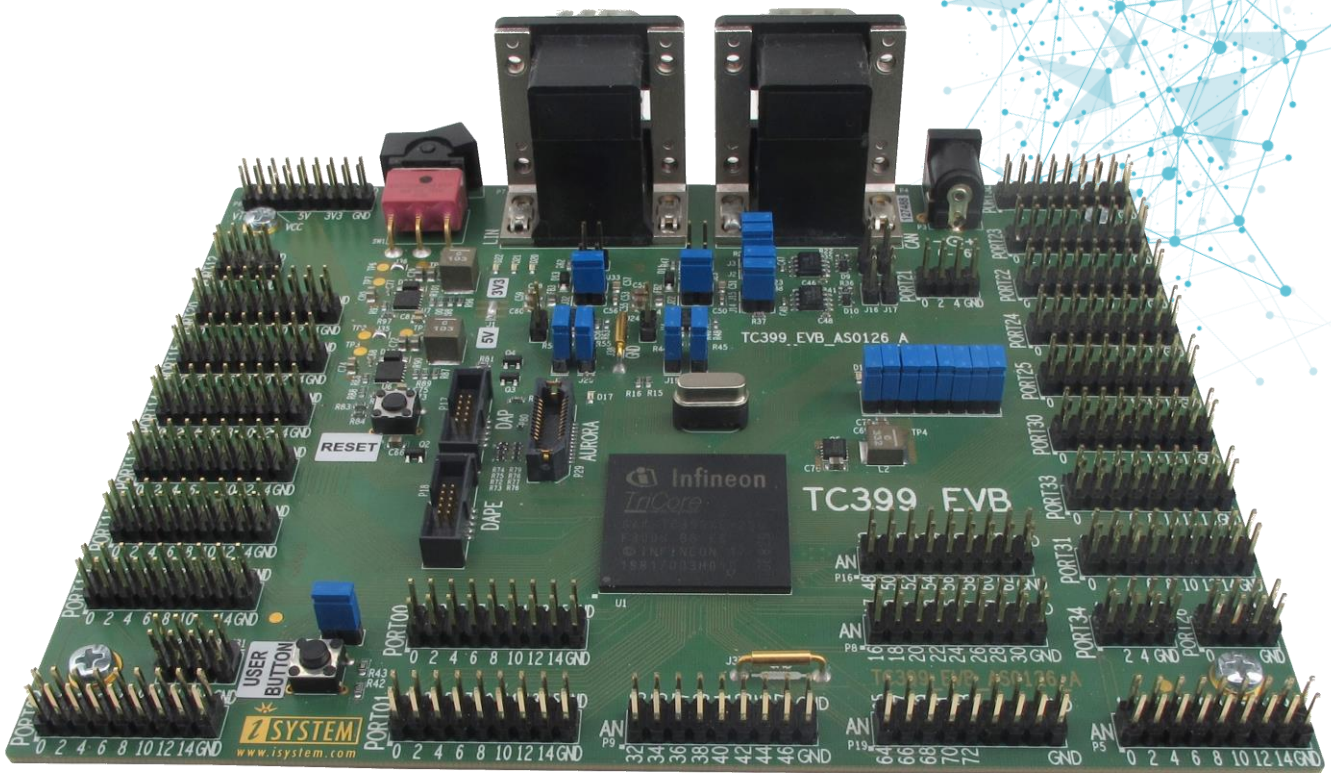


User Manual



Enabling Safer Embedded Systems

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Introduction

iSYSTEM evaluation and development systems are optimized for evaluation of the featuring microcontroller whether it fits the project requirements or for the development of the target application while the hardware is still in the design stage. Our systems are distinguished by high speed debug and trace connection to experience the full microcontroller capabilities.

ITTC399 Evaluation Board features:







- TC399XE microcontroller in the LFBGA-516 package
- 27 expansion connectors making all microcontroller pins easily accessible
- 10-pin 1.27mm DAP connector
- 10-pin 1.27mm DAPE connector
- 22-pin AGBT ERF8 connector
- 2 CAN and 2 LIN connectors connected to the microcontroller CAN/LIN module
- 8 user LED indicators
- 1 user push button
- Reset button

Change from DAP/DAPE to AGBT interface and vice versa without any hardware modification. The application can run from the internal program FLASH or from the internal SRAM.



Contact sales@isystem.com to inquire about iSYSTEM BlueBox development and test tools.

Package content

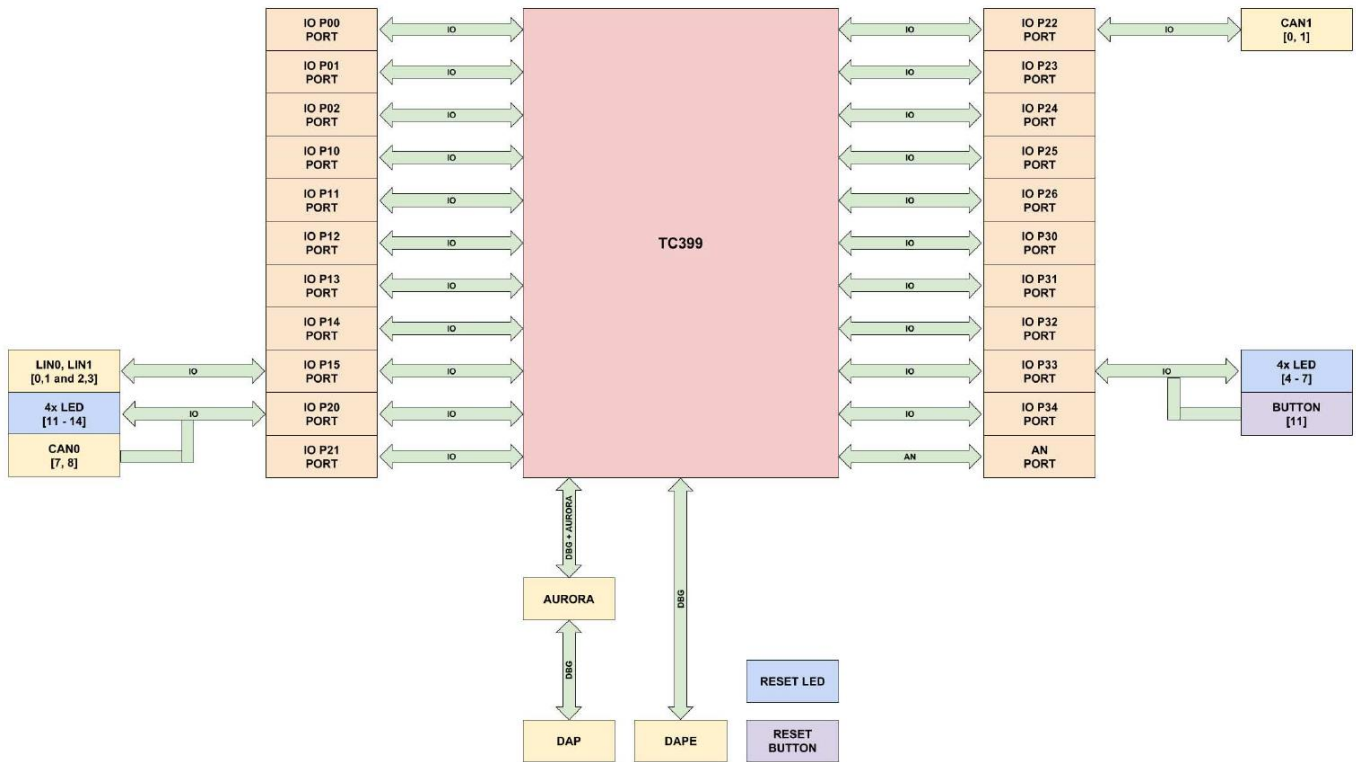
ITTC399 Target board	Power supply	User manual
Ordering code: ITTC399	Ordering code: IT12V-PS	
		
5-piece clip wires set	5-piece test clips set	20-piece jumpers set
Ordering code: BB-CLIPWIRES5	Ordering code: BB-CLIPSET5	Ordering code: BB-JUMPERS20
		

Specifications

Supply voltage	6 – 16V, min. 350 mA, + in the center
Board Size	157 mm x 123 mm
Microcontroller (package)	TC399XE-256F300S (LFBGA-516)
Debug & trace connection	10-pin 1.27mm DAP connector 10-pin 1.27mm DAPE connector 22-pin AGBT ERF8 connector
DAP clock	160 MHz
CAN/LIN Interface connections	2x CAN, 2x LIN
User interface	8x user LED 1x user button Reset push button All CPU pins exposed
On-board clock (xtal)	20 MHz

Device description

Block Diagram



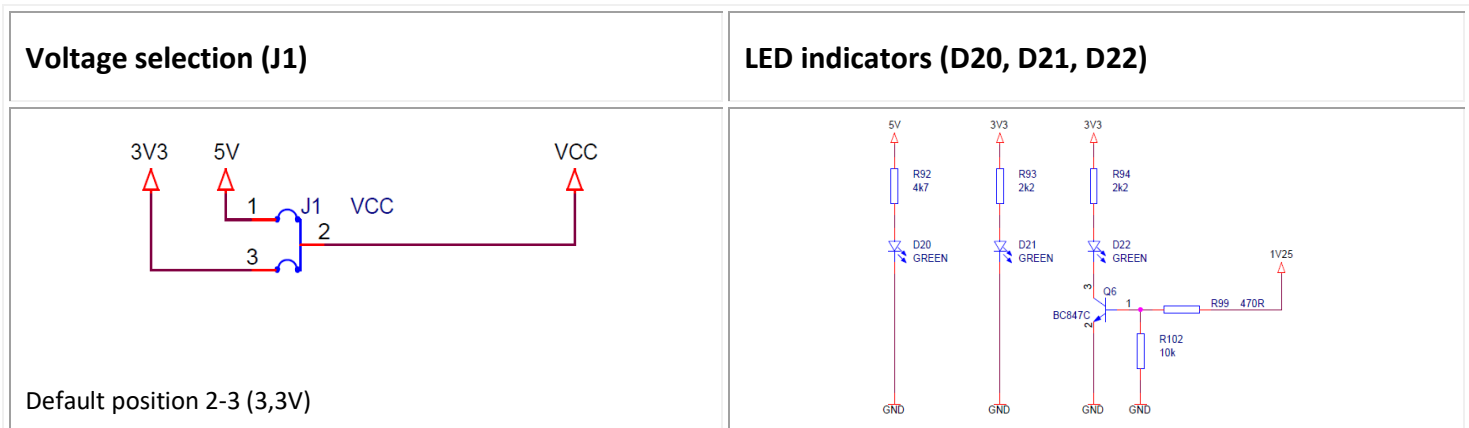
Power Supply

Permissible input voltage: 6 - 16 V DC, **+ in the center**. The required current load capacity of the power supply depends on the specific configuration of the target board. A power supply with a minimum of 350mA is recommended and delivered in the package.



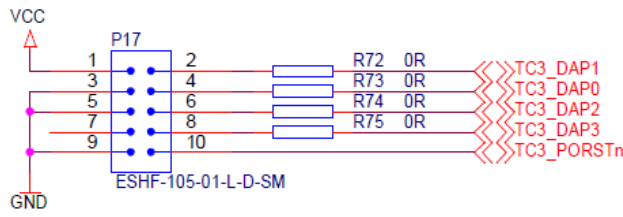
First plug in the AC power supply to the mains and target board, then switch on the target. When connecting an external debugger, switch the debugger on before powering on the target board. When powering down the system, power off the target before powering off the debugger!

Supply voltage selection



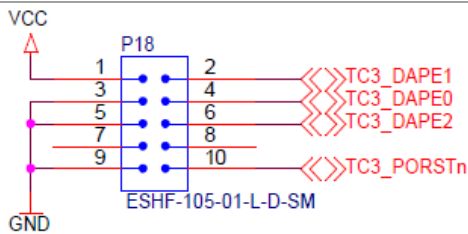
Debug & Trace Interface Connectors

DAP (P17)



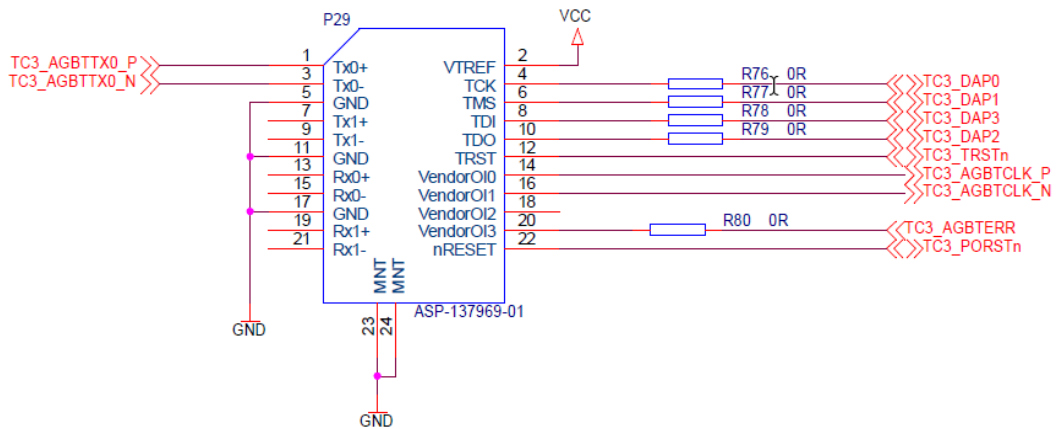
Vcc	1	2	TC3_DAP1
GND	3	4	TC3_DAP0
GND	5	6	TC3_DAP2
-	7	8	TC3_DAP3
GND	9	10	TC3_PORSTn

DAPE (P18)



Vcc	1	2	TC3_DAPE1
GND	3	4	TC3_DAPE0
GND	5	6	TC3_DAPE2
-	7	8	-
GND	9	10	TC3_PORSTn

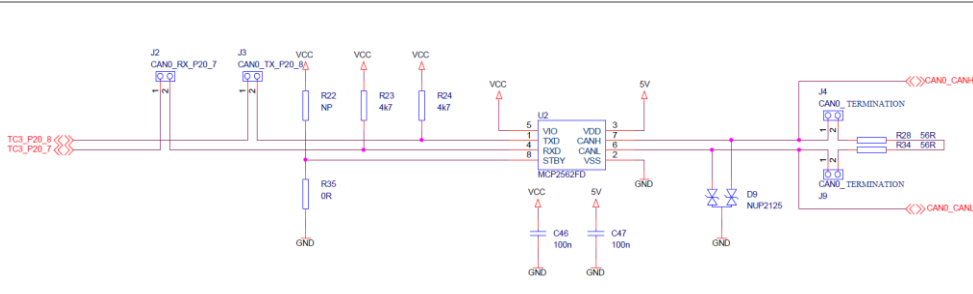
INFINEON AGBT (P29)



CPU Port	Connector PIN description	Connector PIN No.		Connector PIN description	CPU PORT
TC3_AGBTTX0_P	Tx0+	1	2	VTREF	Vcc
TC3_AGBTTX0_N	Tx0-	3	4	TCK	TC3_DAP0
GND	GND	5	6	TMS	TC3_DAP1
-	Tx1+	7	8	TDI	TC3_DAP3
-	Tx1-	9	10	TDO	TC3_DAP2
GND	GND	11	12	TRST	TC3_TRSTn
-	Rx0+	13	14	VendorOI0	TC3_AGBTCLK_P
-	Rx0-	15	16	VendorOI1	TC3_AGBTCLK_N
GND	GND	17	18	VendorOI2	-
-	Rx1+	19	20	VendorOI3	TC3_AGBTERR
-	Rx1-	21	22	nRESET	TC3_PORSTn
GND	MNT	23	24	MNT	GND

CAN modules & connectors

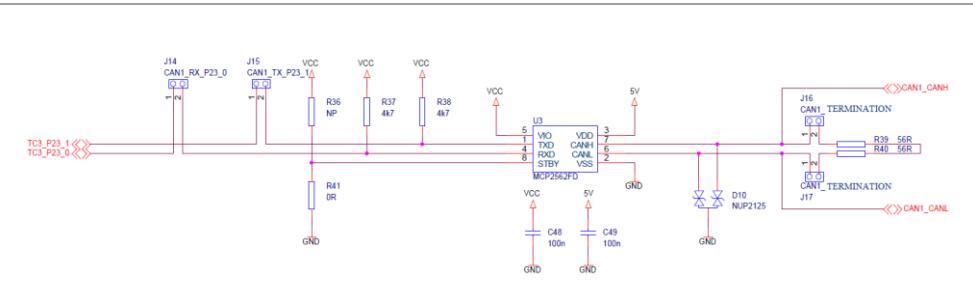
CAN0 module



Place corresponding jumpers to enable CAN for application use.

Ports	RXD	TC3_P20_8
	TXD	TC3_P20_7
Connected CAN0	Place jumpers J2, J3	
Enable termination	Place jumpers J4, J9	

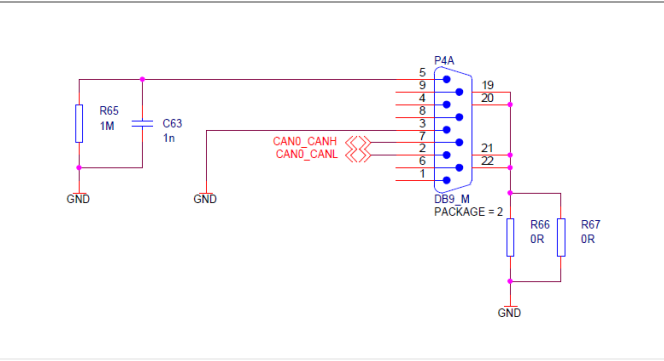
CAN1 module



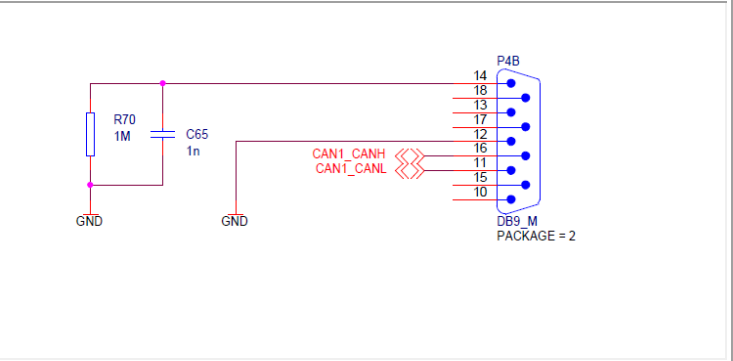
Place corresponding jumpers to enable CAN for application use.

Ports	RXD	TC3_P23_0
	TXD	TC3_P23_1
Connected CAN1	Place jumpers J14, J15	
Enable termination	Place jumpers J16, J17	

CAN0 connector (P4A)

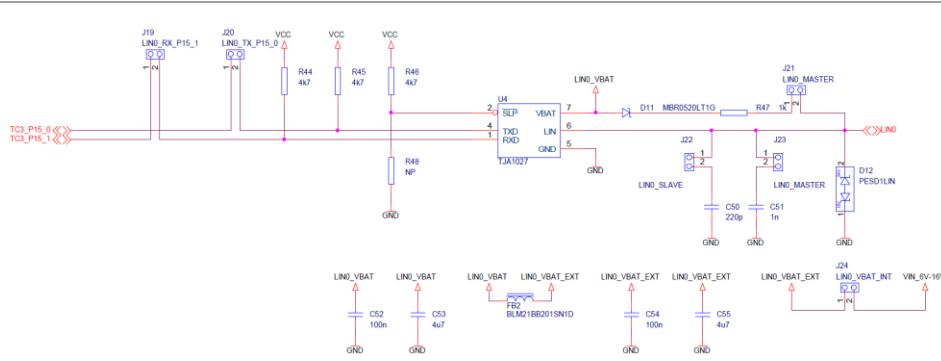


CAN1 connector (P4B)



LIN modules & connectors

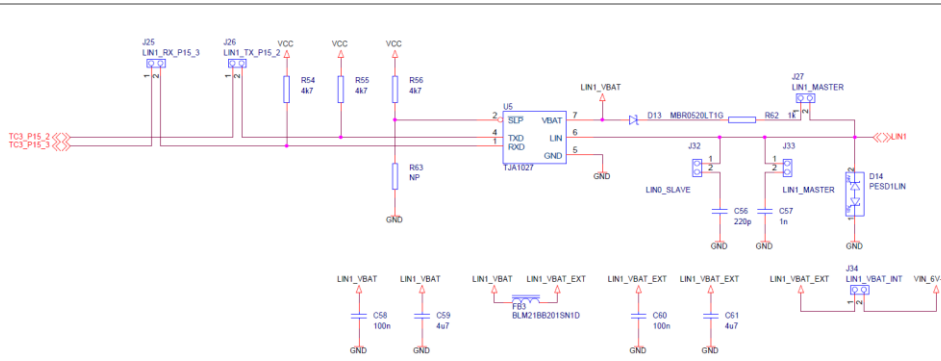
LIN0 module



Place corresponding jumpers to enable LIN for application use.

Ports	TXD	TC3_P15_0
	RXD	TC3_P15_1
Connected LIN0	Place jumpers J19, J20	
Enable master mode	Place jumpers J21, J23	
Enable slave mode	Place jumper J22	
Enable powering LIN0 module with board power supply*	Place jumper J24 *Use 12V only! Place it only on Master.	

LIN1 module

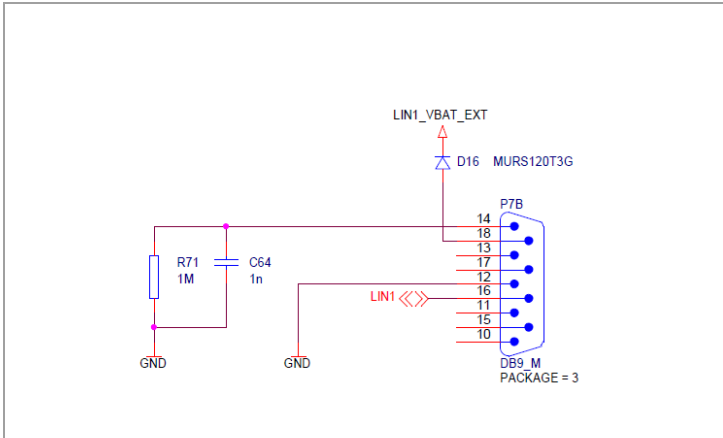
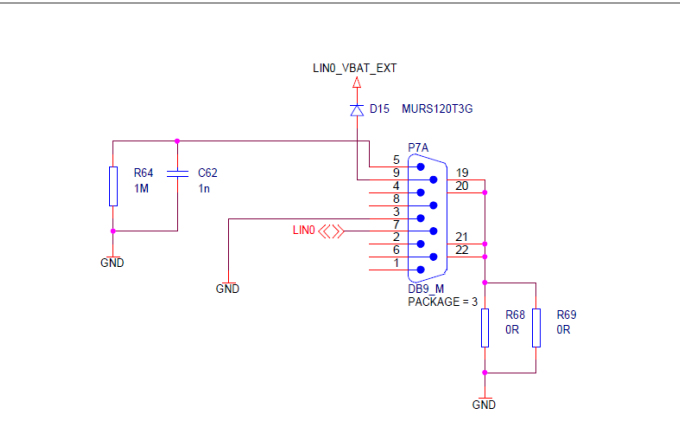


Place corresponding jumpers to enable LIN for application use.

Ports	TXD	TC3_P15_2
	RXD	TC3_P15_3
Connected LIN1	Place jumpers J25, J26	
Enable master mode	Place jumpers J27, J33	
Enable slave mode	Place jumper J32	
Enable powering LIN1 module with board power supply*	Place jumper J34 *Use 12V only! Place it only on Master.	

LIN0 connector (P7A)

LIN1 connector (P7B)

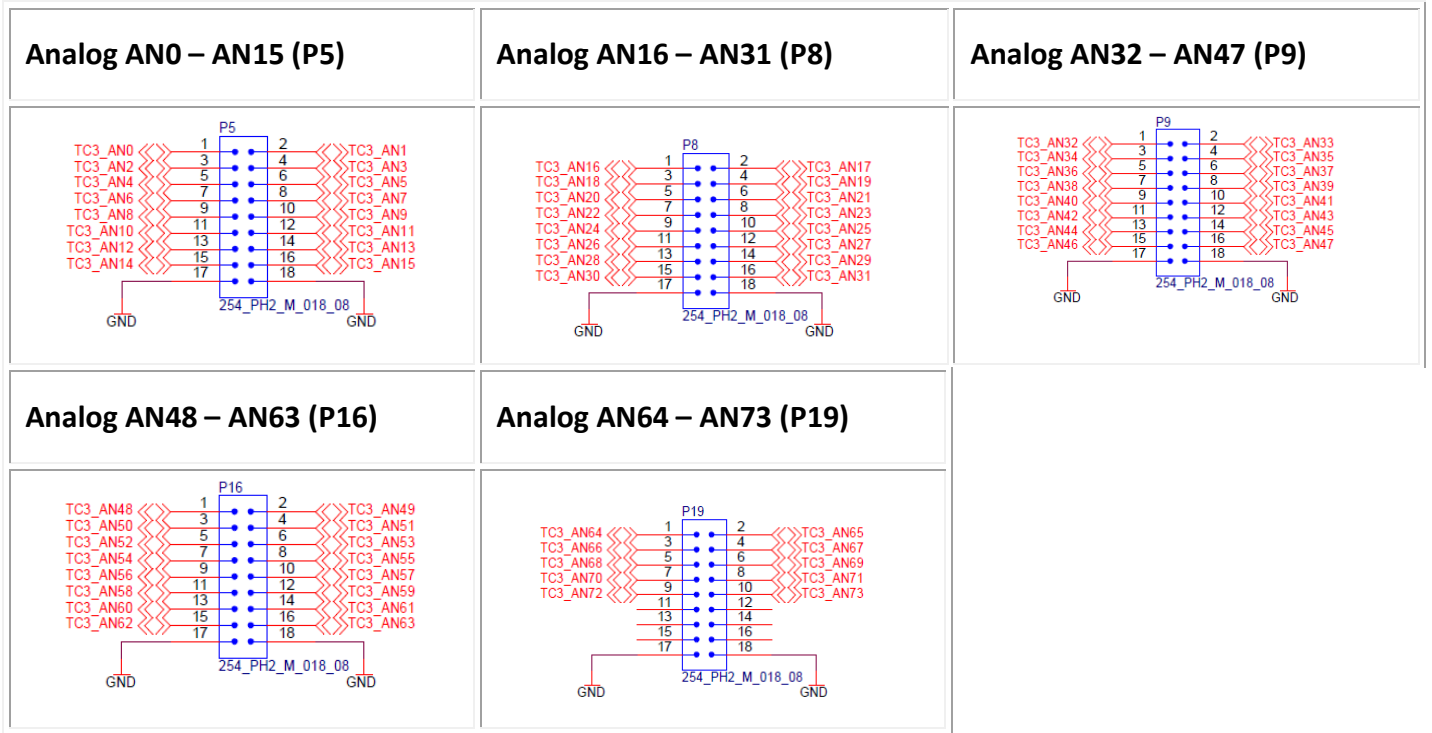


Revision A2 replaces D15 (LIN0 connector) and D16 (LIN1 connector) with resettable fuses.

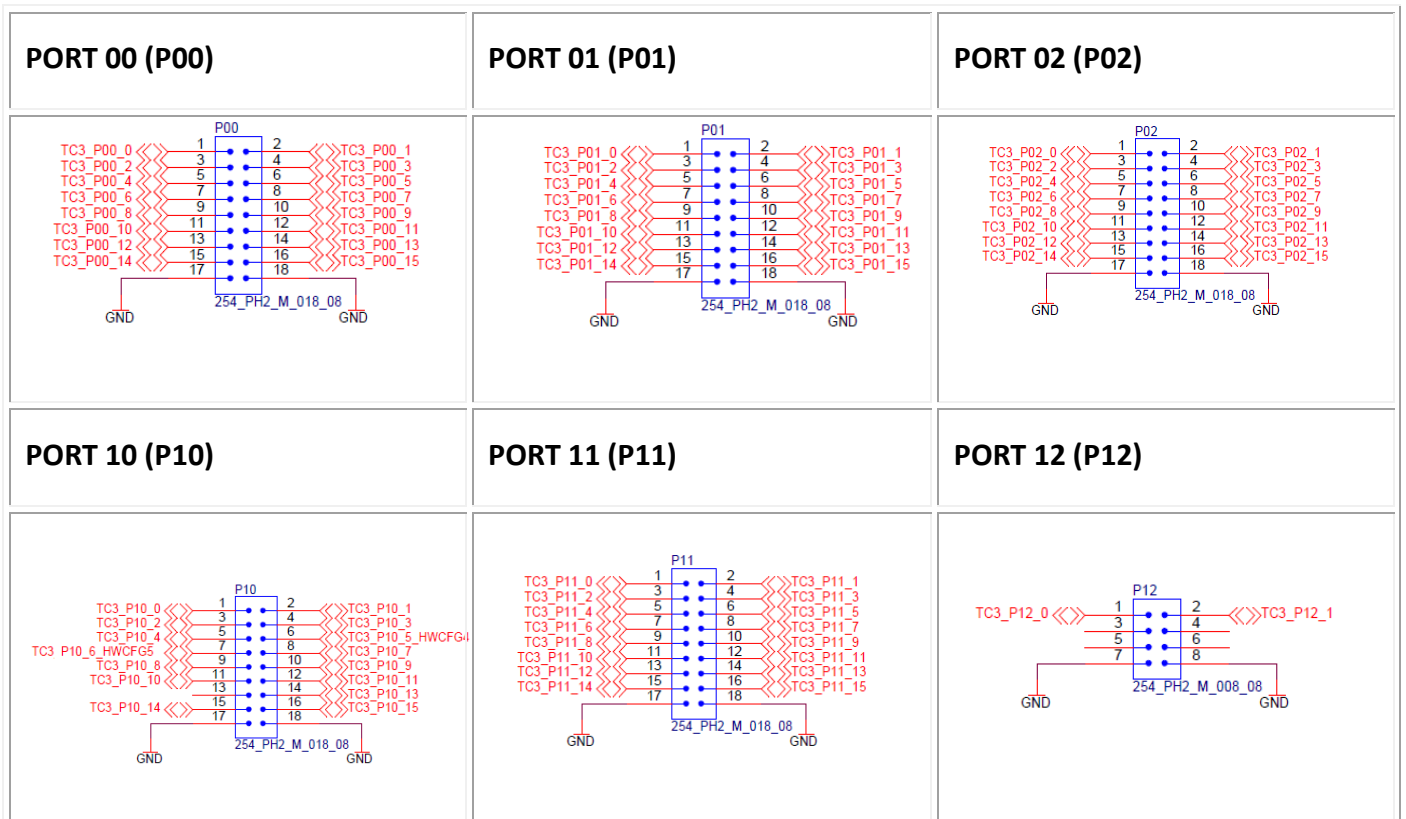
IO Interface

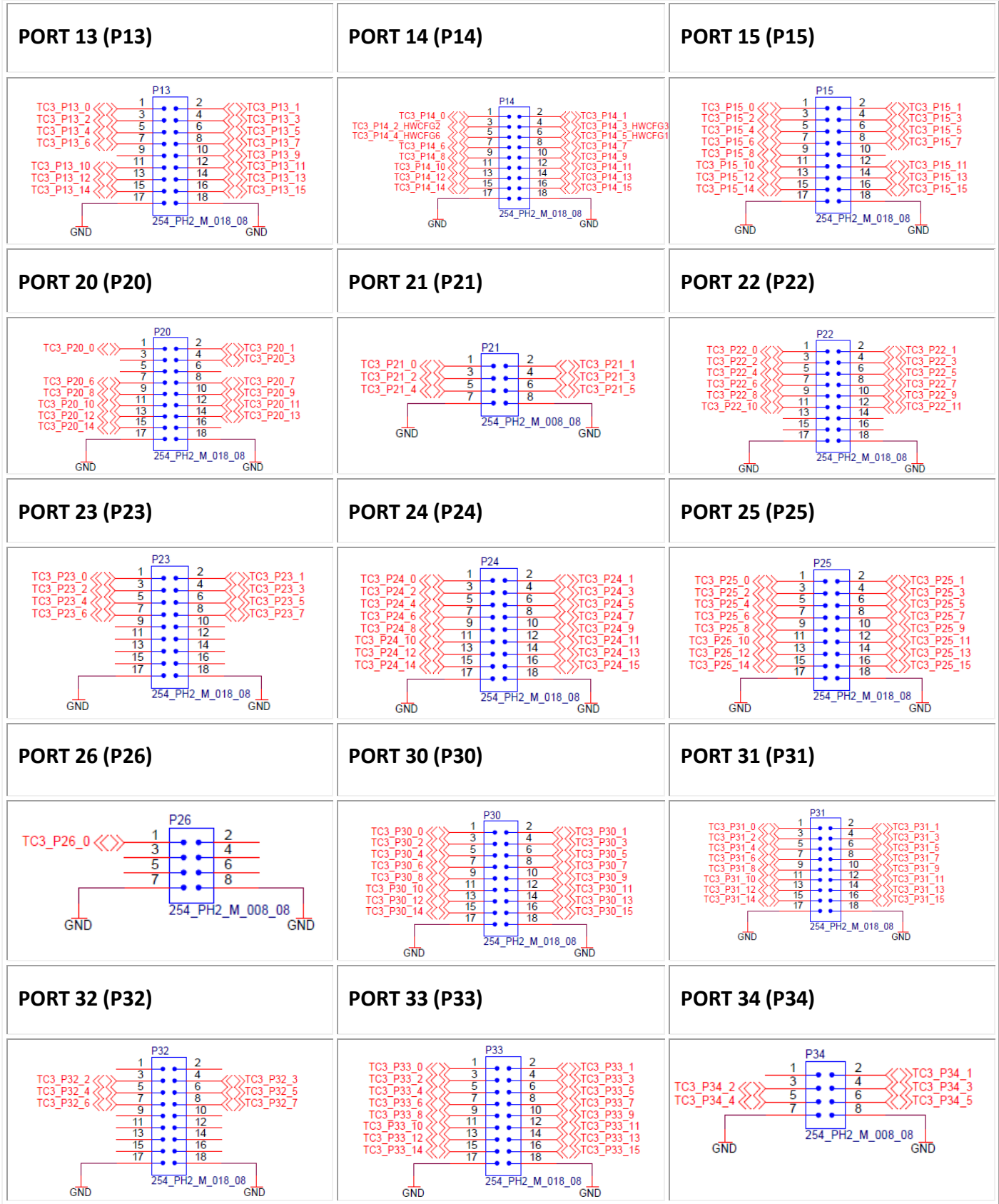
The target board exposes all TC399XE pins/signals, which allow easy expansion of the development system.

Analog inputs (AN0 – AN73)



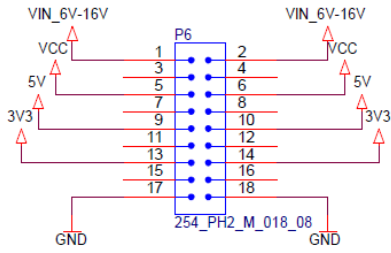
TriCore Ports 00 - 34





Internal voltage scale

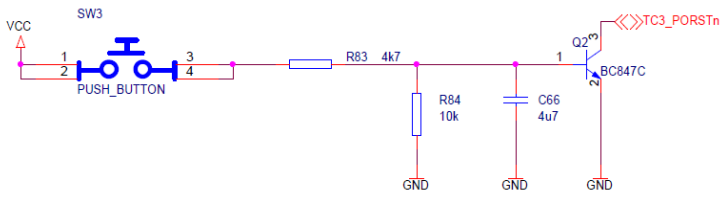
V_{io} (P6)



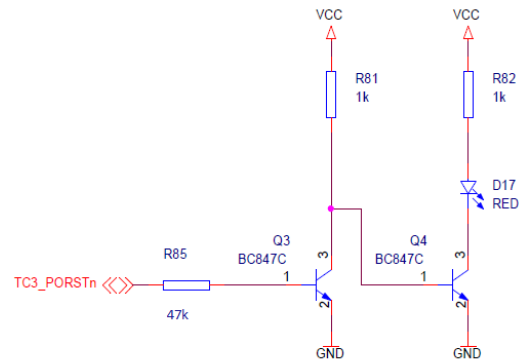
VIN_6V-16V	1	2	VIN_6V-16V
-	3	4	-
Vcc	5	6	Vcc
-	7	8	-
5V	9	10	5V
-	11	12	-
3V3	13	14	3V3
-	15	16	-
GND	17	18	GND

Reset

PORSTn (SW3, D17)



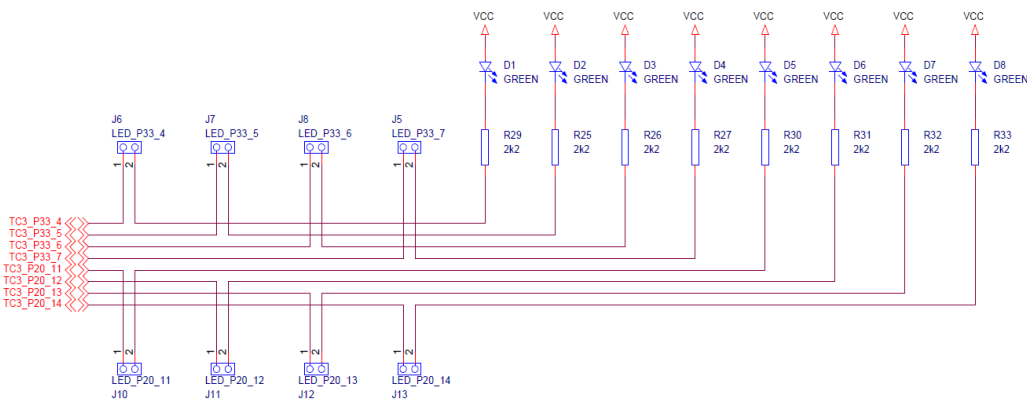
Push button SW3: manual reset



Red LED D17 indicates CPU reset

User LEDs

LEDs (D1 – D8)

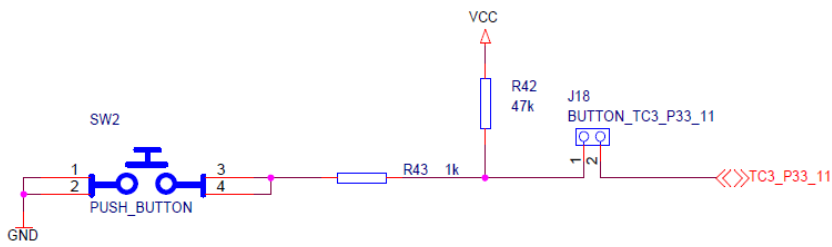


Port	Jumper	LED
P33_4	J6	D1
P33_5	J7	D2
P33_6	J8	D3
P33_7	J5	D4
P33_11	J10	D5
P33_12	J11	D6
P33_13	J12	D7
P33_14	J13	D8

Place corresponding jumper to enable LED indicator for application use.

User button

Push button (SW2)

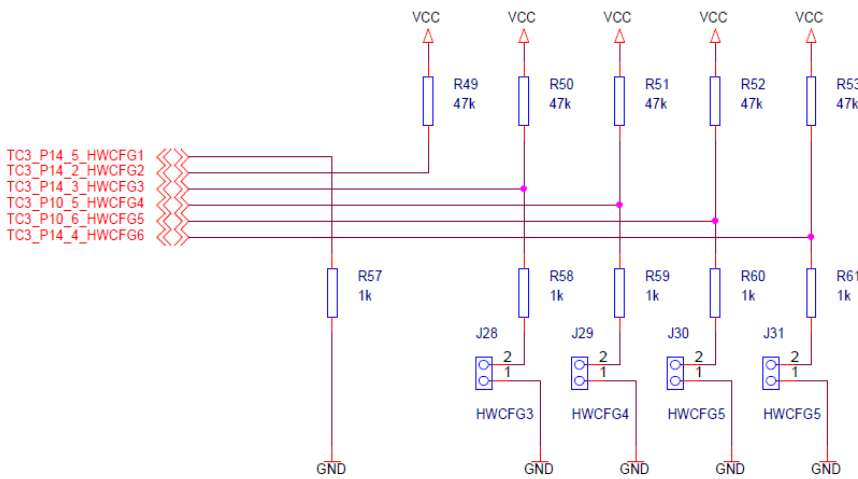


Jumper	Port	Button
J18	P33_11	SW2

Place jumper J18 to enable push button for application use.

Hardware configuration

HWCFG jumpers






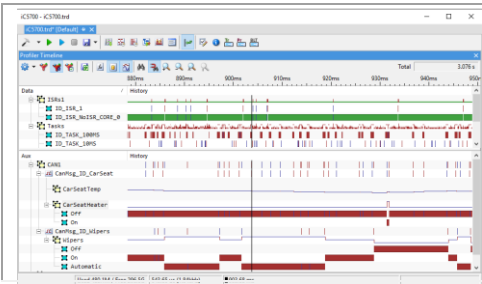


Jumper	Port	Action
-	Port 14 HWCFG1 = 0	EVR33 inactive
-	Port 14 HWCFG2 = 1	EVRC in SMPS mode
J28	Port 14 HWCFG3 = 0	BOOT from pins
J29	Port 10 HWCFG4 = 1	Start from FLASH
J30	Port 10 HWCFG5 = 1	Start from FLASH
J31	Port 14 HWCFG6 = 1	Pins PULL UP

Placed HWCFG jumpers set logical 0.

Recommended iSYSTEM tools

To ease the evaluation and development process we recommend using following tools with ITTC399 evaluation board.

iC5700 with IOM6 hub	
	<p>On-chip analyzer:</p> <ul style="list-style-type: none">- Debug- FLASH programming- Trace- Multi MCU synchronization
Active probe DAP	
	<p>Connect to the target:</p> <ul style="list-style-type: none">- Connect to the DAP debug and DAPE trace interface at maximum frequency.
Active probe AGBT	
	<p>Connect to the target:</p> <ul style="list-style-type: none">- Connect to the Aurora GigaBit Trace (AGBT) interface at maximum frequency.- Up to 4 parallel AGBT lanes, running at a maximum bitrate of 5Gbps.
CAN/LIN analyzer	
	<p>Network analyzer:</p> <ul style="list-style-type: none">- 2 CAN, 2 LIN channels- Galvanic separation- CAN message injection
Analog/Digital/SPI analyzer	
	<p>Network analyzer:</p> <ul style="list-style-type: none">- 2 analog IO channels- 32 digital I/O channels- 2 SPI channels, 3 chip-selects
winIDEA	
	<p>Integrated development environment:</p> <ul style="list-style-type: none">- Debug, FLASH programming, Trace- Code coverage, Timing analysis- Multi core synchronization- Multi MCU synchronization- MCU to network event correlation in a single view

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