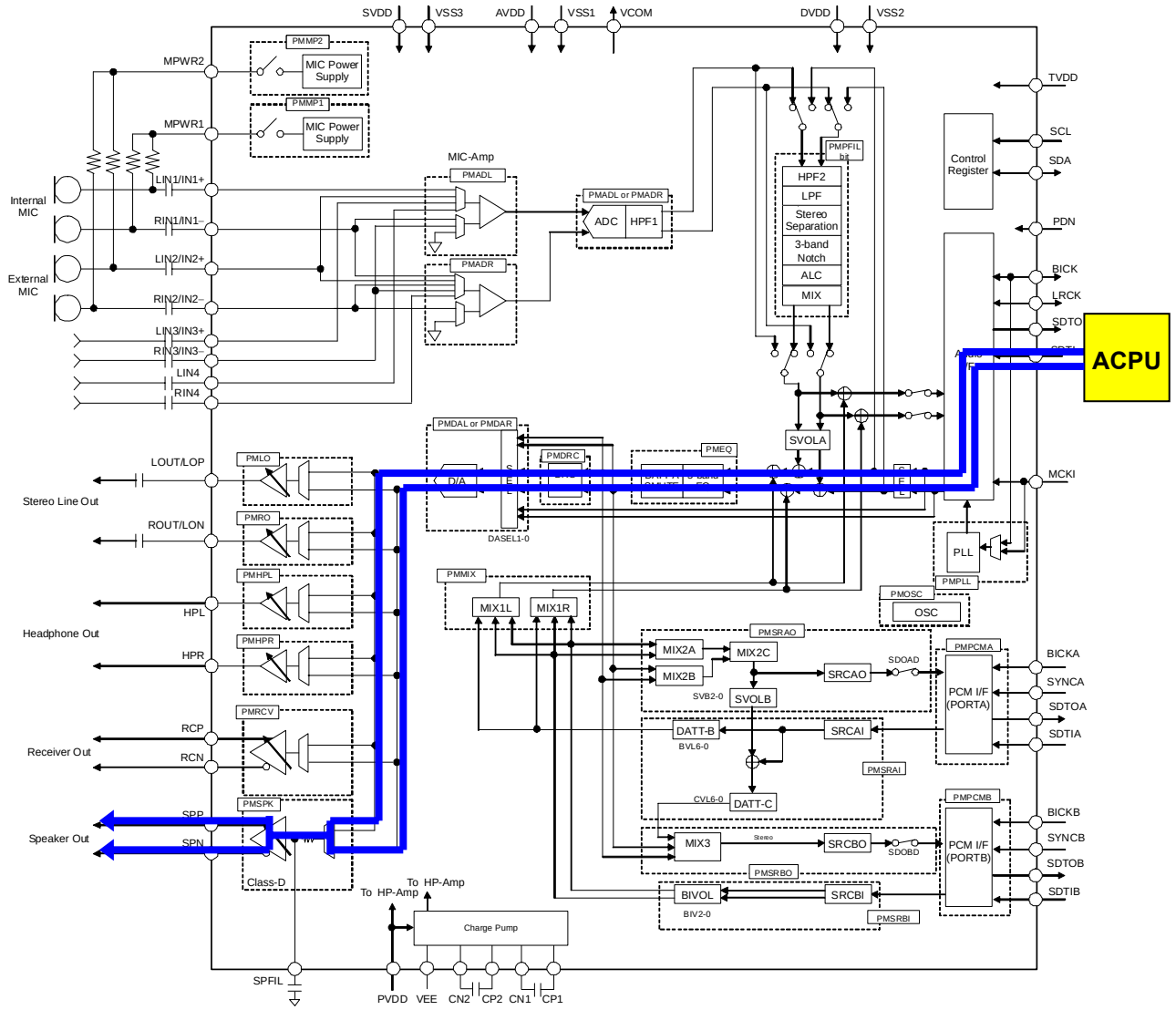
1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=14H, Data=00H (PFMXL/R1-0 bits=“00”, SRMXL/R1-0 bits=“00”)
12. Address=17H, Data=00H (SDIM1-0 bits = “00”)
13. Address=19H, Data=02H (DASEL1-0 bits = “00”)
14. Address=25H, Data=00H (MX1L2-0 bits = “000”, MX1R2-0 bits = “000”)
15. Address=0FH, Data=19H (HPG = -20dB)

(If needed, 5-band equalyzer is set-up.)

16. Address=01H, Data=0DH (5-band EQ, DAC L/Rch Power-Up)
17. Address=0BH, Data=03H (Headphone L/Rch Power-Up)
18. Wait 28ms
19. Playback from Headphone

20. Address=0BH, Data=00H (Headphone L/Rch Power-Down)
21. Address=01H, Data=00H (5-band EQ, DAC L/Rch Power-Down)
22. Address=04H, Data=22H (PLL Power-Down)
23. Address=00H, Data=00H (VCOM Power-Down)
24. PDN pin: “H” → “L”
25. Clock Stop
26. Stop Power Supply

5-2. Speaker



Audio Playback: SDTI → 5band EQ → DATT-A → DRC → DAC → Speaker (Mono)

<Sequence>

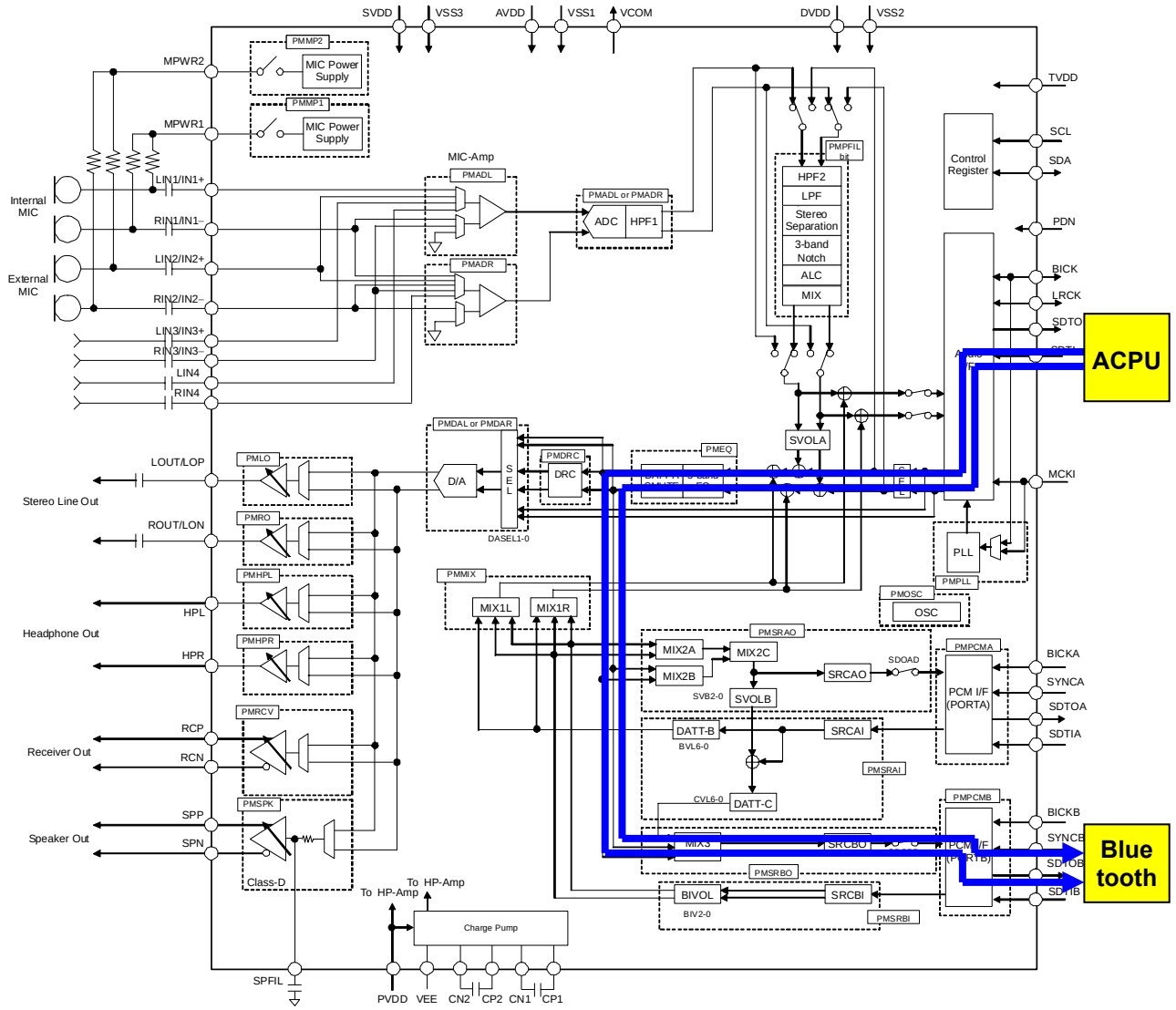
1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=14H, Data=00H (PFMXL/R1-0 bits=“00”, SRMXL/R1-0 bits=“00”)
12. Address=17H, Data=00H (SDIM1-0 bits = “00”)
13. Address=19H, Data=06H (DASEL1-0 bits = “01”)
14. Address=09H, Data=C0H (DACSL = DACSR bits = “1”)
15. Address=10H, Data=B9H (SPKG = -6dB)

(If needed, 5-band equalyzer and DRC are set-up.)

16. Address=01H, Data=0FH (5-band EQ, DRC, DAC L/Rch Power-Up)
17. Address=0DH, Data=10H (Speaker Power-Up)
18. Wait 32ms
19. Playback from Speaker

20. Address=0DH, Data=00H (Speaker Power-Down)
21. Address=01H, Data=00H (5-band EQ, DAC L/Rch Power-Down)
22. Address=04H, Data=22H (PLL Power-Down)
23. Address=00H, Data=00H (VCOM Power-Down)
24. PDN pin: “H” → “L”
25. Clock Stop
26. Stop Power Supply

5-3. Bluetooth



Audio Playback: SDTI → 5band EQ → DATT-A → MIX3 → SRCBO → SDTOB(Stereo)

<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=14H, Data=00H (PFMXL/R1-0 bits=“00”, SRMXL/R1-0 bits=“00”)
12. Address=17H, Data=00H (SDIM1-0 bits = “00”)
13. Address=21H, Data=03H (PCM I/F B: I2S, 16bit Linear, SDOBD bits = “0”)
14. Address=25H, Data=00H (MX1L2-0 bits = “000”, MX1R2-0 bits = “000”)
15. Address=27H, Data=00H (MXSB2-0 bits = “000”)

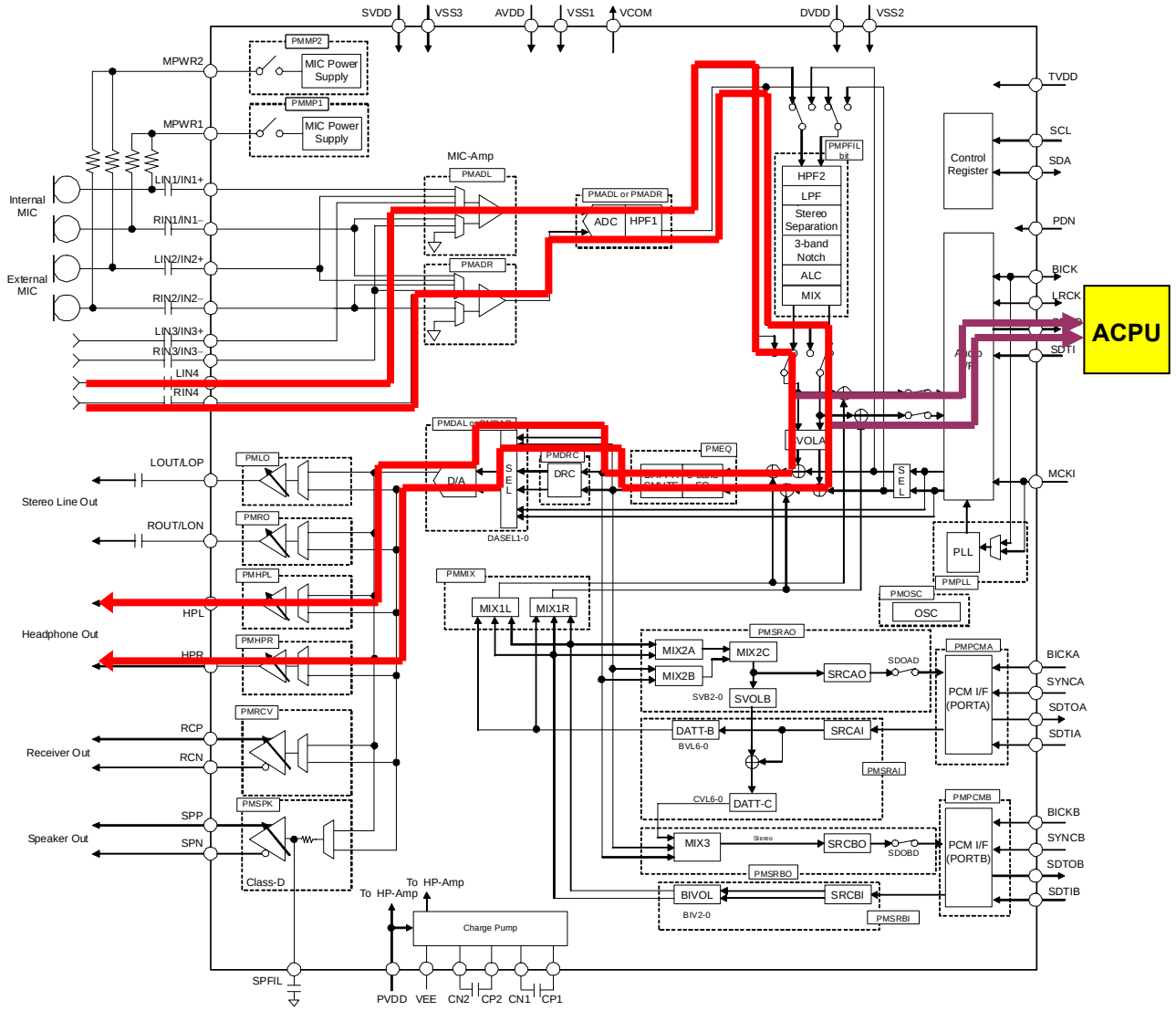
(If needed, 5-band equalyzer is set-up.)

16. Address=01H, Data=01H (5-band EQ Power-Up)
17. SYNCB/BICKB clock input
18. Address=1FH, Data=D8H (Oscillator, SRCBO, PCM I/F B Power-Up)
19. Wait 9.75ms (SRC intial time(9.75ms=156/fs3@fs3=16kHz))
20. Playback from Bluetooth

21. Address=1FH, Data=00H (Oscillator, SRCBO, PCM I/F B Power-Down)
22. Address=01H, Data=00H (5-band EQ Power-Down)
23. Address=04H, Data=22H (PLL Power-Down)
24. Address=00H, Data=00H (VCOM Power-Down)
25. PDN pin: “H” → “L”
26. Clock Stop
27. Stop Power Supply

6. FM Radio Playback & Recording

6-1. Headphone



FM Playback: LIN4/RIN4 (Stereo) → ADC → 5band EQ → DATT-A → DAC → Headphone (Stereo)
FM Recording: LIN4/RIN4 (Stereo) → ADC → SDOL/R → SDTO (Stereo)

<Sequence>

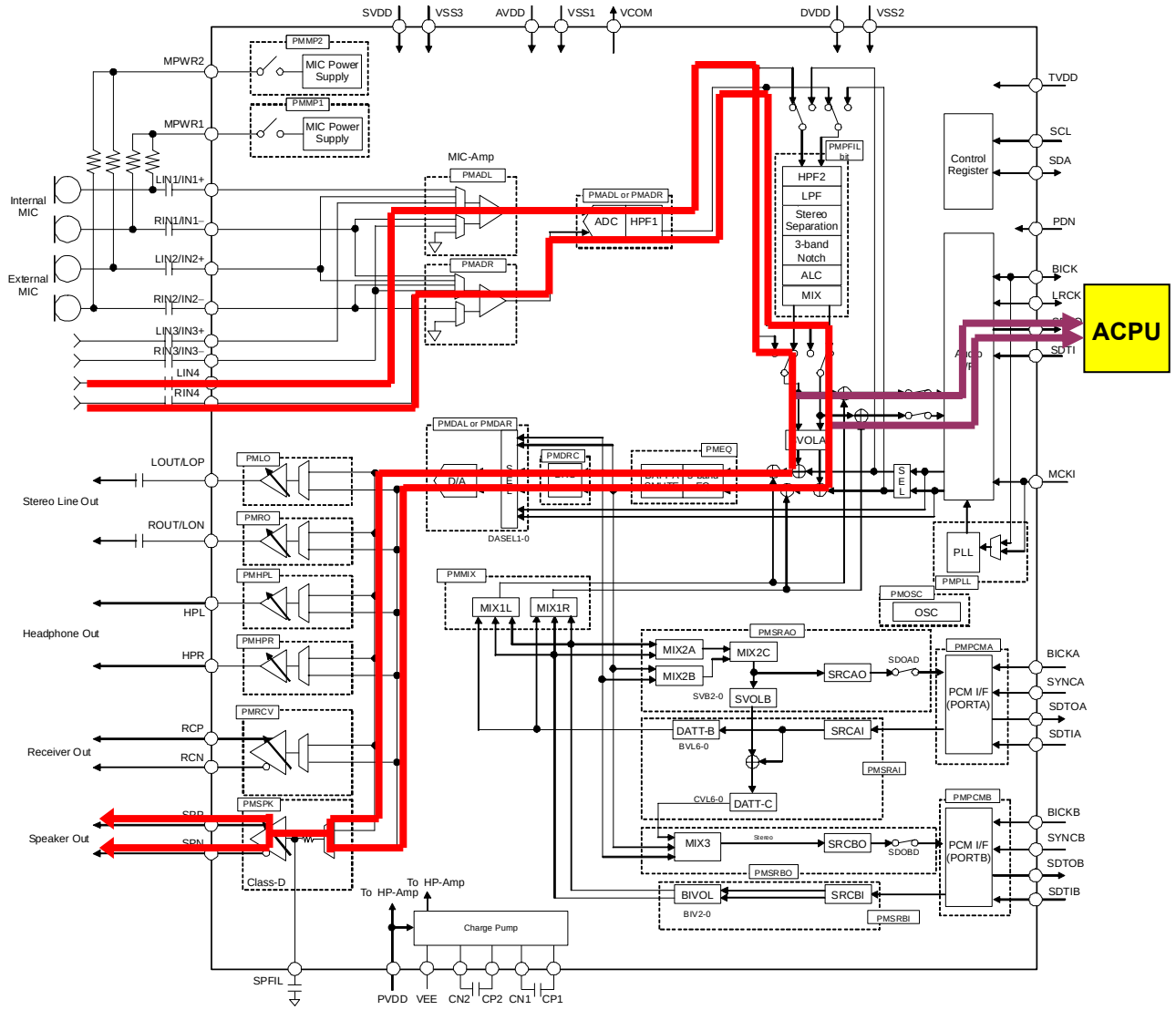
1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = “0”, I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=06H, Data=0FH (MIC-Amp LIN4/RIN4)
12. Address=07H, Data=00H (MGAIN = 0dB)
13. Address=14H, Data=00H (PFMXL/R1-0 bits=“00”, SRMXL/R1-0 bits=“00”)
14. Address=19H, Data=00H (PFSDO bit = “0”, DASEL1-0 bits = “00”)
15. Address=1CH, Data=00H (SVAL/R2-0 bits = “000”(0dB))
16. Address=28H, Data=00H (SDOL/R1-0 bits = “00”)
17. Address=0FH, Data=19H (HPG = -20dB)

(If needed, 5-band equalyzer is set-up.)

18. Address=00H, Data=31H (MIC-Amp and ADC L/Rch Power-Up)
19. Address=01H, Data=0DH (5-band EQ, DAC L/Rch Power-Up)
20. Wait 80ms (MIC-Amp & ADC initial time(80ms))
21. Recording
22. Address=0BH, Data=0BH (Headphone L/Rch Power-Up)
23. Wait 28ms
24. Playback from Headphone

25. Address=0BH, Data=08H (Headphone L/Rch Power-Down)
26. Address=01H, Data=00H (5-band EQ, DAC L/Rch Power-Down)
27. Address=00H, Data=01H (MIC-Amp and ADC L/Rch Power-Down)
28. Address=04H, Data=22H (PLL Power-Down)
29. Address=00H, Data=00H (VCOM Power-Down)
30. PDN pin: “H” → “L”
31. Clock Stop
32. Stop Power Supply

6-2. Speaker



FM Playback: LIN4/RIN4 (Stereo) → ADC → 5band EQ → DATT-A → DRC → DAC → Speaker (Mono)
FM Recording: LIN4/RIN4 (Stereo) → ADC → SDOL → SDTO (Stereo)

<Sequence>

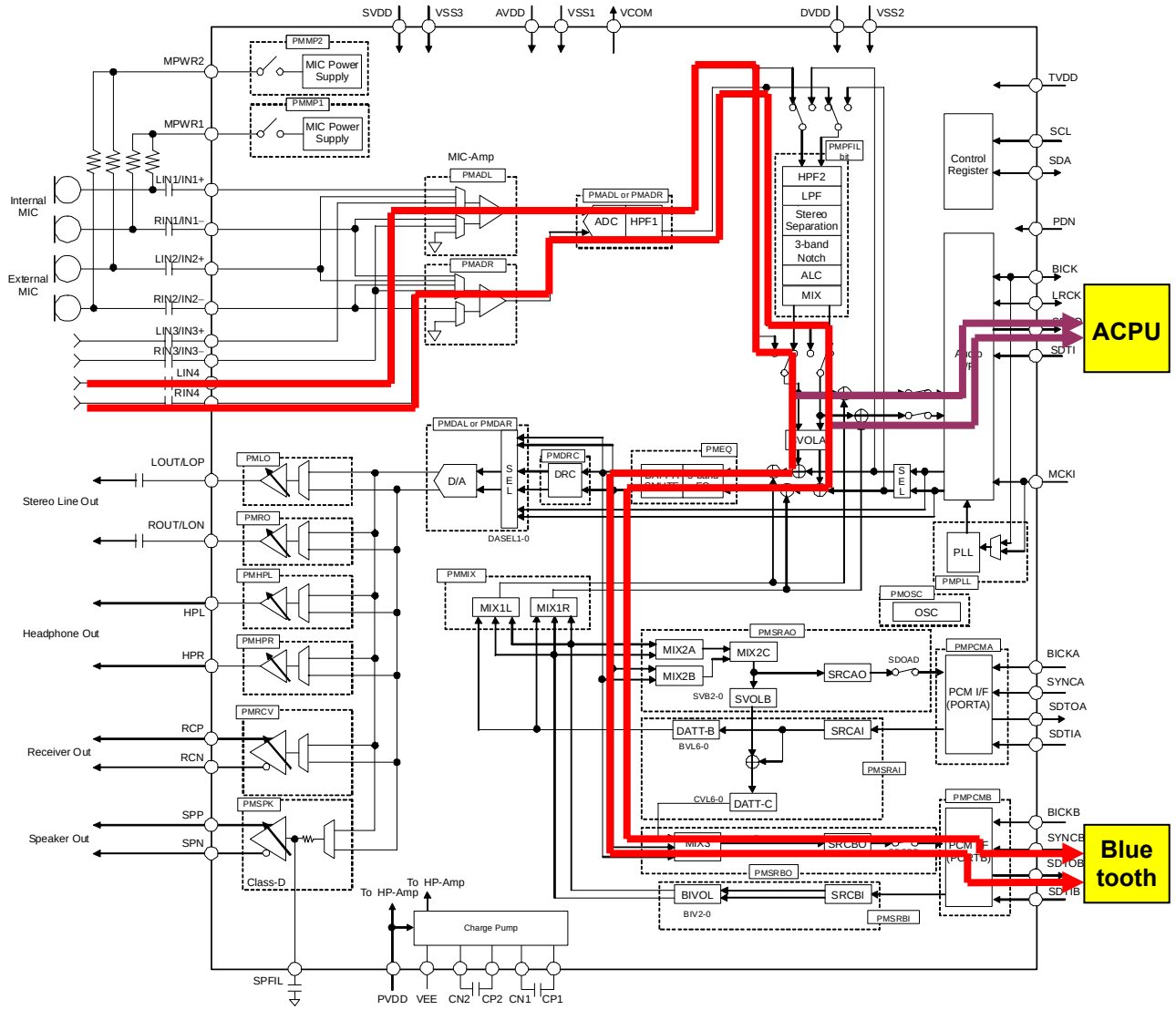
1. Power Supply
2. Wait 1μs
3. PDN pin: “L“ → “H”
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = “0”, I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=06H, Data=0FH (MIC-Amp LIN4/RIN4)
12. Address=07H, Data=00H (MGAIN = 0dB)
13. Address=14H, Data=00H (PFMXL/R1-0 bits=“00”, SRMXL/R1-0 bits=“00”)
14. Address=19H, Data=04H (PFSDO bit = “0”, DASEL1-0 bits = “01”)
15. Address=1CH, Data=00H (SVAL/R2-0 bits = “000”(0dB))
16. Address=28H, Data=00H (SDOL/R1-0 bits = “00”)
17. Address=09H, Data=80H (DACSL = DACSR bits = “1”)
18. Address=10H, Data=B9H (SPKG = -6dB)

(If needed, 5-band equalyzer and DRC are set-up.)

19. Address=00H, Data=31H (MIC-Amp and ADC L/Rch Power-Up)
20. Address=01H, Data=0FH (5-band EQ, DRC, DAC L/Rch Power-Up)
21. Wait 80ms (MIC-Amp & ADC initial time(80ms))
22. Recording
23. Address=0DH, Data=10H (Speaker Power-Up)
24. Wait 32ms
25. Playback from Speaker

26. Address=0DH, Data=00H (Speaker Power-Down)
27. Address=01H, Data=00H (5-band EQ, DRC, DAC L/Rch Power-Down)
28. Address=00H, Data=01H (MIC-Amp and ADC L/Rch Power-Down)
29. Address=04H, Data=22H (PLL Power-Down)
30. Address=00H, Data=00H (VCOM Power-Down)
31. PDN pin: “H” → “L”
32. Clock Stop
33. Stop Power Supply

6-3. Bluetooth



FM Playback: LIN4/RIN4 (Stereo) → ADC → 5band EQ → DATT-A → MIX3 → SRCBO → SDTOB (Stereo)
FM Recording: LIN4/RIN4 (Stereo) → ADC → SDOL → SDTO (Stereo)

<Sequence>

1. Power Supply
2. Wait 1μs
3. PDN pin: "L" → "H"
4. Address=00H, Data=00H (Dummy Command; Digital block power-up)
5. Address=03H, Data=B8H (MCKI=19.2MHz, fs=48kHz)
6. Address=04H, Data=23H (BCKO=64fs, PLL Master Mode)
7. Address=05H, Data=03H (SDOD bit = "0", I2S)
8. MCKI Clock Input
9. Address=00H, Data=01H (VCOM & PLL Power-up)
10. Wait 11ms (VCOM power-Up + PLL Lock Time)
11. Address=06H, Data=0FH (MIC-Amp LIN4/RIN4)
12. Address=07H, Data=00H (MGAIN = 0dB)
13. Address=14H, Data=00H (PFMXL/R1-0 bits="00", SRMXL/R1-0 bits="00")
14. Address=19H, Data=00H (PFSDO bit = "0")
15. Address=1CH, Data=00H (SVAL/R2-0 bits = "000"(0dB))
16. Address=21H, Data=03H (PCM I/F B: I2S, 16bit Linear, SDOBD bits = "0")
17. Address=27H, Data=00H (MXSB2-0 bits = "000")
18. Address=28H, Data=00H (SDOL/R1-0 bits = "00")

(If needed, 5-band equalyzer is set-up.)

19. SYNCB/BICKB clock input
20. Address=00H, Data=31H (MIC-Amp and ADC L/Rch Power-Up)
21. Address=01H, Data=01H (5-band EQ Power-Up)
22. Address=1FH, Data=D8H (Oscillator, SRCBO, PCM I/F B Power-Up)
23. Wait 80ms (MIC-Amp & ADC initial time(80ms) with SRC intial time(9.75ms=156/fs3@fs3=16kHz)
24. Recording & Playback from Bluetooth

25. Address=1FH, Data=00H (Oscillator, SRCBO, PCM I/F B Power-Down)
26. Address=01H, Data=00H (5-band EQ Power-Down)
27. Address=00H, Data=01H (MIC-Amp and ADC L/Rch Power-Down)
28. Address=04H, Data=22H (PLL Power-Down)
29. Address=00H, Data=00H (VCOM Power-Down)
30. PDN pin: "H" → "L"
31. Clock Stop
32. Stop Power Supply