TEB0728 TRM

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Overview

The Trenz Electronic TEB0728 Carrier Board provides functionalities for testing, evaluation and development purposes of company's 6 x 6 cm SoMs. The Carrier Board is equipped with various components and connectors for different configuration setups. See "6 x 6 SoM" Carriers" page for more information about 6 x 6 cm SoMs.

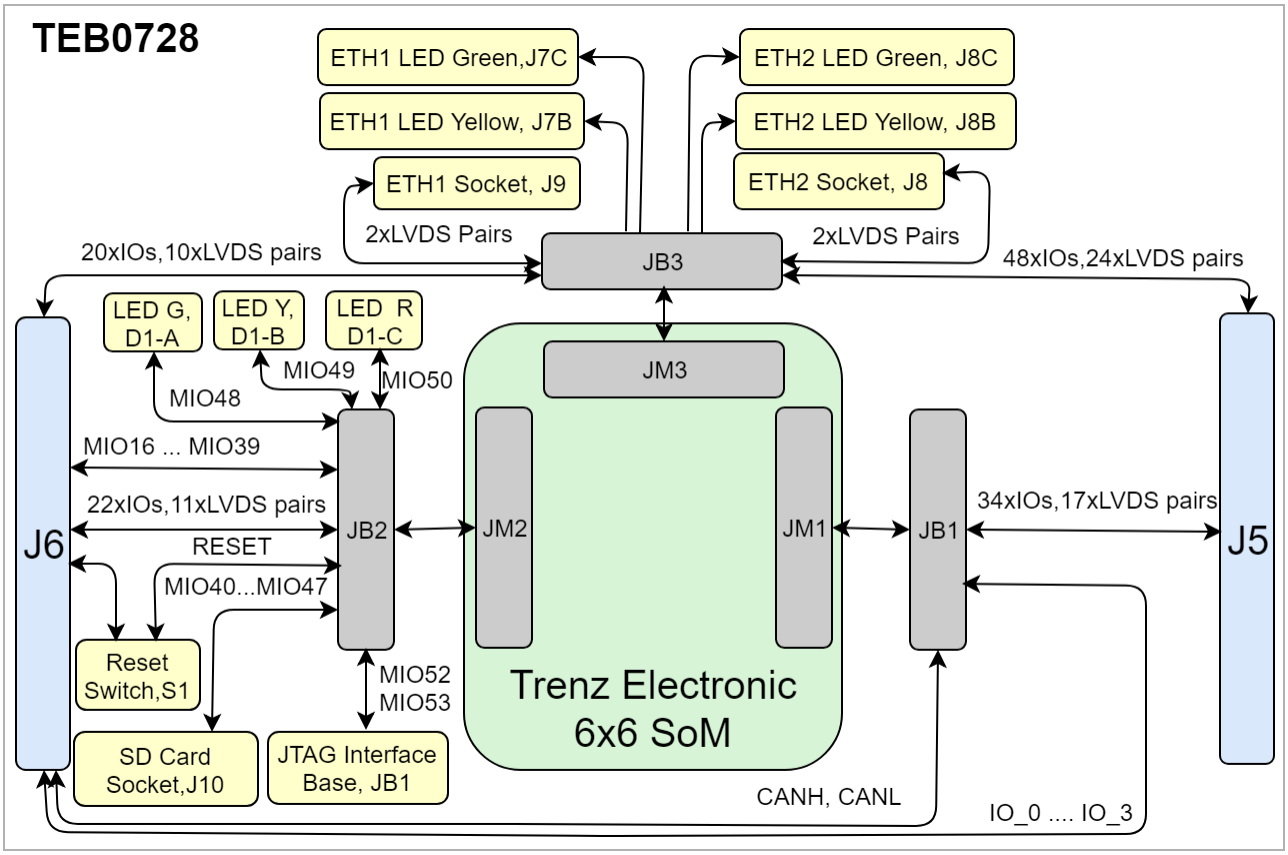
Refer to http://trenz.org/TEB0728-info for the current online version of this manual and other available documentation.

Key Features

- Samtec Tiger Eye Terminal Socket (80 pins, 2 rows)
- Micro SD card socket

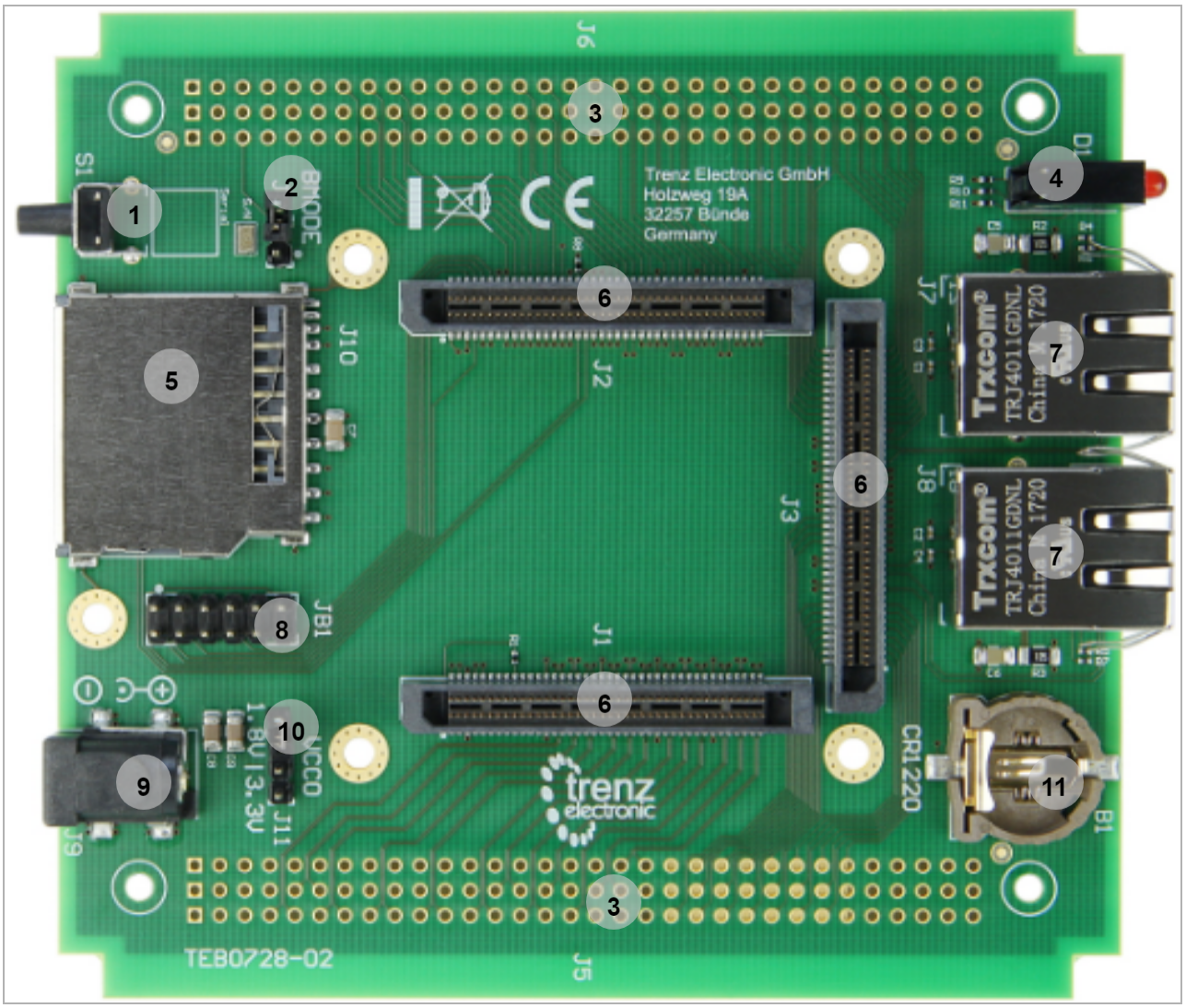
- 3 User LEDs, Red, Yellow, Green
- Two RJ45 Gigabit Ethernet socket
- Trenz 6x6 module connector strips (3 x Samtec Tiger Eye series connectors)
- Barrel Jack for 5V power supply
- One user push button

Block Diagram



TEB0728 block diagram

Main Components



TEB0728 main components

1. User push-button, S1
2. Jumper (Boot Mode), J4
3. External connector (VG96) placeholder, J5 / J6
4. LEDs , D1
5. SD Card Connector, J10
6. Board to Board Connector, J1-J2-J3
7. RJ45 Gigabit Ethernet connector, J7-J8
8. XMOD JTAG- / UART-header, JB1
9. Barrel jack for 5V power supply, J9
10. Jumper(VCCIO_13), J11
11. CR1220 Backup-Battery holder, B1

Initial Delivery State

There is no hardware component to be programmed on the carrier.

Storage device name	Content	Notes
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Initial delivery state of programmable devices on the module

Configuration Signals

Signal	Designator	B2B	Jumper	Boot Mode
Boot_R	J4	J2-11	Open	QSPI
			Short	SD Card

Boot process.

There is a user push button which is used for RESET signal.

Signal	Designator	B2B	Active Level
RESET	S1	J2-7	Active High

Reset process.

Signals, Interfaces and Pins

Board to Board (B2B) I/Os

Number of I/O signals FPGA bank numbers connected to the B2B connectors:

B2B Connector	Interfaces	Number of I/O	Notes
J1	User I/O	48 singel ended, 24 differential	Connected to Bank 13
		4 Single ended	MIO10...13
	CANH , CANL	2 single ended	MIO8, MIO9
J2	User I/O	22 singel ended, 11 differential	
		38 single ended	MIO16...53
	SoM Control Signals	5	RESET, RST_OUT, BOOT_R,
	JTAG Interface	4	TCK , TDO, TDI, TMS
J3	User I/O	20 Single ended, 10 differential	Connected to Bank 35
		34 single ended, 17 differential	Connected to Bankd 33
	Ethernet 1	4 single ended, 2 differential	ETH_CTREF , ETH_TD+, ETH_TD- , ETH_RD+, ETH_RD-, ETH_LED1, ETH_LED2, ETH_LED3
	Ethernet 2	4 single ended, 2 differential	ETH_CTREF , ETH_TD+, ETH_TD- , ETH_RD+, ETH_RD-, ETH_LED1, ETH_LED2, ETH_LED3

General overview of PL I/O signals and SoM's interfaces connected to the B2B connectors.

On-board Connector

There are two pin placeholder on the board, J5-J6.

VGA96 Vertical Connector	Interfaces	Number of I/O	Notes
J5	User I/O	48 singel ended, 24 differential	Connected to Bank 13
		34 single ended, 17 differential	Connected to Bank 33
J6	User I/O	42 singel ended, 21 differential	
		27 single ended	MIO16... MIO39 + MIO51...53
		4 single ended	MIO10...13
	SoM Control Signals	3	RESET, RST_OUT, BOOT_R
	JTAG Interface	4	TCK , TDO, TDI, TMS
	CANH , CANL	2 single ended	MIO8, MIO9

General information about On-board connectors information

JTAG Interface Base

JTAG access to the TEB0728 Trenz module is available through B2B connector J2. JTAG Programmer TE0790_02 is provided by Trenz Electronic, More information is available here.

Designator	B2B Pin	XMOD Header JB1	Note
A	J2-15	JB1-3	UART Txd - input
B	J2-16	JB1-7	UART Rxd - Output
C	J2-12	JB1-4	JTAG-TMS
D	J2-10	JB1-8	JTAG-TDI
F	J2-8	JB1-10	JTAG-TDO
H	J2-6	JB1-12	JTAG-TCK
G	J2-7	JB1-11	RESET will be connected to Push Button on JTAG Programmer
3.3V	-	JB1-5	connected to GND
VIO	J2-2/4	JB1-6	VIO is connected to 3.3V which is supplied by carrier

JTAG interface Base

SD Card Socket

Power supply voltage for SD card holder is 3.3V.

Signals	B2B	Notes
CMD	J2-29	
CLK	J2-34	
DAT0	J2-37	
DAT1	J2-40	
DAT2	J2-32	
CD/DAT3	J2-31	

CD	J2-35	
WP	J2-33	

On board peripherals

RJ45 Connector

Both Ethernet sockets,ETH1 and ETH2, are connected to the Board to Board (B2B) J3 on the carrier.

Signal	ETH1	ETH2	Notes
ETH_TD+	J3-58	J3-28	Transfer
ETH_TD-	J3-56	J3-26	
ETH_RD+	J3_52	J3-22	Receive
ETH_RD-	J3-50	J3-20	
ETH_CTREF	J3_57	J3-25	
ETH_LED1	J3-55	J3-23	Yellow LED- Activity
ETH_LED3	J3-51	J3-19	Green Green- Link

Ethernet Connections to B2B Connectors

On-board Peripherals

Push button

Designator	Connected to	B2B	Active Level	Note
S1-A	RESET	J2-7	Active high	General Input RESET

On-board push button

Jumpers

Designator	Connected to	B2B	Note
J4	Boot_R	J2-11	Open: QSPI
			Short: SD Card

On-board Jumpers

Designator	Connected to	Voltage	Note
J11	VCCIO_13	3.3 V	Pin 1 and the middle pin are connected
		1.8 V	Pin 3 and the middle pin are connected

On-board Jumpers

LEDs

Designator	Color	B2B	Active Level	Note
D1-A	Red	J2-30	Active high	
D1-B	Yellow	J2-38	Active high	
D1-C	Green	J2-36	Active high	

On-board LEDs

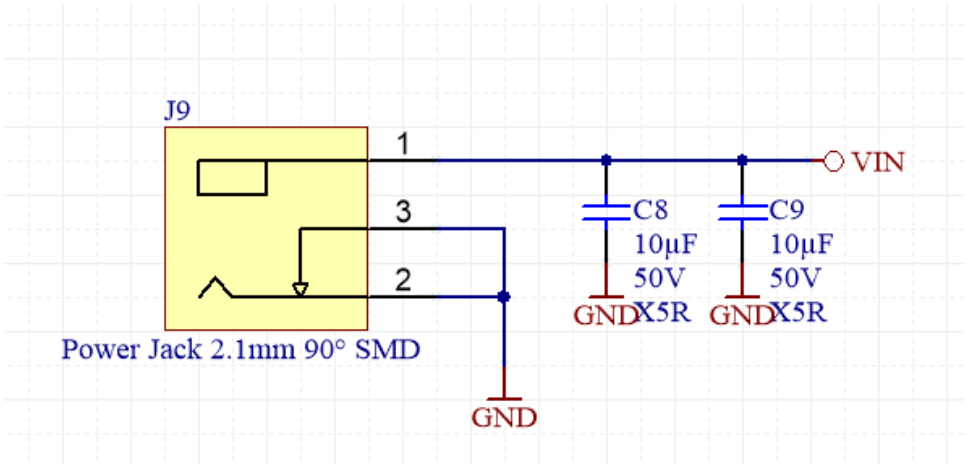
Power and Power-On Sequence

Power Supply

> ⚠ No power supply protection circuit on the carrier, module will be powered directly

Single 5V power supply with minimum current capability of 2.5A is recommended to operate the board.

- 5V VIN (inner)
- GND (outer)



Power Connector

Power Consumption

Power Input Pin	Typical Current
VIN	TBD*
VBATT	TBD*

Power Consumption

* TBD - To Be Determined

Power Rails

Module Connector (B2B) Designator	VCC / VCCIO	Direction	Pins	Notes
JB1	VIN	Output	1, 3	Up to 12V carrier supply voltage
	3.3V	Input	19	PL IO-bank VCCIO
	VCCO_13	Output	39	1.8V or 3.3V over jumper
JB2	3.3V	Input	2, 4	3.3V module supply voltage
	1.8V	Input	5	PL IO-bank VCCIO
	VBATT	Output	1	RTC buffer voltage
JB3	-	-	-	-

Carrier Power Rails.

Board to Board Connectors

6 x 6 modules use two or three Samtec Micro Tiger Eye Socket Strip on the bottom side.

- 3 x REF-189018-01 (compatible to TEM-140-02-03.0-H-D-A), (80 pins, "40" per row)

Connector Specifications	Value
Insulator material	Black Liquid Crystal Polymer
Stacking height	6 mm
Contact material	Phosphor-bronze
Plating	Au or Sn over 50 " (1.27 m) Ni
Current rating	2.9 A per pin (2 pins powered)
Operating temperature range	-55 °C to +125 °C
RoHS compliant	Yes

Connector specifications.

Connector Mating height

When using the same type on baseboard, the mating height is 6mm. Other mating heights are possible by using connectors with a different height

Order number	Connector on baseboard	compatible to	Mating height
26056	REF-189018-01	TEM-140-02-03.0-H-D-A	6 mm
	SEM-140-02-03.0-H-D-A	TEM-140-02-03.0-H-D-A	6 mm

Connectors.

The module can be manufactured using other connectors upon request.

Connector Speed Ratings

The LSHM connector speed rating depends on the stacking height; please see the following table:

Stacking height	Speed rating

6 mm, Single-Ended	12 GHz
10 mm, Differential	17 GHz
6 mm, Single-Ended	14.5 GHz
10 mm, Differential	17.5 GHz

Speed rating.

Current Rating

Current rating of Samtec Micro Tiger Eye Connector™ LSHM B2B connectors is 2.9A per pin (2 adjacent pins powered).

Connector Mechanical Ratings

- Shock: 100G, 6 ms Sine
- Vibration: 7.5G random, 2 hours per axis, 3 axes total

Manufacturer Documentation

File	Modified
PDF File SEM-140-02-03.0-H-D-A.pdf	11 02, 2019 by Pedram Babakhani
PDF File TEM-140-02-03.0-H-D-A.pdf	11 02, 2019 by Pedram Babakhani

Download All

Absolute Maximum Ratings

Parameter	Min	Max	Units	Note
VIN supply voltage	--	--	V	• Connected directly to the module power supply, see Module TRM
Storage Temperature	-25	+85	°C	

Module absolute maximum ratings.

Recommended Operating Conditions

Operating temperature range depends also on customer design and cooling solution. Please contact us for options.

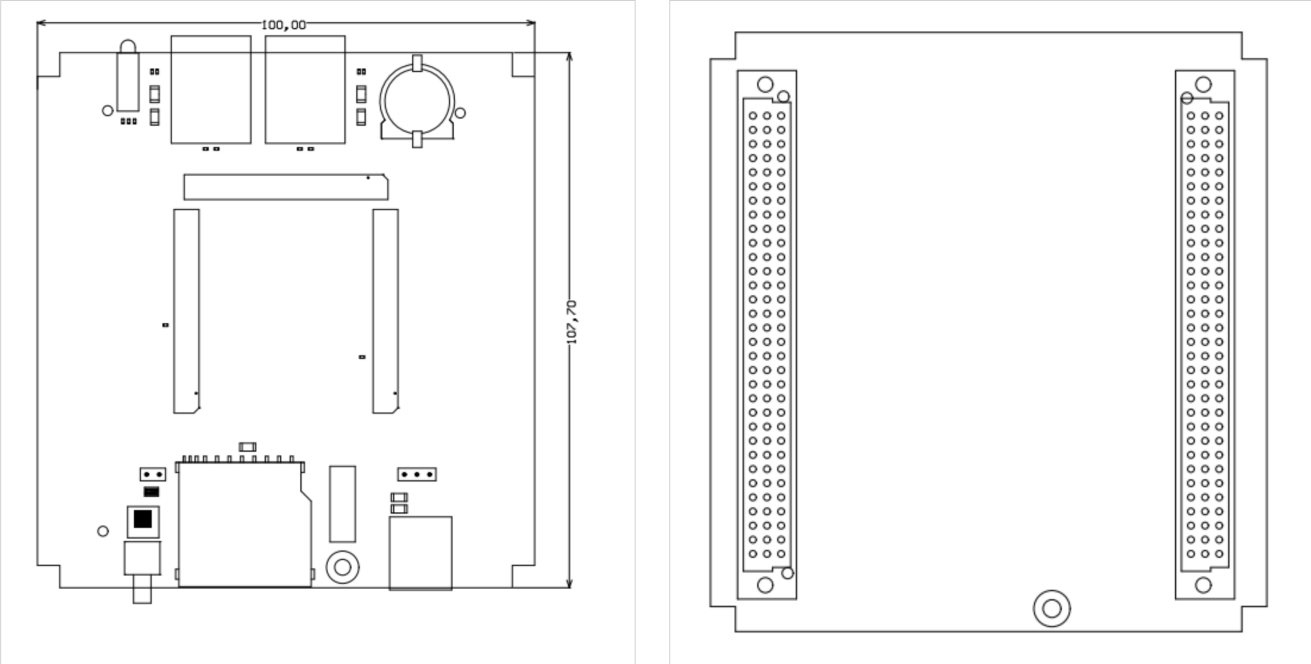
Parameter	Min	Max	Units	Note
VIN supply voltage	--	--	V	• Connected directly to the module power supply, see Module TRM • 5V recommended for usage with TE0728
Operating Temperature	-25	+85	°C	

Recommended operating conditions.

Physical Dimensions

- Module size: 100 mm × 107.7 mm. Please download the assembly diagram for exact numbers.

- Mating height with standard connectors: 7 mm.
- PCB thickness: 1.6 mm.



Physical Dimension

Currently Offered Variants

Trenz shop TEB0728 overview page	
English page	German page

Trenz Electronic Shop Overview

Revision History

Hardware Revision History

Date	Revision	Changes
2018-07-18	02	• changed value R1 • changed magjack connectors J7, J8 • changed 2.1mm power jack THT on SMD • magjack connectors: pin8 connected to frame (shassis ground) • lib component update • added thermal bias to mounting holes • added visual serial number • changed 2.1mm power jack THT on SMD • added 2 x 10uF to VIN

2016-11-02	01	• ---

Hardware Revision History

Hardware revision number is printed on the PCB board next to the module model number separated by the dash.

Document Change History

Date	Revision	Contributor	Description
Error rendering macro 'page-info' Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	• typo table title • power rail section
2019-6-25	v.132	Pedram Babakhani	• initial release

--	all	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk.proxy241.$Proxy3496#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]	• --

Document change history.

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