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Revisions

Rev	Description	Date	Approved
	Initial draft	May 15th, 2020	Lucie Hernandez
X1	A055 PPL Released	May 18th, 2020	Lucie Hernandez
	A070 Released	May 29th, 2020	Lucie Hernandez
X2	R156(560R), D20 Added J26 Net names swapped & Default jumpers added J15 Default jumper changed from 1-2 to 2-3 SW4 & SW5 Mfg. part numbers changed Texts added for D7, D11, D12	Jun 11th, 2020	Lucie Hernandez
X3	Texts added for D14, D15, D16 LEDs FS0b_MCU signal changed to FRDM K25Z J1-10 pin instead of J2-1.	Jun 12th, 2020 Jun 16th, 2020	Lucie Hernandez
X4	Solder jumper SJ2 default position change to Open	Jun 17th, 2020	Lucie Hernandez
A	A085 (Final SCH, BOM) Prototype Release	Jun 30th, 2020	Lucie Hernandez
B	- R61 & R69 changed from 5.1K to 10K - R65 changed from 1.1K to 0 Ohm - 10nF(C66) Added between BAT_SW and GND - 10nF(C67) Added between Q7-2 and VSUP - 2K(R157) Added between Q7-2 and GND	Aug 14th, 2020	Lucie Hernandez
C	In Page3 VSUP net position changed. And Near Q1 Two more nets added before Q1 is VPI net name and after Q1 is VPRE_IN net name's updated. A085 (Final SCH, BOM) Prototype Release	Sep 1st, 2020	Lucie Hernandez
C1	R2 & R3 Changed to 6.65K	Sep 9, 2020	Lucie Hernandez
D	Changes done as per FS86 KITs modification.doc and release final A085 files in agile	Jan 1, 2021	Nicolas
E	LBO1 changed to SPM5030VT-4R7M-D	Feb 23, 2021	Nicolas

KITFS86SKTFRDMEM
Socketed Board

Analog Sensor Product Group
6501 William Cannon Drive West
Austin, TX 78735-8598

Designer: Vijayalakshmi	Drawing Title: KITFS86SKTFRDMEM		
Drawn by: Vijayalakshmi	Page Title: TITLE, TOC & REV		
Approved: Lucie Hernandez	Size C	Document Number SCH-47409 PDF: SPF-47409	Rev E
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1. Jumpers default configuration

REF DES	JUMPER(DEFAULT)	PAGE NAME
J4	OPEN	03-FS86SKT
J12,J30,J3	Open	03-FS86SKT
J8,J7	1-2 Short	03-FS86SKT
J11,J9	1-2 short	03-FS86SKT
J31,J15	2-3 Short	03-FS86SKT
J13	7-8 short	03-FS86SKT
J27,J19,J20,J18,J17	1-2 Short	04-VMON, DEBUG
J26	1-2, 3-4, 5-6, 7-8, 9-10 Short	04-VMON, DEBUG
J24	2-3 Short	04-VMON, DEBUG
J25	All Open	04-VMON, DEBUG

2. Not populated components

REF DES	ASSY_OPT	PAGE NAME
D21,C68,R6,R11,CPRE2,R158, C18,C4,R7,CSUP6,C17,D3,R2, C19,CPRE3,R71,C20,C449,CSUP5, CPI3,R18	DNP	03-FS86SKT
R148,R150	DNP	04-VMON, DEBUG
C448	DNP	05-FRDM MCU

3. Switch default configuration

REF DES	SWITCH(DEFAULT)	PAGE NAME
SW3	OFF	03-FS86SKT
SW1	ON	03-FS86SKT
SW2	OPEN	03-FS86SKT
SW5,SW4	ALL ON	03-FS86SKT

4. Solder jumpers default configuration

REF DES	SHORT	PAGE NAME
SJ2	Open	03-FS86SKT
SJ5,SJ4,SJ1,SJ3,SJ6	Short	03-FS86SKT

Board Configuration

This board is meant to be fully configurable. However, we propose bellow a configuration exemple :

REG	Switching frequency	Output voltage	Max output current	Input	Monitoring
Vpre	455 kHz	4.1V	10A	Vsup	VMON8_RES
Buck	2.22 MHz	3.3V	2.5A	Vpre	VMON7_RES
Boost	2.22 MHz	6V	1A	Vpre	VMON9_RES
LDO1	-	3.3V	400mA	Vpre	VMON5_RES
LDO2	-	5V	400mA	Vboost	VMON6_RES

Vpre & Pi Filter Coil Selection :

For Vpre 15 Amps :
- PiFilter : SPM7054VT-1R0M-D Isat 19.3A / Itemp@40°C 14.9A (7.5 x 7mm)
- Vpre 455kHz : SPM12565VT-4R7M-D Isat 22.2 / Itemp@40°C 14A (13 x 12.5mm) / DCR 7.1 mOhm

Alternate Parts for Vpre 10 Amps :
- PiFilter : SPM6545VT-1R0M-D Isat 17.9A / Itemp@40°C 13.3A (7 x 6.5mm)
- Vpre 455kHz : SPM10065VT-4R7M-D Isat 19.3A / Itemp 11.7A (10 x 10.5mm) / DCR 9.2 mOhm

Alternate Parts for Vpre 6 Amps :
- PiFilter : SPM6545VT-1R0M-D Isat 17.9A / Itemp@40°C 13.3A (7 x 6.5mm)
- Vpre 455kHz : SPM7054VT-4R7M-D Isat 11.2A / Itemp 7.8A (7.5 x 7mm) / DCR 16.6 mOhm

Alternative parts for 2.22MHz (fit with 455KHz inductors footprint for evaluation purpose) :
- Vpre 2.22MHz : SPM10040T-2R2M-HZ Isat 13A / Itemp@40°C 16.7A (10.7 x 10mm) / DCR 6.8 mOhm
- Vpre 2.22MHz : SPM7054VT-2R2M-D Isat 14.1A / Itemp 12A (7.5 x 7mm) / DCR 7.4 mOhm

Alternate Parts for Vpre 10 Amps :
- Vpre 455KHz : XAL1010-682 Isat 21.8A / Itemp 14A (10x11.3mm)
- Vpre 2.22MHz : XAL6030-182ME Isat 18.2A / Itemp@20C 10A

For Vpre 6 Amps :
- Vpre : XAL6060-682ME

Vpre MOS Optimization :

For Vpre 15 A (40V max):
- HS : BUK9M9R5-40H
- LS : BUK9M3R3-40H

For Vpre 10 Amps and Vbat 24V (60V max):
- HS : BUK9M42-60E
- LS : BUK9M12-60E

Vpre 2.22MHz :

For Vpre 6A and 40V max:
- HS : BUK9M20-40H
- LS : BUK9M20-40H

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Drawing Title: KITFS86SKTFRDMEM

Page Title: NOTES

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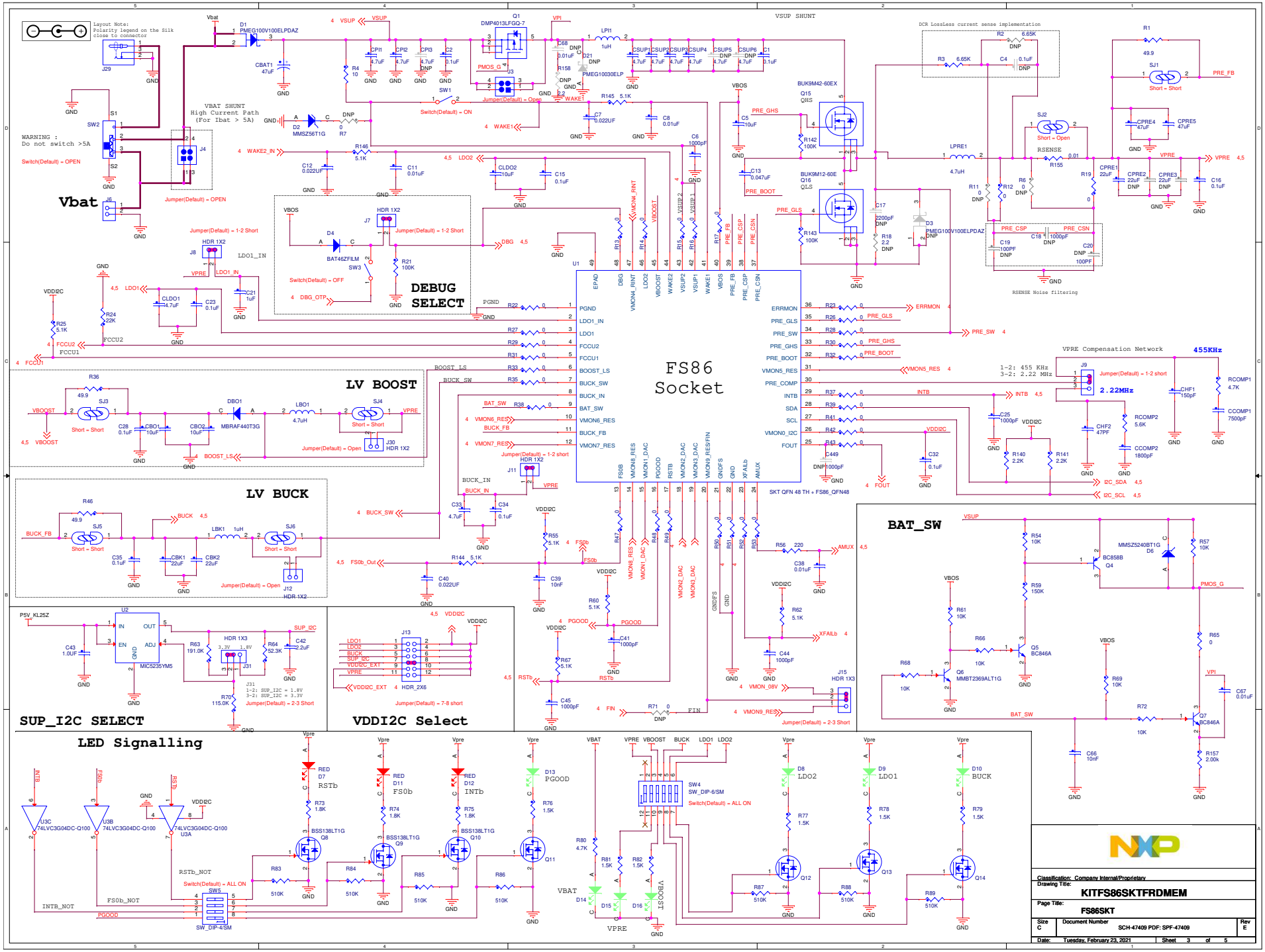
Vbat
DEBUG SELECT
FS86 Socket
SKT QFN 48 TH + FS86_QFN48
LV BOOST
LV BUCK
BAT_SW
SUP_I2C SELECT
VDDI2C Select
LED Signalling
VSUP SHUNT
VBAT SHUNT
High Current Path
(For Ibat > 5A)
DCR LossLess current sense implementation
RSENSE Noise filtering
VPRE Compensation Network
455KHz
2.22MHz
KITFS86SKTFRDMEM
FS86SKT
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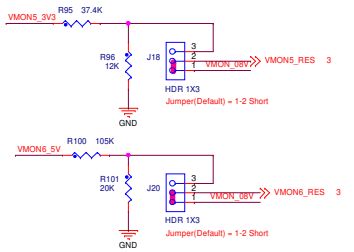
Classification: Company Internal/Proprietary

Fixed Voltage Monitoring

VMONs Fixed Resistor Bridges

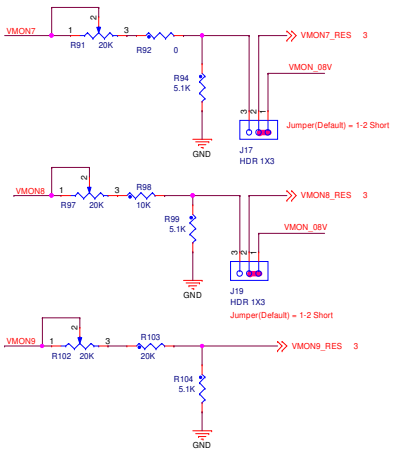
	Monitoring	
	VMON_3V3	VMON_5V
Voltage	3.3V	5V
RH	37.4K	105K
RL	12K	20K



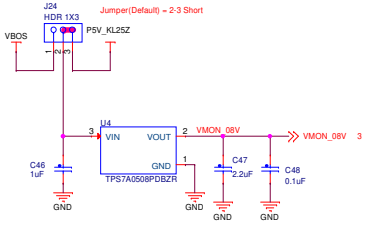
Flexible Voltage Monitoring

VMONs Flexible Resistor Bridges

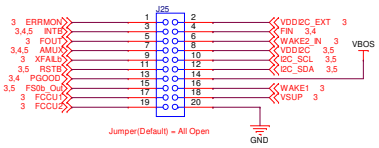
	Monitoring		
	VMON7	VMON8	VMON9
Voltage	0.8V -> 3.9V	2.4V -> 5.5V	3.9V -> 7V
RH	POT 20K	10K + POT 20K	20K + POT 20K
RL	5.1K	5.1K	5.1K



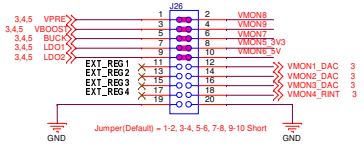
VMON_08V



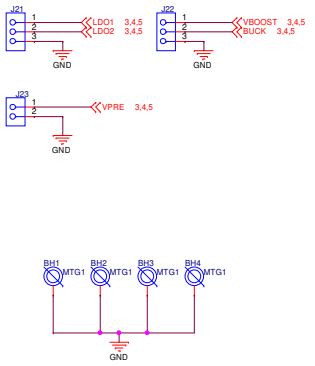
FS8600 Signals



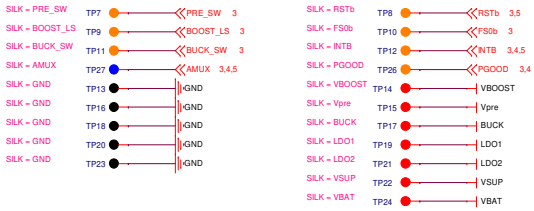
FS8600 Monitored Signals



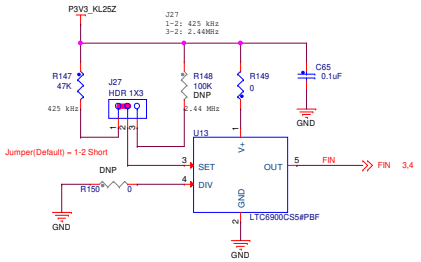
POWER



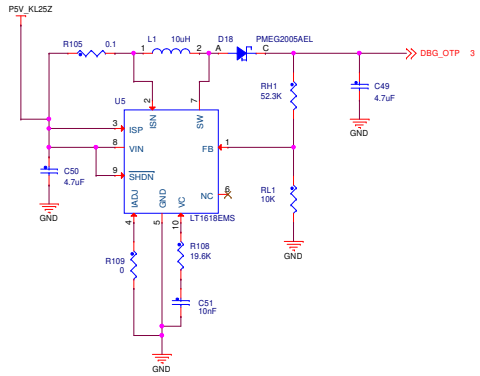
Test Points

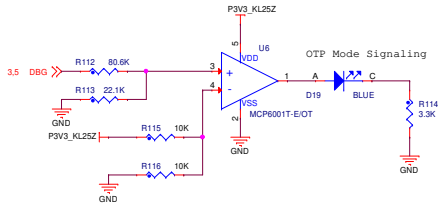


IC External clock generation



OTP Mode entry (Using USB 5V Power Supply)





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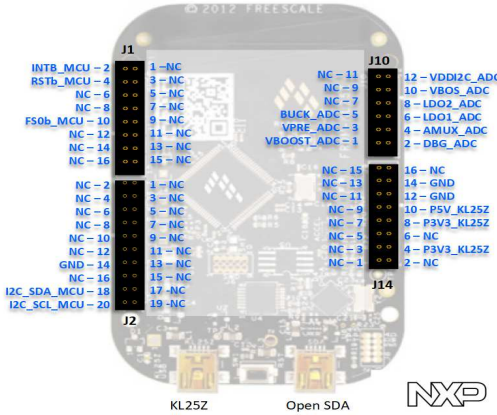
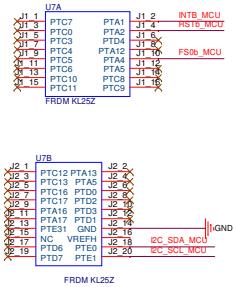
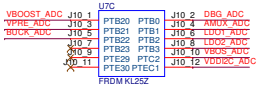
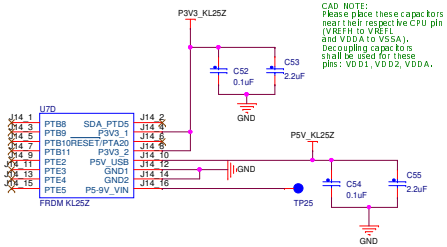
FRDM KL25Z – pinout



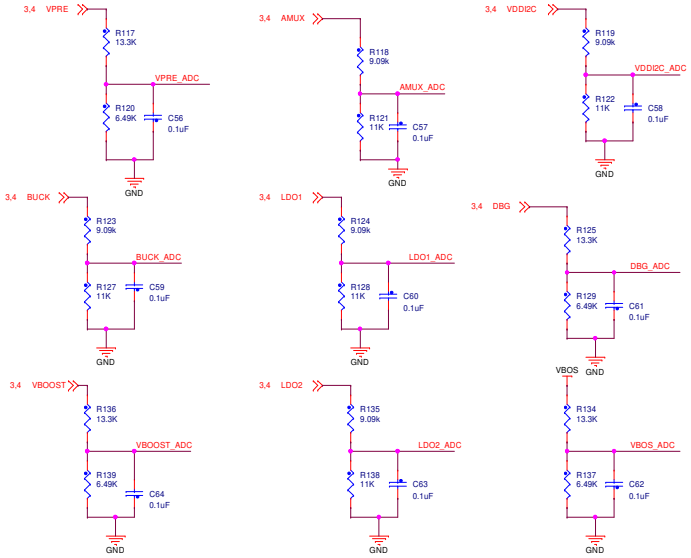




KL25Z Decoupling Caps

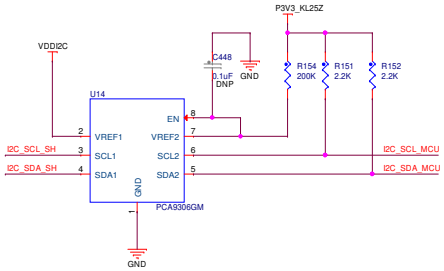


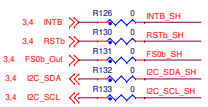
Analog Inputs

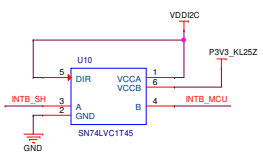


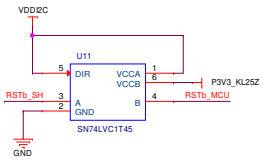
Level Shifter (1.65V / 5.5V)

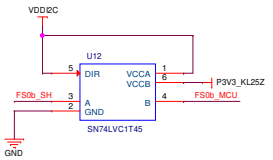
Fail Safe Outputs / I2C











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Drawing Title: **KITFS86SKTFRDMEM**

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