

Trusted 40 Channel 120 Vac Digital Input FTA

Product Overview

The Trusted® 40 Channel 120 Vac Digital Input Field Termination Assembly (FTA) T8824 is designed to act as the main interface between a field device generating a digital signal and the Trusted TMR 120 Vac Digital Input Module T8424.

Features:

- 40 input channels per FTA.
- Industry standard field device connections (2-wire).
- Standard DIN rail compatibility.
- Simple installation and connection.
- 120 Vac operation.
- Fused field power supply per channel.

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PREFACE

In no event will Rockwell Automation be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment. The examples given in this manual are included solely for illustrative purposes. Because of the many variables and requirements related to any particular installation, Rockwell Automation does not assume responsibility or reliability for actual use based on the examples and diagrams.

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DISCLAIMER

It is not intended that the information in this publication covers every possible detail about the construction, operation, or maintenance of a control system installation. You should also refer to your own local (or supplied) system safety manual, installation and operator/maintenance manuals.

REVISION AND UPDATING POLICY

This document is based on information available at the time of its publication. The document contents are subject to change from time to time. The latest versions of the manuals are available at the Rockwell Automation Literature Library under "Product Information" information "Critical Process Control & Safety Systems".

TRUSTED RELEASE

This technical manual was updated for **Trusted Release 4.0**.

LATEST PRODUCT INFORMATION

For the latest information about this product review the Product Notifications and Technical Notes issued by technical support. Product Notifications and product support are available at the Rockwell Automation Support Centre at

<http://rockwellautomation.custhelp.com>

At the Search Knowledgebase tab select the option "By Product" then scroll down and select the Trusted product.

Some of the Answer ID's in the Knowledge Base require a TechConnectSM Support Contract. For more information about TechConnect Support Contract Access Level and Features, click on the following link:

https://rockwellautomation.custhelp.com/app/answers/detail/a_id/50871

This will get you to the login page where you must enter your login details.

IMPORTANT A login is required to access the link. If you do not have an account then you can create one using the "Sign Up" link at the top right of the web page.

DOCUMENTATION FEEDBACK

Your comments help us to write better user documentation. If you discover an error, or have a suggestion on how to make this publication better, send your comment to our technical support group at <http://rockwellautomation.custhelp.com>

SCOPE

This manual specifies the maintenance requirements and describes the procedures to assist troubleshooting and maintenance of a Trusted system.

WHO SHOULD USE THIS MANUAL

This manual is for plant maintenance personnel who are experienced in the operation and maintenance of electronic equipment and are trained to work with safety systems.

SYMBOLS

In this manual we will use these notices to tell you about safety considerations.



SHOCK HAZARD: Identifies an electrical shock hazard. If a warning label is fitted, it can be on or inside the equipment.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which can cause injury or death, property damage or economic loss.



ATTENTION: Identifies information about practices or circumstances that can cause injury or death.



CAUTION: Identifies information about practices or circumstances that can cause property damage or economic loss.



BURN HAZARD: Identifies where a surface can reach dangerous temperatures. If a warning label is fitted, it can be on or inside the equipment.



This symbol identifies items which must be thought about and put in place when designing and assembling a Trusted controller for use in a Safety Instrumented Function (SIF). It appears extensively in the Trusted Safety Manual.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

NOTE

Provides key information about the product or service.

TIP

Tips give helpful information about using or setting up the equipment.

WARNINGS AND CAUTIONS

**WARNING: EXPLOSION RISK**

Do not connect or disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations or equivalent

**AVERTISSEMENT - RISQUE D'EXPLOSION**

Ne pas connecter ou déconnecter l'équipement alors qu'il est sous tension, sauf si l'environnement est exempt de concentrations inflammables ou équivalente

**MAINTENANCE**

Maintenance must be carried out only by qualified personnel. Failure to follow these instructions may result in personal injury.

**CAUTION: RADIO FREQUENCY INTERFERENCE**

Most electronic equipment is influenced by Radio Frequency Interference. Caution should be exercised with regard to the use of portable communications equipment around such equipment. Signs should be posted in the vicinity of the equipment cautioning against the use of portable communications equipment.

**CAUTION:**

The module PCBs contains static sensitive components. Static handling precautions must be observed. DO NOT touch exposed connector pins or attempt to dismantle a module.

ISSUE RECORD

Issue	Date	Comments
5	Jun 16	Rebranded and updated to incorporate IEEE standards with correction of typographical errors and also standardise the Relative Humidity Range and Operating Temperature statements in the Specification Section.
6	Aug 17	Figure 2 “Single Channel Schematic” and Voltage details in Specifications table updated. Clarified distinction between operating range and measurement range.
7	Jan 19	Spec table and diagrams updated Updated to display Rockwell Automation publication numbers. Added trademarks statement.

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1. Description

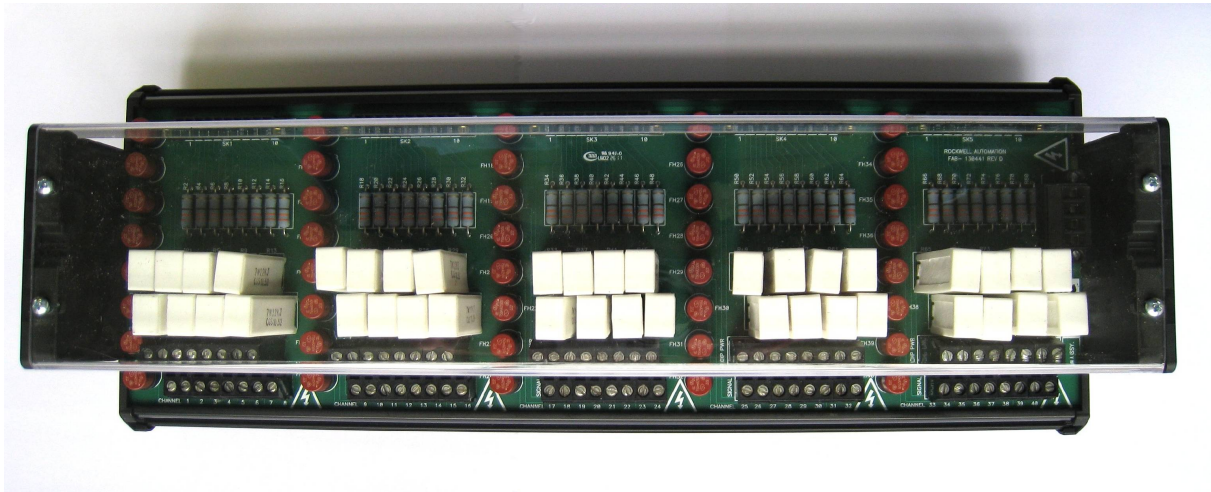


Figure 1 T8824 Photo

The Trusted 40 Channel 120 Vac Digital Input FTA T8824 provides termination for a maximum of 40 input channels from various types of field devices which generate a digital input. Figure 2 below shows the configuration of a single channel.

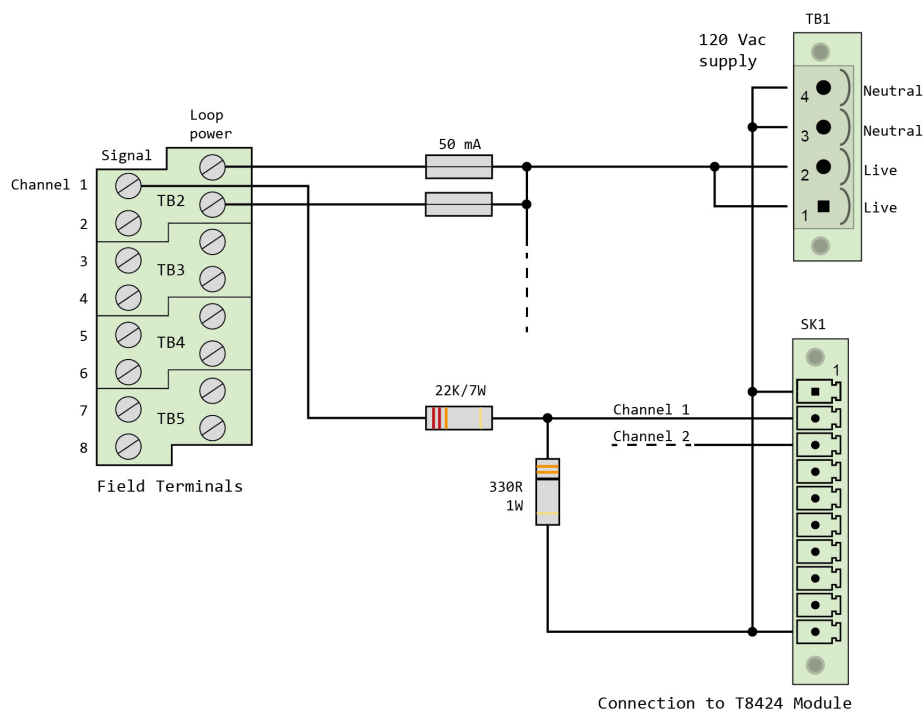


Figure 2 Single Channel Schematic

The supply for the field is derived from a 120 Vac feed which is connected to AC Input terminal block TB1. The supply is then fed to each channel.

The supply voltage to the field is fed via the 50 mA fuse. This effectively limits the current in the field loop. The incoming signal (digital) from the field device is fed to the digital input module via a resistive divider. This divides the voltage down to levels suitable for an analogue measurement.

Revision E T8824 FTAs use two power resistors in series, as shown in the circuit diagram in Figure 2. Earlier revisions used 4x4 resistor arrays. The resistor arrays on the top half are 68 K and the bottom resistor arrays are 1 K.

Line monitoring is limited to voltage detection on the module. Refer to Trusted TMR 120 Vac Digital Input Module 40 Channel, publication [ICSTT-RM450](#) (PD-T8424) for details.

The cable linking the 40 channels on the input module to the FTA is terminated at five 10-way connectors (SK1 to SK5). The input signals from the field (40-off) are connected by 2-wire arrangements terminated on 5-off 16-way terminal blocks.

2. Installation

Trusted 40 Channel 120 Vac Digital Input FTA T8824 is designed to be mounted on either of the TS32 or TS35 DIN rails in the horizontal or vertical positions as required.

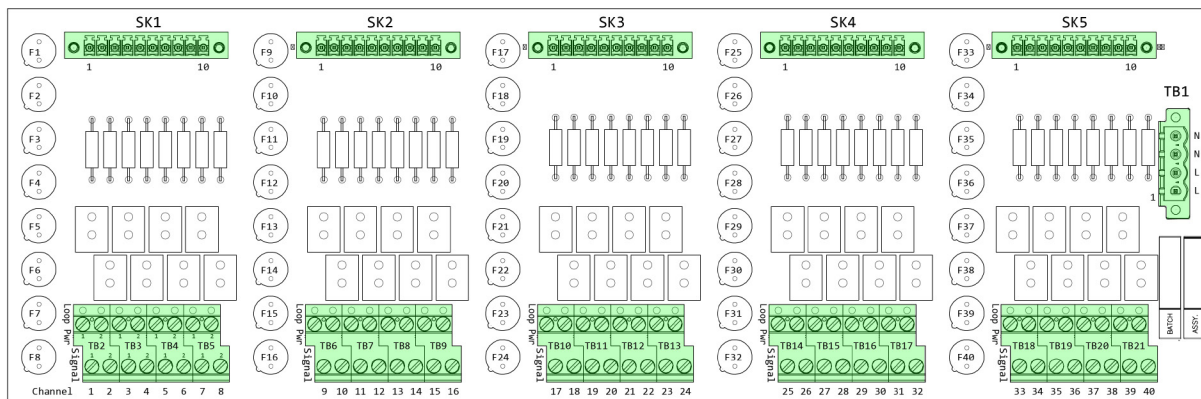


Figure 3 T8824 General Arrangement

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3. Associated Cable Selection

Refer to the product descriptions detailed below:

[ICSTT-RM311](#) (PD-TC200) Trusted I/O Companion Slot Cables

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4. Cable Capacitance

With long field cables the capacitive coupling of the cable can cause a significant voltage to be seen at the T8424 input when the field switch is open. This causes the T8424 to report that the field switch is still on when it is turned off.

Revision E T8824 FTAs have lower loop resistance, which reduces the capacitive noise and increases the available loop length.

The table below shows some estimated maximum lengths for different cables and mains supplies. Practical distances will be less than this due to other noise and for switching safety margins.

	Revision E	Earlier revisions
15 pF/m, 110 V, 50 Hz	2940 m	890 m
30 pF/m, 110 V, 50 Hz	1470 m	470 m
15 pF/m, 110 V, 60 Hz	2450 m	790 m
30 pF/m, 110 V, 60 Hz	1220 m	390 m
15 pF/m, 120 V, 50 Hz	2620 m	850 m
30 pF/m, 120 V, 50 Hz	1310 m	420 m
15 pF/m, 120 V, 60 Hz	2190 m	700 m
30 pF/m, 120 V, 60 Hz	1090 m	350 m

Table 1 Theoretical maximum cable lengths

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5. Assembly Pinout Connections

5.1. AC Supply TB1 Connections

Pin	Service
1	120 Vac Live
2	120 Vac Live
3	120 Vac Neutral
4	120 Vac Neutral

Table 2 AC Supply TB1 Connections

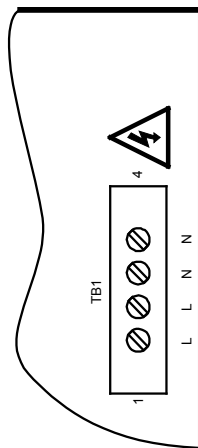


Figure 4 AC Supply TB1 Connections

5.2. Field TB2 – TB5 Connections

	Pin	Loop Power terminal	Signal terminal
TB2	1	Channel 1	Channel 1
	2	Channel 2	Channel 2
TB3	1	Channel 3	Channel 3
	2	Channel 4	Channel 4
TB4	1	Channel 5	Channel 5

	Pin	Loop Power terminal	Signal terminal
TB5	2	Channel 6	Channel 6
	1	Channel 7	Channel 7
	2	Channel 8	Channel 8

Table 3 Field TB2 – TB5 Connections

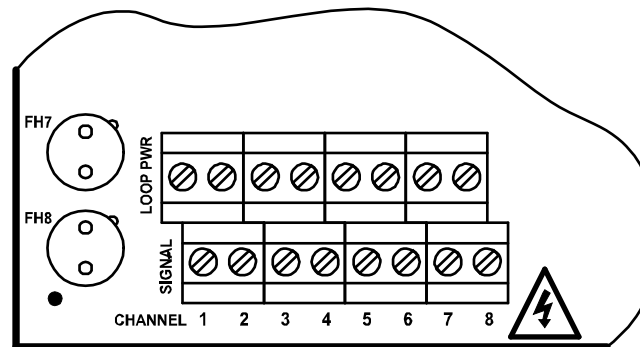


Figure 5 Field TB2 – TB5 Connections

5.3. Field TB6 – TB9 Connections

	Pin	Loop Power terminal	Signal terminal
TB6	1	Channel 9	Channel 9
	2	Channel 10	Channel 10
TB7	1	Channel 11	Channel 11
	2	Channel 12	Channel 12
TB8	1	Channel 13	Channel 13
	2	Channel 14	Channel 14
TB9	1	Channel 15	Channel 15
	2	Channel 16	Channel 16

Table 4 Field TB6 – TB9 Connections

5.4. Field TB10 – TB13 Connections

	Pin	Loop Power terminal	Signal terminal
TB10	1	Channel 17	Channel 17
	2	Channel 18	Channel 18
TB11	1	Channel 19	Channel 19
	2	Channel 20	Channel 20
TB12	1	Channel 21	Channel 21
	2	Channel 22	Channel 22
TB13	1	Channel 23	Channel 23
	2	Channel 24	Channel 24

Table 5 Field TB10 – TB13 Connections

5.5. Field TB14 – TB17 Connections

	Pin	Loop Power terminal	Signal terminal
TB14	1	Channel 25	Channel 25
	2	Channel 26	Channel 26
TB15	1	Channel 27	Channel 27
	2	Channel 28	Channel 28
TB16	1	Channel 29	Channel 29
	2	Channel 30	Channel 30
TB17	1	Channel 31	Channel 31
	2	Channel 32	Channel 32

Table 6 Field TB14 – TB17 Connections

5.6. Field TB18 – TB21 Connections

	Pin	Loop Power terminal	Signal terminal
TB18	1	Channel 33	Channel 33
	2	Channel 34	Channel 34
TB19	3	Channel 35	Channel 35
	4	Channel 36	Channel 36
TB20	5	Channel 37	Channel 37
	6	Channel 38	Channel 38
TB21	7	Channel 39	Channel 39
	8	Channel 40	Channel 40

Table 7 Field TB18 – TB21 Connections

5.7. SK1 Connections

Pin	Service
1	0 V
2	Channel 1
3	Channel 2
4	Channel 3
5	Channel 4
6	Channel 5
7	Channel 6
8	Channel 7
9	Channel 8
10	Not used

Table 8 SK1 Connections

5.8. SK2 Connections

Pin	Service
1	0 V
2	Channel 9
3	Channel 10
4	Channel 11
5	Channel 12
6	Channel 13
7	Channel 14
8	Channel 15
9	Channel 16
10	Not used

Table 9 SK2 Connections

5.9. SK3 Connections

Pin	Service
1	0 V
2	Channel 17
3	Channel 18
4	Channel 19
5	Channel 20
6	Channel 21
7	Channel 22
8	Channel 23

Pin	Service
9	Channel 24
10	Not used

Table 10 SK3 Connections

5.10. SK4 Connections

Pin	Service
1	0 V
2	Channel 25
3	Channel 26
4	Channel 27
5	Channel 28
6	Channel 29
7	Channel 30
8	Channel 31
9	Channel 32
10	Not used

Table 11 SK4 Connections

5.11. SK5 Connections

Pin	Service
1	0 V
2	Channel 33
3	Channel 34
4	Channel 35
5	Channel 36

Pin	Service
6	Channel 37
7	Channel 38
8	Channel 39
9	Channel 40
10	Not used

Table 12 SK5 Connections

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6. Specifications

Field Supply Voltage	90 - 150 Vac
Power Dissipation	0.65 W / Channel (120 Vac); 26 W max 1 W / channel (150 Vac); 40 W max
Isolation	N/A. Isolation provided in T8424 Module only.
Maximum Current (Field Supply)	5.4 mA per channel (120 Vac) 6.7 mA per channel (150 Vac)
Fusing	50 mA fuse for each channel field voltage supply.
Operating Temperature	0 °C to +60 °C (+32 °F to +140 °F)
Storage Temperature	-25 °C to +70 °C (-13 °F to +158 °F)
Relative Humidity – Operating and Storage	10 % – 95 %, non-condensing
Environmental Specifications	Refer to Document ICSTT-TD003
Dimensions	
Height	111 mm (4.4 in)
Width	335 mm (13.2 in)
Depth	51 mm (2 in)
Weight	900 g (2 lb)