



TMPC-FCA TLA Logic Analyzer Instruction Manual

Protocol support for S-FPDP over Fibre Channel

1 Support Description

The TMPC-FCA Support Package provides capture and S-FPDP disassembly of packed Fibre Channel data output from the TMPC FCA-6 hardware. Three independent Fibre Channel streams can be captured simultaneously on a 136-channel TLA module, with the display of S-FPDP “disassembly” of one stream at a time.

2 Installing the TMPC-FCA Support Package

If you received the TMPC-FCA bus support via e-mail, then unpack .zip archive into a temporary folder (either on the TLA itself or accessible over a network by the TLA) and run the Setup.exe from the TLA. If you received a TMPC-FCA installation disk or CD, insert the disk or CD in to the TLA run the Setup.exe from there.

The installation program will automatically install the package software into the appropriate folders in the file system. For the TMPC-FCA package, the support files will be installed into the “C:/Program Files/TLA700/Supports/TMPC-FCA” folder.

3 Loading the TMPC-FCA Support Package

To load the TMPC-FCA support package you must first select the logic analysis module that will be connected to the bus under test. Only TLA 7XX mainframes with multiple modules will have more than one option. To do this, bring up the System window from the Window menu. Click in the title field to select the appropriate module.

With the System window on top, select “Load Support Package...” from the File menu. A list box with all of the installed packages will pop up on the screen, allowing you to pick the package you wish to load into the logic analysis module. Note that the list of support packages shown will depend on which packages have been previously installed on the TLA.

Select “TMPC-FCA” from the list and click on the Load button. A dialog box with the following text will appear on the screen:

“Loading a support package invalidates a module’s acquired data. Do you wish to save the current module’s settings and data before loading the support package?”

If you choose “Yes”, a “Save As...” file dialog box will appear, allowing you to save your current module setup and data. Selecting “No” will cause the TLA to overwrite your current setup and data with the TMPC-FCA package setup.

To load the support package in a second module, click in the title field of the second module in the System window and repeat the previous steps.

4 Signals and Groups

The FCA-6 hardware provides 8 mictor connectors, divided into two sets of 4 mictors. Each set of 4 mictors connects to a 136-channel TLA module and services 3 Fibre Channel streams, one mictor each for clock, valid, and data and a common mictor to carry other status and qualifier signals.

The TMPC-FCA support package uses the following signals/groups for each channel, where ‘X’ is represents either channel A, B, or C:

ClkX	Clock for channel X
ValidX	Data valid for channel X
DataX[31..0]	Data for channel X
StatusX[4..0]	Status/qualifier signals for channel X
- Bit4: CommaX	Ordered set qualifier flag
- Bit3: HoldBOTX	Held ‘Beginning-Of-Transfer’ flag
- Bit2: BOTX	‘Beginning-Of-Transfer’ flag
- Bit1: EOTX	‘End-Of-Transfer’ flag
- Bit0: BadCrcX	Bad CRC flag

All of the ClkX signals are identical. For convenience to the support package, this clock signal is also replicated as MClk on the “helper” mictor connector. The ValidX signal qualifies DataX, indicating that data that is valid. In one of its normal acquisition modes, TLA records captured by the TMPC-FCA support package will have at least one ValidX signal asserted. CommaX true indicates that the word is a Fibre Channel Ordered Set (as opposed to data or CRC). BOTX and EOTX are asserted on the MEOF ordered set of a S-FPDP “Sync Without Data” and “Sync With Data” packet respectively. HoldBOTX is asserted high when BOTX goes high and held until it is de-asserted when EOTX is

asserted high. Finally, BadCrcX is asserted one clock after the CRC data word of a packet when there is a checksum error (i.e. during an MEOF or FEOF ordered set).

One group of signals not associated with a specific channel, User[5..0], conveys the state of user-defined signals on the back DB25 connector of the FCA-6 hardware. For the first set of 4 mictors (FCA-6 Channels A,B,C), the DB25 pin association for User[5..0] is 7, 6, 5, 4, 3, and 2, msb-to-lsb respectively. For the second set of 4 mictors (FCA-6 Channels D,E,F), the DB25 pin association for User[5..0] is 15, 12, 11, 10, 9, and 8.

5 Mictor Connector Signals

Tables 1-4 describe the FCA-6 mictor signal pin-outs. Note that Agilent and Tektronix use different Mictor pin numberings; both numbering schemes are provided in the tables.

Table 1 - A CONNECTOR

	Tek	A3/A2	Agilent	A1/A0	Tek	
	1	NC	1	2	38	
	2	NC	3	4	37	
ValidA	3	CLK:0	5	6	36	ClkA
DataA31	4	A3:7	7	8	35	DataA15
DataA30	5	A3:6	9	10	34	DataA14
DataA29	6	A3:5	11	12	33	DataA13
DataA28	7	A3:4	13	14	32	DataA12
DataA27	8	A3:3	15	16	31	DataA11
DataA26	9	A3:2	17	18	30	DataA10
DataA25	10	A3:1	19	20	29	DataA9
DataA24	11	A3:0	21	22	28	DataA8
DataA23	12	A2:7	23	24	27	DataA7
DataA22	13	A2:6	25	26	26	DataA6
DataA21	14	A2:5	27	28	25	DataA5
DataA20	15	A2:4	29	30	24	DataA4
DataA19	16	A2:3	31	32	23	DataA3
DataA18	17	A2:2	33	34	22	DataA2
DataA17	18	A2:1	35	36	21	DataA1
DataA16	19	A2:0	37	38	20	DataA0

Table 2 - D CONNECTOR

	Tek	D3/D2	Agilent	D1/D0	Tek	
	1	NC	1	2	NC	38
	2	NC	3	4	NC	37
ValidB	3	QUAL:0	5	6	CLK:2	36 ClkB
DataB31	4	D3:7	7	8	D1:7	35 DataB15
DataB30	5	D3:6	9	10	D1:6	34 DataB14
DataB29	6	D3:5	11	12	D1:5	33 DataB13
DataB28	7	D3:4	13	14	D1:4	32 DataB12
DataB27	8	D3:3	15	16	D1:3	31 DataB11
DataB26	9	D3:2	17	18	D1:2	30 DataB10
DataB25	10	D3:1	19	20	D1:1	29 DataB9
DataB24	11	D3:0	21	22	D1:0	28 DataB8
DataB23	12	D2:7	23	24	D0:7	27 DataB7
DataB22	13	D2:6	25	26	D0:6	26 DataB6
DataB21	14	D2:5	27	28	D0:5	25 DataB5
DataB20	15	D2:4	29	30	D0:4	24 DataB4
DataB19	16	D2:3	31	32	D0:3	23 DataB3
DataB18	17	D2:2	33	34	D0:2	22 DataB2
DataB17	18	D2:1	35	36	D0:1	21 DataB1
DataB16	19	D2:0	37	38	D0:0	20 DataB0

Table 3 - C CONNECTOR

	Tek	C3/C2	Agilent	C1/C0	Tek	
	1	NC	1	2	NC	38
	2	NC	3	4	NC	37
MClk	3	CLK:3	5	6	QUAL:1	36 BOTa
EOTa	4	C3:7	7	8	C1:7	35 SpareAB4
HoldBOTa	5	C3:6	9	10	C1:6	34 SpareAB3
	6	C3:5	11	12	C1:5	33
SpareAB0	7	C3:4	13	14	C1:4	32 SpareCD1
BadCrcA	8	C3:3	15	16	C1:3	31 User3
SpareAB2	9	C3:2	17	18	C1:2	30 SpareCD0
BadCrcB	10	C3:1	19	20	C1:1	29 BOTC
BadCrcC	11	C3:0	21	22	C1:0	28 SpareCD2
HoldBOTC	12	C2:7	23	24	C0:7	27 User1
SpareAB1	13	C2:6	25	26	C0:6	26
	14	C2:5	27	28	C0:5	25 BOTB
EOTB	15	C2:4	29	30	C0:4	24 HoldBOTB
CommaB	16	C2:3	31	32	C0:3	23 User0
CommaA	17	C2:2	33	34	C0:2	22 User4
CommaC	18	C2:1	35	36	C0:1	21 User2
EOTC	19	C2:0	37	38	C0:0	20 User5

Table 4 - E CONNECTOR

	Tek	E3/E2	Agilent	E1/E0	Tek		
	1	NC	1	2	NC	38	
	2	NC	3	4	NC	37	
ValidC	3	QUAL:3	5	6	QUAL:2	36	CLKC
DataC31	4	E3:7	7	8	E1:7	35	DataC15
DataC30	5	E3:6	9	10	E1:6	34	DataC14
DataC29	6	E3:5	11	12	E1:5	33	DataC13
DataC28	7	E3:4	13	14	E1:4	32	DataC12
DataC27	8	E3:3	15	16	E1:3	31	DataC11
DataC26	9	E3:2	17	18	E1:2	30	DataC10
DataC25	10	E3:1	19	20	E1:1	29	DataC9
DataC24	11	E3:0	21	22	E1:0	28	DataC8
DataC23	12	E2:7	23	24	E0:7	27	DataC7
DataC22	13	E2:6	25	26	E0:6	26	DataC6
DataC21	14	E2:5	27	28	E0:5	25	DataC5
DataC20	15	E2:4	29	30	E0:4	24	DataC4
DataC19	16	E2:3	31	32	E0:3	23	DataC3
DataC18	17	E2:2	33	34	E0:2	22	DataC2
DataC17	18	E2:1	35	36	E0:1	21	DataC1
DataC16	19	E2:0	37	38	E0:0	20	DataC0

6 Connecting the TLA to the TMPC-FCA Bus

For correct naming association with the FCA-6 hardware and TMPC-FCA support package, the following cable configuration is intended:

FCA-6 HW	TLA
Chan A	Connector A, Module 1
Chan B	Connector D, Module 1
Chan C	Connector E, Module 1
Helper ABC	Connector C, Module 1
Chan D	Connector A, Module 2
Chan E	Connector D, Module 2
Chan F	Connector E, Module 2
Helper DEF	Connector C, Module 2

However, a minimum disassembly configuration only requires two cables: one connecting the mictor of the channel of interest and one connecting its associated helper mictor.

7 Custom Clocking Options

The TMPC-FCA support package provides one clocking mode (“FCA Clocking”) with 5 clock enable options. These options are selected by clicking on the “More” button next to the “Clocking” selection box in the TMPC-FCA Setup window:

“ENABLE ON”	DESCRIPTION
“Always”	Capture records on all rising edges of MCLK
“Valid A,B,or C”	Capture records on any valid data
“Valid A”	Capture records on valid channel A data
“Valid B”	Capture records with valid channel B data
“Valid C”	Capture records with valid channel C data

Generally, “Valid A”, “Valid B” and “Valid C” options should be used for normal single-channel capture and disassembly. The “Valid A,B, or C” option is used for data-only capture and export and is not generally used for disassembly. The “Always” option is used for debugging.

8 Disassembly

Once the TMPC-FCA support package has been loaded and a trace taken, the Listing window will display disassembled S-FPDP data. In addition to the signal groups defined in the Setup window (e.g. DataX, StatusX, ValidX and User), the support package defines additional groups for display:

GROUP	DESCRIPTION
TMPC-FCA Data	DataX from selected disassembly channel
TMPC-FCA Comma	CommaX from selected disassembly channel
TMPC-FCA HoldBOT	HoldBOTX from selected disassembly channel
TMPC-FCA BOT	BOTX from selected disassembly channel
TMPC-FCA EOT	EOTX from selected disassembly channel
TMPC-FCA Bad CRC	BadCRCX from selected disassembly channel
TMPC-FCA Mnemonics	S-FPDP symbol or FibreChannel ordered set
TMPC-FCA SOF_FI	S-FPDP flags for SOF symbol
TMPC-FCA SEOF FI	S-FPDP flags for SEOF symbol
TMPC-FCA VDataA	Valid DataA (if ValidA is low, ‘-----’ is displayed)
TMPC-FCA VDataB	Valid DataB (if ValidB is low, ‘-----’ is displayed)
TMPC-FCA VDataC	Valid DataC (if ValidC is low, ‘-----’ is displayed)

Disassembly options can be found under the Disassembly tab of the Listing display properties pages. To get to these pages, right-click in the Listing data window and select

‘Properties’ from the pop-up menu. The following disassembly options are available for the TMPC-FCA support package:

OPTION	DESCRIPTION
Disassembly Channel	Selects channel A, B, or C for disassembly
Display Filter	Disassembly filtering mode: “Show All”, “Show All But Idles”, “Show Data Only”
CRC Mode	Enables/disables CRC mode
Mnemonic Type	Display FPDP symbol or Fibre Channel ordered set

Note that the “Display Filter” and “CRC Mode” options affect disassembly display only (as opposed to affecting the records captured). For example, selecting “Show Data Only” merely hides non-data records from the display. On the other hand, selecting the “Data Only” switch position on the FCA-6 hardware causes only data words to be passed to the TLA for acquisition.

Note also that for single-channel disassembly, changing the “Disassembly Channel” option generally requires changing the “Enable On” custom clocking option and vice-versa. However, if the “Valid A, B, or C” custom clocking option is selected then all valid data from all three channels will be captured and any “Disassembly Channel” can be chosen. In fact, in this mode, the disassembly from each channel can be viewed from a single acquisition.

9 Quick Start

The following steps describe a typical initial install and configuration of the TMPC-FCA support on a two-module TLA.

- 1) Install TMPC-FCA support package. Run the setup.exe provided.
- 2) Bring up the TLA application.
- 3) In the System window, click in the name field of module 1.
- 4) Load the support package into module 1 using “File->Load Support Package”. Select TMPC-FCA from the list and click on the “Load” button. Click “Yes” to acknowledge that loading will invalidate acquired data.
- 5) In the System window, click in the name field of module 2.
- 6) Repeat step 4.
- 7) In the System window, click on the Setup icon for module 1. Adjust the memory depth to a reasonable length for quick acquisitions, e.g 4096. Make sure the clocking mode is selected as “Custom” and click on the “More” button. Choose the correct “Enable On” option, most generally “Valid A, B, or C”. Click OK.
- 8) Repeat step 7 for module 2.

- 9) If desired, review the trigger state machine for module 1 (master trigger). Click on the Trigger icon for module 1 in the System window. The trigger state machine has If Anything Then Trigger All Modules. This will cause both modules to acquire all 6 FCA channels simulataneously.
- 10) Connect the TLA cables to the FCA-6 hardware. Assigning module 1 to FCA-6 channels A, B, and C, connect the cable as follows:

Module 1 (top) TLA cable A to FCA-6 chan A mictor,
Module 1 (top) TLA cable D to FCA-6 chan B mictor,
Module 1 (top) TLA cable C to FCA-6 helper ABC mictor,
Module 1 (top) TLA cable E to FCA-6 chan C mictor,
Module 2 (bottom) TLA cable A to FCA-6 chan D mictor,
Module 2 (bottom) TLA cable C to FCA-6 helper DEF mictor,
Module 2 (bottom) TLA cable D to FCA-6 chan E mictor,
Module 2 (bottom) TLA calbe E to FCA-6 chan F mictor

- 11) For test, connect the optical fibers pair-wise between adjacent channels such that the transmit and receive links for Chan A and B, Chan C and D, and Chan E and F are connected.
- 12) Power on the FCA-6. After a few seconds, the LEDs should light up when the hardware has finished initialization. Place the front-panel switch positions into the following state:

CRC	On
Xmit	Tee
Rate	1G
Test	On (Green LED)
Mode	Pass All
Format	4 th LED
Module	<don't care>
Link	6

Note that with the Xmit in Tee, and Test On (Green) the FCA-6 generates a simple S-FPDP packet sequence on all its transmit links. The sequence transmitted is determined by Format:

1 st LED	Idle packets only
2 nd LED	Alternating Idle and short Data packets
3 rd LED	Repeating sequence of Idle, short Data, Sync w/o Data packets
4 th LED	Repeating sequence of Idle, short Data, Sync with Data packets.

- 13) If the fibers are connected properly, the “RxX Good” status LEDs should be on (where X stands for A, B, C, D, E, or F).

- 14) Press the Run/Stop button on the TLA or click on the Run button in the TLA application to acquire data. From the System menu, bring up the Listing 1 and/or Listing 2 windows to view disassembly. Add/remove groups as desired by right-clicking in the window and choosing “Add column”. Order the groups as desired by dragging the group headers right or left. Change the column widths to suit by dragging at the edges of the group headers.
- 15) Right-click in each listing window and click on the Disassembly listing tab to set the CRC Mode to Enabled and select a Disassembly Channel as desired.
- 16) Verify that the listings look correct. S-FPDP packets are highlighted in alternate colors for visual framing. Save your configuration using File->Save System. You can then reload this system file to restore your configuration in subsequent sessions.

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