



CARLO GAVAZZI SPACE SpA

HSO/FIRST-DPU

DOCUMENT TYPE : TEST REPORT

DRD : -

TITLE: EM CPU BOARD P/N DPU-EM-100.00-0 S/N 05 TEST REPORT

DOCUMENT No: DPU-RP-CGS-026

PAGE: 1 OF 64

ISSUE No: 1

DATE: 15/04/2002

PREPARED BY: HSO TEAM

APPROVED BY: M. VITTA

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DOCUMENT CHANGE RECORD

ISSUE N°	DATE	CHANGE AUTHORITY	PAGES AFFECTED	REMARKS
1	15/04/2002			



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LIST OF ACRONYMS

ARF	Active Register File
DPU	Data Processing Unit
DM	Data Memory
DPR	Dual Port Ram
EEPROM	Electrically Erasable Programmable Read Only Memory
EM	Engineering Model
EPROM	Erasable Programmable Read Only Memory
EQM	Engineering Qualification Model
FIRST	Far Infra-Red and Sub-millimeter Telescope
FM	Flight Model
FPGA	Field Programmable Gate Array
HIFI	Heterodyne Instrument for First
HSO	Herschel Space Observatory
IF	Interface
ISR	Interrupt Service Routine
LSA	Logic State Analyzer
PACS	Photoconductor Array Camera and Spectrometer
PCB	Printed Circuit Board
PM	Program Memory
PROM	Programmable Read Only Memory
PL	Payload
RAM	Random Access Memory
SC	Spacecraft
SPIRE	Spectral and Photometric Imaging Receiver
TE	Test Equipment



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1 SCOPE

The aim of the present document is to provide a detailed test report of CPU board P/N DPU-EM-100.00-0 S/N 05 to be used in the Data Processing Units, developed in the framework of the HSO/FIRST program. Particularly it must be tested each of the following block:

1. DSP and Program Memory
2. Data Memory
3. 32-Bit Internal Bus
4. Interval Timer & Interrupt Manager
5. Watchdog
6. EEPROM
7. IEEE 1355 Interface



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2 APPLICABLE DOCUMENTS

The current issue of the following documents is applicable:

[AD1]: DPU-PL-CGS-001 "Product Assurance Plan for FIRST-DPU"

[AD1]: DPU-PR-CGS-001 "EM CPU Board Test Procedure"



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3 REFERENCE DOCUMENTS

To test the board the user needs the current issue of the following documents:

[RD1]: DPU-SP-CGS-001, FIRST CPU BOARD SPECIFICATION

[RD2]: DPU-MA-CGS-001, CPU BOARD USER MANUAL



4 PARTICIPANTS REQUIRED

4.1 General

All tests shall be performed under QA surveillance in accordance with and following detailed procedure of CGS PA Plan [AD1].

The test shall be notified to the Customer as applicable.

4.2 Responsibility

The technical responsibilities for testing and test results is of the Engineering department.

Project and test managers are responsible for the test program. The test engineer is responsible for the correct execution of the test program and for the fulfilment of the requirements, for measurement and recording and for the preparation of the test report.

QA is responsible for ensuring that all the agreed procedures are carefully observed, that test equipment and instrumentation used during testing are calibrated and within validity date, that the test results are recorded in the relative Test Report and signed by the operators and QA, that all non conforming condition and test results are properly documented and notified to the customer and that all requirements of applicable PA Plan, Specification and Statement Of Work pertaining to the acceptance tests, are fully satisfied.

4.3 QA witness of Tests and Sign-off

QA inspector, or its delegate, shall witness the tests described in this procedure in accordance to the requirement specified in the applicable PA Plans. The PA/QA personnel will check the report by sign off each sheet.

4.4 Non-conformance and failures

Any malfunction occurred during the tests shall be processed according to the Non-Conformance Procedure.



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4.5 Calibration Requirements

All instruments used for testing shall be calibrated.

Evidence of certification shall be provided by a label attached to the instruments itself, showing the calibration date, the expire date and the signature of the operator.



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5 TEST CONDITIONS

- The Unit shall be tested in its defined configuration: it shall be properly mounted, all the electrical loads (if any) shall be present and the unit interface function(s) shall be simulated.
- Unless otherwise specified, all the measurements are to be performed at the following ambient conditions:
 - Temperature : $22^{\circ}\text{C} \pm 3^{\circ}\text{C}$
 - Relative humidity: $55\% \pm 10\% \text{ RH}$
 - Pressure : Ambient
 - Cleanliness : NA
- All tests, unless otherwise specified, shall be performed internally to CGS laboratories in a proper clean area.
General disposition shall be applied to maximise personnel safety from potential hazards.
- Skilled personnel shall be employed.
- All used instruments shall meet the necessary accuracy and shall not degrade the UUT performance.

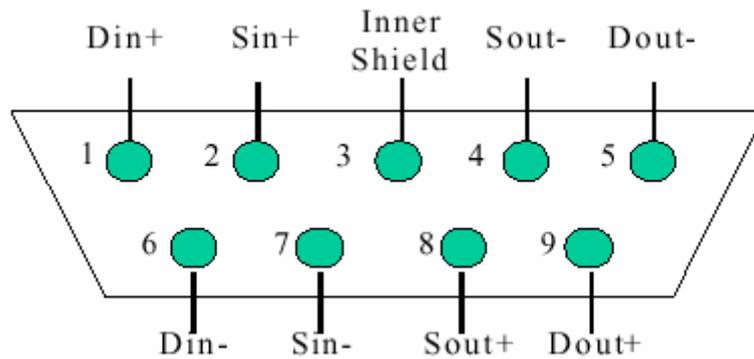


6 TEST CONFIGURATION

To test IEEE 1355 links make the connections specified in the following Table:

	LINK1	LINK2	LINK3
Micro-D PLUG	P2 Connector Pin Number		
Din+	10	44	74
Din-	11	45	75
Sin+	14	48	78
Sin-	15	49	79
Sout+	6	40	70
Sout-	7	41	71
Dout+	2	36	66
Dout-	3	37	67

Table 6-1



Picture 1 Viewed from rear of socket or front of plug



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7 INSTRUMENTATION

The complete list of the instruments used during the test is reported in Table 7-1.

PROJECT: HSO/FIRST-DPU							
N.	EQUIPMENT	MANUFACTURER	P/N	S/N	ACCURACY	NEXT CAL. DATE	REMARKS
1	OSCILLOSCOPE	TEKTRONIX	TDS620	B020528	-	18/04/02	-
2	POWER SUPPLY	TOP WARD	6303A	667104	-	-	-
3	POWER SUPPLY	TOP WARD	6303A	998095	-	-	-
4	LOGIC STATE ANALYZER	HP	1671G	US39240135	-	18/04/02	-
5	MULTIMETER	HP	34401A	3146A10908	-	17/04/02	-

Table 7-1



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8 TEST DATA SHEETS

The step-by-step procedure sheets are provided in the following pages.



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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
1	DSP and Program Memory			
1.1	Insert the EZ ICE probe in the JTAG plug (JP12)		OK	
1.2	Supply electrical power to the board	Green led on	OK	
1.3	Open the program ADSP-21020 Emulator		OK	
1.4	Type Enter two times to end Row JTAG and Opcode Scan Test		OK	
1.5	From menu Memory select "Program"	PM window appears	OK	
1.6	From menu Memory select "Data"	DM window appears	OK	
1.7	From menu File select "Load File..."	A prompt window appears	OK	
1.8	In the HSO folder select "hsoconf.ach"	"RAM" (left side mem. loc.)	OK	
1.9	From menu File select "Load File..."	A prompt window appears	OK	
1.10	In the HSO folder select "dsp_init.exe"		OK	
1.11	Select Program Memory window		OK	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
1.12	Search "done" with the scroll bar and select the line		OK	
1.13	Double click on the memory location	" * " appears after "RAM"	OK	
1.14	From menu Execution select "Run"	"Target running" (status bar)	OK	
1.15	Select "OK" in the FYI dialogue window	"Target halted" (status bar)	OK	
1.16	From menu Execution select "Chip Reset"		OK	
1.17	Select "OK"		OK	
1.18	From menu Execution select "Assembly Breaks"		OK	
1.19	Select "Delete All"		OK	
1.20	From menu File select "Load File..."	A prompt window appears	OK	
1.21	In the HSO folder select "hsoconf.ach"		OK	
1.22	From menu File select "Load File..."	A prompt window appears	OK	
1.23	In the HSO folder select "pm_test2.exe"		OK	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
1.24	Select Program Memory window		OK	
1.25	Search "done" with the scroll bar and select the line		OK	
1.26	Double click on the memory location	" * " appears after "RAM"	OK	
1.27	From menu Core select "Register File"	The Active Register File window appears	OK	
1.28	From menu Execution select "Run"	"Target running" (status bar)	OK	
1.29	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
1.30	Check the R2 register in the Active Register File window	R2: 0000000000	R2: 0000000000	
1.31	Check Program Memory content from address location 00000120 to 0007ffff	Value increases from 000001200000 to 0007ffff0000	Value increases from 000001200000 to 0007ffff0000	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
2	Data Memory			
2.1	Insert the EZ ICE probe in the JTAG plug (JP12)		OK	
2.2	Supply electrical power to the board	Green led on	OK	
2.3	Open the program ADSP-21020 Emulator		OK	
2.4	Type Enter two times to end Row JTAG and Opcode Scan Test		OK	
2.5	From menu Memory select "Program"	PM window appears	OK	
2.6	From menu Memory select "Data"	DM window appears	OK	
2.7	From menu File select "Load File..."	A prompt window appears	OK	
2.8	In the HSO folder select "hsoconf.ach"	"RAM" (left side mem. loc.)	OK	
2.9	From menu File select "Load File..."	A prompt window appears	OK	
2.10	In the HSO folder select "dsp_init.exe"		OK	
2.11	Select Program Memory window		OK	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
2.12	Search "done" with the scroll bar and select the line		OK	
2.13	Double click on the memory location	" * " appears after "RAM"	OK	
2.14	From menu Execution select "Run"	"Target running" (status bar)	OK	
2.15	Select "OK" in the FYI dialogue window	"Target halted" (status bar)	OK	
2.16	From menu Execution select "Chip Reset"		OK	
2.17	Select "OK"		OK	
2.18	From menu Execution select "Assembly Breaks"		OK	
2.19	Select "Delete All"		OK	
2.20	From menu File select "Load File..."	A prompt window appears	OK	
2.21	In the HSO folder select "hsoconf.ach"		OK	
2.22	From menu File select "Load File..."	A prompt window appears	OK	
2.23	In the HSO folder select "dm_rw1cy.exe"		OK	
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2.24	Select Program Memory window		OK	
2.25	Search "done" with the scroll bar and select the line		OK	
2.26	Double click on the memory location	" * " appears after "RAM"	OK	
2.27	From menu Core select "Register File"	The Active Register File window appears	OK	
2.28	From menu Execution select "Run"	"Target running" (status bar)	OK	
2.29	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
2.30	Check the R2 register in the Active Register File window	R2: 0000000000	R2: 0000000000	
2.31	Check Data Memory content from address location 00000000 to 0007ffff	Value increases from 0000000000 to 0007ffff00	OK	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
3	32-Bit Internal Bus			
3.1	Insert the EZ ICE probe in the JTAG plug (JP12)		OK	
3.2	Connect JP15 with POD1 and POD2 of LSA		OK	
3.3	Connect the probe channel 1 oscilloscope with pin 23 of P1		OK	
3.4	Connect the probe channel 2 oscilloscope with pin 77 of P1		OK	
3.5	Connect the probe channel 0 POD3 of LSA with pin 77 of P1		OK	
3.6	Set LSA trigger on channel 0 POD3 signal		OK	
3.7	Supply electrical power to the board	Green led on	OK	
3.8	Open the program ADSP-21020 Emulator		OK	
3.9	Type Enter two times to end Row JTAG and Opcode Scan Test		OK	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
3.10	From menu Memory select "Program"	PM window appears	OK	
3.11	From menu Memory select "Data"	DM window appears	OK	
3.12	From menu File select "Load File..."	A prompt window appears	OK	
3.13	In the HSO folder select "hsoconf.ach"	"RAM" (left side mem. loc.)	OK	
3.14	From menu File select "Load File..."	A prompt window appears	OK	
3.15	In the HSO folder select "bus_rw0.exe"		OK	
3.16	Select Program Memory window		OK	
3.17	Search "done" with the scroll bar and select the line		OK	
3.18	Double click on the memory location	" * " appears after "RAM"	OK	
3.19	From menu Execution select "Run"	"Target running" (status bar)	OK	
3.20	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101 ns each)	See PVS 01 and Printout 01
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
3.21	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.4ns)	See Printout 01
3.22	Check on the screen of the LSA	Value increases from 880000000 to 88FFFFFF	OK	
3.23	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.24	From menu Execution select "Chip Reset"		OK	
3.25	Select "OK"		OK	
3.26	From menu Execution select "Assembly Breaks"		OK	
3.27	Select "Delete All"		OK	
3.28	Connect the probe channel 1 oscilloscope with pin 55 of P1		OK	
3.29	Select "Run" on LSA		OK	
3.30	From menu File select "Load File..."	A prompt window appears	OK	
3.31	In the HSO folder select "hsoconf.ach"		OK	
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3.32	From menu File select "Load File..."	A prompt window appears	OK	
3.33	In the HSO folder select "bus_rw1.exe"		OK	
3.34	Select Program Memory window		OK	
3.35	Search "done" with the scroll bar and select the line		OK	
3.36	Double click on the memory location	" * " appears after "RAM"	OK	
3.37	From menu Execution select "Run"	"Target running" (status bar)	OK	
3.38	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101.2 ns each)	See PVS 01 and Printout 02
3.39	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.4 ns)	See Printout 02
3.40	Check on the screen of the LSA	Value increases from 89000000 to 89FFFFFF	OK	
3.41	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.42	From menu Execution select "Chip Reset"		OK	
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3.43	Select "OK"		OK	
3.44	From menu Execution select "Assembly Breaks"		OK	
3.45	Select "Delete All"		OK	
3.46	Connect the probe channel 1 oscilloscope with pin 87 of P1		OK	
3.47	Select "Run" on LSA		OK	
3.48	From menu File select "Load File..."	A prompt window appears	OK	
3.49	In the HSO folder select "hsoconf.ach"		OK	
3.50	From menu File select "Load File..."	A prompt window appears	OK	
3.51	In the HSO folder select "bus_rw2.exe"		OK	
3.52	Select Program Memory window		OK	
3.53	Search "done" with the scroll bar and select the line		OK	
3.54	Double click on the memory location	" * " appears after "RAM"	OK	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
3.55	From menu Execution select "Run"	"Target running" (status bar)	OK	
3.56	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101.2 ns each)	See PVS 01 and Printout 03
3.57	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.2 ns)	See Printout 03
3.58	Check on the screen of the LSA	Value increases from 8A000000 to 8AFFFFFF	OK	
3.59	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.60	From menu Execution select "Chip Reset"		OK	
3.61	Select "OK"		OK	
3.62	From menu Execution select "Assembly Breaks"		OK	
3.63	Select "Delete All"		OK	
3.64	Connect the probe channel 1 oscilloscope with pin 24 of P1		OK	
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3.65	Select "Run" on LSA		OK	
3.66	From menu File select "Load File..."	A prompt window appears	OK	
3.67	In the HSO folder select "hsoconf.ach"		OK	
3.68	From menu File select "Load File..."	A prompt window appears	OK	
3.69	In the HSO folder select "bus_rw3.exe"		OK	
3.70	Select Program Memory window		OK	
3.71	Search "done" with the scroll bar and select the line		OK	
3.72	Double click on the memory location	" * " appears after "RAM"	OK	
3.73	From menu Execution select "Run"	"Target running" (status bar)	OK	
3.74	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101.4 ns each)	See PVS 01 and Printout 04
3.75	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.8 ns)	See Printout 04
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3.76	Check on the screen of the LSA	Value increases from 8B000000 to 8BFFFFFF	OK	
3.77	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.78	From menu Execution select "Chip Reset"		OK	
3.79	Select "OK"		OK	
3.80	From menu Execution select "Assembly Breaks"		OK	
3.81	Select "Delete All"		OK	
3.82	Connect the probe channel 1 oscilloscope with pin 56 of P1		OK	
3.83	Select "Run" on LSA		OK	
3.84	From menu File select "Load File..."	A prompt window appears	OK	
3.85	In the HSO folder select "hsoconf.ach"		OK	
3.86	From menu File select "Load File..."	A prompt window appears	OK	
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3.87	In the HSO folder select "bus_rw4.exe"			OK	
3.88	Select Program Memory window			OK	
3.89	Search "done" with the scroll bar and select the line			OK	
3.90	Double click on the memory location	" * " appears after "RAM"		OK	
3.91	From menu Execution select "Run"	"Target running" (status bar)		OK	
3.92	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101.4 ns each)		See PVS 01 and Printout 05
3.93	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.4 ns)		See Printout 05
3.94	Check on the screen of the LSA	Value increases from 8C000000 to 8CFFFFFF		OK	
3.95	Select "OK" in the dialogue window FYI	"Target halted" (status bar)		OK	
3.96	From menu Execution select "Chip Reset"			OK	
3.97	Select "OK"			OK	
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3.98	From menu Execution select "Assembly Breaks"			OK	
3.99	Select "Delete All"			OK	
3.100	Connect the probe channel 1 oscilloscope with pin 88 of P1			OK	
3.101	Select "Run" on LSA			OK	
3.102	From menu File select "Load File..."	A prompt window appears		OK	
3.103	In the HSO folder select "hsoconf.ach"			OK	
3.104	From menu File select "Load File..."	A prompt window appears		OK	
3.105	In the HSO folder select "bus_rw5.exe"			OK	
3.106	Select Program Memory window			OK	
3.107	Search "done" with the scroll bar and select the line			OK	
3.108	Double click on the memory location	" * " appears after "RAM"		OK	
3.109	From menu Execution select "Run"	"Target running" (status bar)		OK	
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3.110	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101 ns each)	See PVS 01 and Printout 06
3.111	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.4 ns)	See Printout 06
3.112	Check on the screen of the LSA	Value increases from 8D000000 to 8DFFFFFF	OK	
3.113	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.114	From menu Execution select "Chip Reset"		OK	
3.115	Select "OK"		OK	
3.116	From menu Execution select "Assembly Breaks"		OK	
3.117	Select "Delete All"		OK	
3.118	Connect the probe channel 1 oscilloscope with pin 25 of P1		OK	
3.119	Select "Run" on LSA		OK	

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3.120	From menu File select "Load File..."	A prompt window appears	OK	
3.121	In the HSO folder select "hsoconf.ach"		OK	
3.122	From menu File select "Load File..."	A prompt window appears	OK	
3.123	In the HSO folder select "bus_rw6.exe"		OK	
3.124	Select Program Memory window		OK	
3.125	Search "done" with the scroll bar and select the line		OK	
3.126	Double click on the memory location	" * " appears after "RAM"	OK	
3.127	From menu Execution select "Run"	"Target running" (status bar)	OK	
3.128	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 110 ns each)	Sequence of two negative pulses (width 101 ns each)	See PVS 01 and Printout 07
3.129	Verify signal on channel 2 of the oscilloscope	Sequence of a negative pulse (width < 60 ns)	Sequence of a negative pulse (width 31.6ns)	See Printout 07
3.130	Check on the screen of the LSA	Value increases from 8E000000 to 8EFFFFFF	OK	
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3.131	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.132	From menu Execution select "Chip Reset"		OK	
3.133	Select "OK"		OK	
3.134	From menu Execution select "Assembly Breaks"		OK	
3.135	Select "Delete All"		OK	
3.136	Connect the probe channel 1 oscilloscope with pin 57 of P1		OK	
3.137	Select "Run" on LSA		OK	
3.138	From menu File select "Load File..."	A prompt window appears	OK	
3.139	In the HSO folder select "hsoconf.ach"		OK	
3.140	From menu File select "Load File..."	A prompt window appears	OK	
3.141	In the HSO folder select "bus_rw7.exe"		OK	
3.142	Select Program Memory window		OK	
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3.143	Search "done" with the scroll bar and select the line		OK	
3.144	Double click on the memory location	" * " appears after "RAM"	OK	
3.145	From menu Execution select "Run"	"Target running" (status bar)	OK	
3.146	Verify signal on channel 1 of the oscilloscope	Sequence of two negative pulses (width < 400 ns each)	Sequence of two negative pulses (width 300.5 ns each)	See Printout 08
3.147	Verify signal on channel 2 of the oscilloscope	Sequence of a pulse (width < 350 ns)	Sequence of a negative pulse (width 230.5 ns)	See Printout 08
3.148	Check on the screen of the LSA	Value increases from 8F000000 to 8FFFFFFF	OK	
3.149	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
3.150	From menu Execution select "Chip Reset"		OK	
3.151	Select "OK"		OK	
3.152	From menu Execution select "Assembly Breaks"		OK	
3.153	Select "Delete All"		OK	
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4	Interval Timer & Interrupt Manager			
4.1	Insert the EZ ICE probe in the JTAG plug		OK	
4.2	Supply electrical power to the board	Green led on	OK	
4.3	Open the program ADSP-21020 Emulator		OK	
4.4	Type Enter two times to end Row JTAG and Opcode Scan Test		OK	
4.5	From menu Memory select "Program"	PM window appears	OK	
4.6	From menu Memory select "Data"	DM window appears	OK	
4.7	From menu File select "Load File..."	A prompt window appears	OK	
4.8	In the HSO folder select "hsoconf.ach"		OK	
4.9	From menu File select "Load File..."	A prompt window appears	OK	
4.10	In the HSO folder select "it_test.exe"		OK	
4.11	From menu Core select "Register File"	The A R F window appears	OK	
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4.12	From menu Execution select "Run"	"Target running" (status bar)	OK	
4.13	Wait 60 seconds		OK	
4.14	From menu Execution select "Halt"	"Target halted" (status bar)	OK	
4.15	Check the R5 register in the Active Register File window	R5: 000000003C	R5: 000000003C	
4.16	Connect the probe channel 1 oscilloscope with pin 3 of JP2		OK	
4.17	Verify signal on channel 1 of the oscilloscope	Sequence of a pulse (width ~200 ns) every second	Sequence of a pulse (width: 196.4 ns, T: 1s)	
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5	Watchdog			



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5.1	Insert the EZ ICE probe in the JTAG plug			OK			
5.2	Verify that JP1 is not closed			OK			
5.3	Connect the probe channel 1 oscilloscope with pin 2 of JP1			OK			
5.4	Supply electrical power to the board	Green led on		OK			
5.5	Open the program ADSP-21020 Emulator			OK			
5.6	Type Enter two times to end Row JTAG and Opcode Scan Test			OK			
5.7	From menu Memory select "Program"	PM window appears		OK			
5.8	From menu Memory select "Data"	DM window appears		OK			
5.9	From menu File select "Load File..."	A prompt window appears		OK			
5.10	In the HSO folder select "hsoconf.ach"	"RAM" (left side mem. loc.)		OK			
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5.11	From menu File select "Load File..."		A prompt window appears	OK			
5.12	In the HSO folder select "wdtrigg.exe"			OK			



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5.13	From menu Execution select "Run"	"Target running" (status bar)	OK	
5.14	Verify signal on channel 1 of the oscilloscope	Signal goes up to 5V	OK	
5.15	From menu Execution select "Halt"	"Target halted" (status bar)	OK	
5.16	Close the program ADSP-21020 Emulator		OK	
5.17	Switch the board off		OK	
5.18	Close JP1		OK	
5.19	Supply electrical power to the board	Green led on	OK	
5.20	Check the red LED (D3)	Red led light on after 13 seconds	OK	
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6	EEPROM			
6.1	Insert the EZ ICE probe in the JTAG plug		OK	



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6.2	Verify that JP3 is closed			OK	
6.3	Supply electrical power to the board	Green led on		OK	
6.4	Open the program ADSP-21020 Emulator			OK	
6.5	Type Enter two times to end Row JTAG and Opcode Scan Test			OK	
6.6	From menu Memory select "Program"	PM window appears		OK	
6.7	From menu Memory select "Data"	DM window appears		OK	
6.8	From menu File select "Load File..."	A prompt window appears		OK	
6.9	In the HSO folder select "hsoconf.ach"	"RAM" (left side mem. loc.)		OK	
6.10	From menu Memory select "Operation" and then "Fill"	Fill Memory Data window appears		OK	
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6.11	Type "00000000"		OK		
6.12	Select "OK"	Fill Memory Range window appears	OK		



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6.13	In Starting Address field type "80000000"			OK	
6.14	In Ending Address field type "80000FFF"			OK	
6.15	In Memory Space field select "DM"			OK	
6.16	Select "OK"			OK	
6.17	Verify the DM content from address 80000000 to 80000FFF	"FFFFFFFF00"		FFFFFFFF00	
6.18	Close the program ADSP-21020 Emulator			OK	
6.19	Switch the board off			OK	
6.20	Open JP3			OK	
6.21	Supply electrical power to the board	Green led on		OK	
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6.22	Open the program ADSP-21020 Emulator		OK		
6.23	Type Enter two times to end Row JTAG and Opcode Scan Test		OK		
6.24	From menu Memory select "Program"	PM window appears	OK		



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6.25	From menu Memory select "Data"	DM window appears	OK	
6.26	From menu File select "Load File..."	A prompt window appears	OK	
6.27	In the HSO folder select "hsoconf.ach"	"RAM" (left side mem. loc.)	OK	
6.28	From menu File select "Load File..."	A prompt window appears	OK	
6.29	In the HSO folder select "eep_rw.exe"		OK	
6.30	Select Program Memory window		OK	
6.31	Search "done" with the scroll bar and select the line		OK	
6.32	Double click on the memory location	" * " appears after "RAM"	OK	
6.33	From menu Core select "Register File"	The A R F window appears	OK	
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6.34	From menu Execution select "Run"	"Target running" (status bar)	OK	
6.35	Select "OK" in the dialogue window FYI	"Target halted" (status bar)	OK	
6.36	Check the R2 register in the Active Register File window	R2: 0000000000	R2: 0000000000	
6.37	Verify the DM content from address 80000000 to	Value increases from	OK	



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	8003FFFF	8000000000 to 8003FFFF00		
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7	IEEE 1355 Interface			IEEE 1355 interface is not mounted on serial number 05 (SPIRE CONFIGURATION)
7.1	Insert the EZ ICE probe in the JTAG plug		N.A.	
7.2	Make the connections specified in Table 6-1 (LINK 1)		N.A.	
7.3	Supply electrical power to the board	Green led on	N.A.	



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7.4	Open the program ADSP-21020 Emulator			N.A.	
7.5	Type Enter two times to end Row JTAG and Opcode Scan Test			N.A.	
7.6	From menu Memory select "Program"	PM window appears		N.A.	
7.7	From menu Memory select "Data"	DM window appears		N.A.	
7.8	From menu Execution select "CBUG"	CBUG window appears		N.A.	
7.9	From menu File select "Load File..."	A prompt window appears		N.A.	
7.10	In the HSO folder select "boot.ach"			N.A.	
7.11	From menu File select "Load File..."	A prompt window appears		N.A.	
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7.12	In the HSO folder select "1355ts1"		N.A.		
7.13	From menu Execution select "Restart"		N.A.		
7.14	Search line " /** START 1 LINK ** / " in the program		N.A.		
7.15	Double click on " if (d_ErrorCode !=0)... "	" * " appears before the line	N.A.		



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7.16	From menu Execution select "Continue"		N.A.	
7.17	Connect the probe channel 1 oscilloscope with pin 9 of U21		N.A.	
7.18	Verify signal on channel 1 of the oscilloscope	Waveform as depicted in Picture 2	N.A.	
7.19	Measure the first negative pulse duration	400 ns	N.A.	
7.20	In the CBUG window search line " /** START 2 LINK **/ "		N.A.	
7.21	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.22	Open program "SpaceWireTest" on 1355TE	A DOS window appears	N.A.	
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Picture 2 Data signal on link start



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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.23	From menu select "2"	Link1, 2, 3 "Transfer Not Started"	N.A.	
7.24	From menu select "10"	"Enter Link"	N.A.	
7.25	Type "2"	"Enter file name"	N.A.	
7.26	Type "rx1.txt"	"Enter file size in byte"	N.A.	
7.27	Type "1024"	"Confirm..."	N.A.	
7.28	Type "Y"		N.A.	
7.29	From menu Execution of emulator select "Continue"		N.A.	
7.30	Open file "rx1.txt" on 1355TE	"Transmission was successful"	N.A.	
7.31	In the CBUG window search "/* * START 3 LINK */"		N.A.	
7.32	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.33	From menu of "SpaceWireTest" program select "12"	"Enter link"	N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.34	Type "2"	"Enter file name"	N.A.	
7.35	Type "tx.txt"	"Enter packet size"	N.A.	
7.36	Type "256"	"Confirm..."	N.A.	
7.36	Type "Y"		N.A.	
7.37	From menu Execution of emulator select "Continue"		N.A.	
7.38	From menu Data select "Watch"	Watch window appears	N.A.	
7.39	Type "RX_BUFFER"		N.A.	
7.40	Select "OK"	Value increases from 00 to FF	N.A.	
7.41	From menu File Select "Exit"	A prompt window appears	N.A.	
7.42	Select "Yes"		N.A.	
7.43	Switch off the Power Supply	Green led off	N.A.	
7.44	Make the connections specified in Table 6-1 (LINK 2)		N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.45	Supply electrical power to the board	Green led on	N.A.	
7.46	Open the program ADSP-21020 Emulator		N.A.	
7.47	Type Enter two times to end Row JTAG and Opcode Scan Test		N.A.	
7.48	From menu Memory select "Program"	PM window appears	N.A.	
7.49	From menu Memory select "Data"	DM window appears	N.A.	
7.50	From menu Execution select "CBUG"	CBUG window appears	N.A.	
7.51	From menu File select "Load File..."	A prompt window appears	N.A.	
7.52	In the HSO folder select "boot.ach"		N.A.	
7.53	From menu File select "Load File..."	A prompt window appears	N.A.	
7.54	In the HSO folder select "1355ts2"		N.A.	
7.55	From menu Execution select "Restart"		N.A.	
7.56	Search line " /** START 1 LINK ** / " in the program		N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.57	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.58	From menu Execution select "Continue"		N.A.	
7.59	Connect the probe channel 1 oscilloscope with pin 7 of U23		N.A.	
7.60	Verify signal on channel 1 of the oscilloscope	Waveform as depicted in Picture 2	N.A.	
7.61	Measure the first negative pulse duration	400 ns	N.A.	
7.62	In the CBUG window search line " /** START 2 LINK **/ "		N.A.	
7.63	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.64	Open program "SpaceWireTest" on 1355TE	A DOS window appears	N.A.	
7.65	From menu select "2"	Link1, 2, 3 "Transfer Not Started"	N.A.	
7.66	From menu select "10"	"Enter Link"	N.A.	
7.67	Type "2"	"Enter file name"	N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.68	Type ""rx2.txt"	"Enter file size in byte"	N.A.	
7.69	Type "1024"	"Confirm..."	N.A.	
7.70	Type "Y"		N.A.	
7.71	From menu Execution of emulator select "Continue"		N.A.	
7.72	Open file "rx2.txt" on 1355TE	"Transmission successful" was	N.A.	
7.73	In the CBUG window search "/* * START 3 LINK */"		N.A.	
7.74	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.75	From menu of "SpaceWireTest" program select "12"	"Enter link"	N.A.	
7.76	Type "2"	"Enter file name"	N.A.	
7.77	Type "tx.txt"	"Enter packet size"	N.A.	
7.78	Type "256"	"Confirm..."	N.A.	
7.79	From menu Execution of emulator select "Continue"		N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.80	From menu Data select "Watch"	Watch window appears	N.A.	
7.81	Type "RX_BUFFER"		N.A.	
7.82	Select "OK"	Value increases from 00 to FF	N.A.	
7.83	From menu File Select "Exit"	A prompt window appears	N.A.	
7.84	Select "Yes"		N.A.	
7.85	Switch off the Power Supply	Green led off	N.A.	
7.86	Make the connections specified in Table 6-1 (LINK 3)		N.A.	
7.87	Supply electrical power to the board	Green led on	N.A.	
7.88	Open the program ADSP-21020 Emulator		N.A.	
7.89	Type Enter two times to end Row JTAG and Opcode Scan Test		N.A.	
7.90	From menu Memory select "Program"	PM window appears	N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.91	From menu Memory select "Data"	DM window appears	N.A.	
7.92	From menu Execution select "CBUG"	CBUG window appears	N.A.	
7.93	From menu File select "Load File..."	A prompt window appears	N.A.	
7.94	In the HSO folder select "boot.ach"		N.A.	
7.95	From menu File select "Load File..."	A prompt window appears	N.A.	
7.96	In the HSO folder select "1355ts3"		N.A.	
7.97	From menu Execution select "Restart"		N.A.	
7.98	Search line " /** START 1 LINK ** / " in the program		N.A.	
7.99	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.100	From menu Execution select "Continue"		N.A.	
7.101	Connect the probe channel 1 oscilloscope with pin 9 of U24		N.A.	
7.102	Verify signal on channel 1 of the oscilloscope	Waveform as depicted in P.1	N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.103	Measure the first negative pulse duration	400 ns	N.A.	
7.104	In the CBUG window search line " /** START 2 LINK **/ "		N.A.	
7.105	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.106	Open program "SpaceWireTest" on 1355TE	A DOS window appears	N.A.	
7.107	From menu select "2"	Link1, 2, 3 "Transfer Not Started"	N.A.	
7.108	From menu select "10"	"Enter Link"	N.A.	
7.109	Type "2"	"Enter file name"	N.A.	
7.110	Type ""rx3.txt"	"Enter file size in byte"	N.A.	
7.111	Type "1024"	"Confirm..."	N.A.	
7.112	Type "Y"		N.A.	
7.113	From menu Execution of emulator select "Continue"		N.A.	
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STEP N°	TEST SEQUENCE	EXPECTED VALUE	MEASURED VALUE	REMARKS
7.114	Open file "rx3.txt" on 1355TE	"Transmission successful" was	N.A.	
7.115	In the CBUG window search "/** START 3 LINK **/"		N.A.	
7.116	Double click on " if (d_ErrorCode !=0)... "	" * " appears	N.A.	
7.117	From menu of "SpaceWireTest" program select "12"	"Enter link"	N.A.	
7.118	Type "2"	"Enter file name"	N.A.	
7.119	Type "tx.txt"	"Enter packet size"	N.A.	
7.120	Type "256"	"Confirm..."	N.A.	
7.121	From menu Execution of emulator select "Continue"		N.A.	
7.122	From menu Data select "Watch"	Watch window appears	N.A.	
7.123	Type "RX_BUFFER"		N.A.	
7.124	Select "OK"	Value increases from 00 to FF	N.A.	
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9 PROCEDURE VARIATION SHEETS

PROCEDURE VARIATION SHEET 01			
Test procedure Ref.: DPU-PR-CGS-001 Issue 2		Page revised: 22, 24, 26, 27, 29, 31, 32	Para. revised: (Step) 3.20, 38, 56, 74, 92, 110, 128
Description of changes:			
3.20	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
3.38	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
3.56	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
3.74	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
3.92	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
3.110	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
3.128	EXPECTED VALUE: Sequence of two negative pulses (width < 80 ns each) Sequence of two negative pulses (width < 110 ns each)		becomes:
Reason for changes:			
Access to the peripherals mapped from address 88000000 to 8e000000 occurs with one hardware wait state.			
CONCURRENCE			
TEST COND	P.A.	ENG.	CUSTOMER



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10 CONCLUSIONS

The unit CPU Board DPU-EM-100.00-0 S/N 05 was tested according to the specification DPU-SP-CGS-001 Issue 1 and following the procedures DPU-PR-CGS-001 Issue 2.

The results of the tests are contained in this document. All the measurements are in agreement with the specifications.



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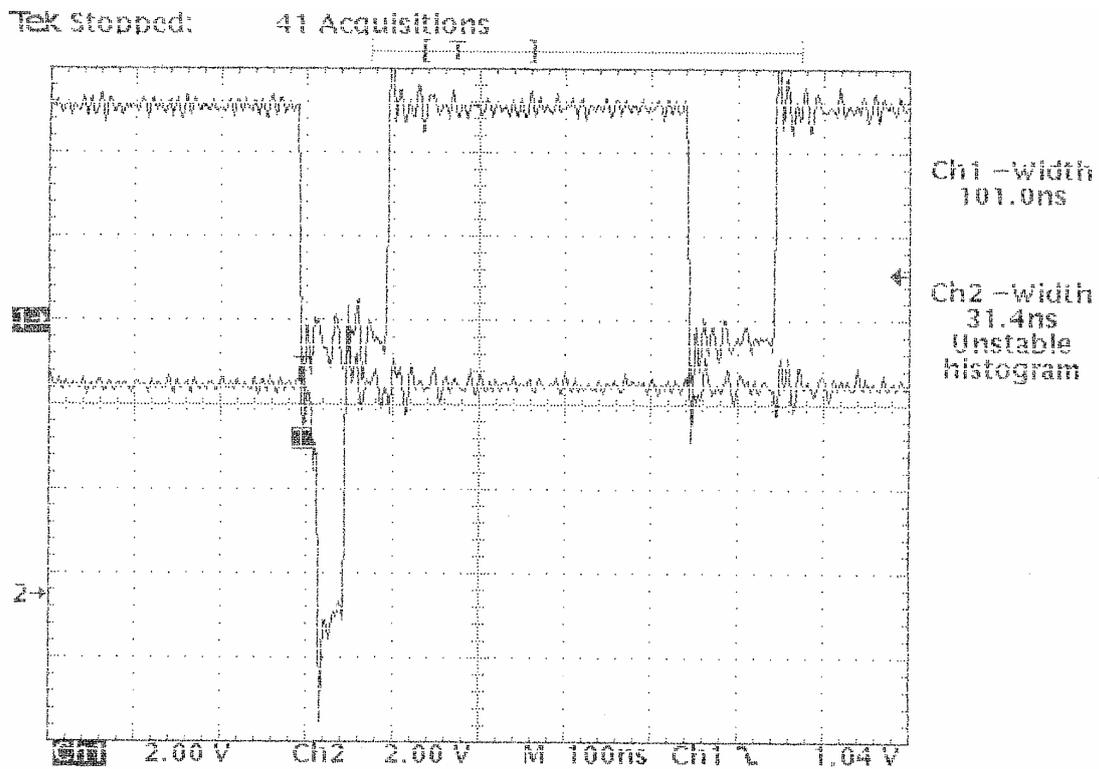
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11 PRINTOUTS

11.1 Printout 01 (see step 3.20, 3.21)



Ch1: \CS0

Ch2: \BUSWR

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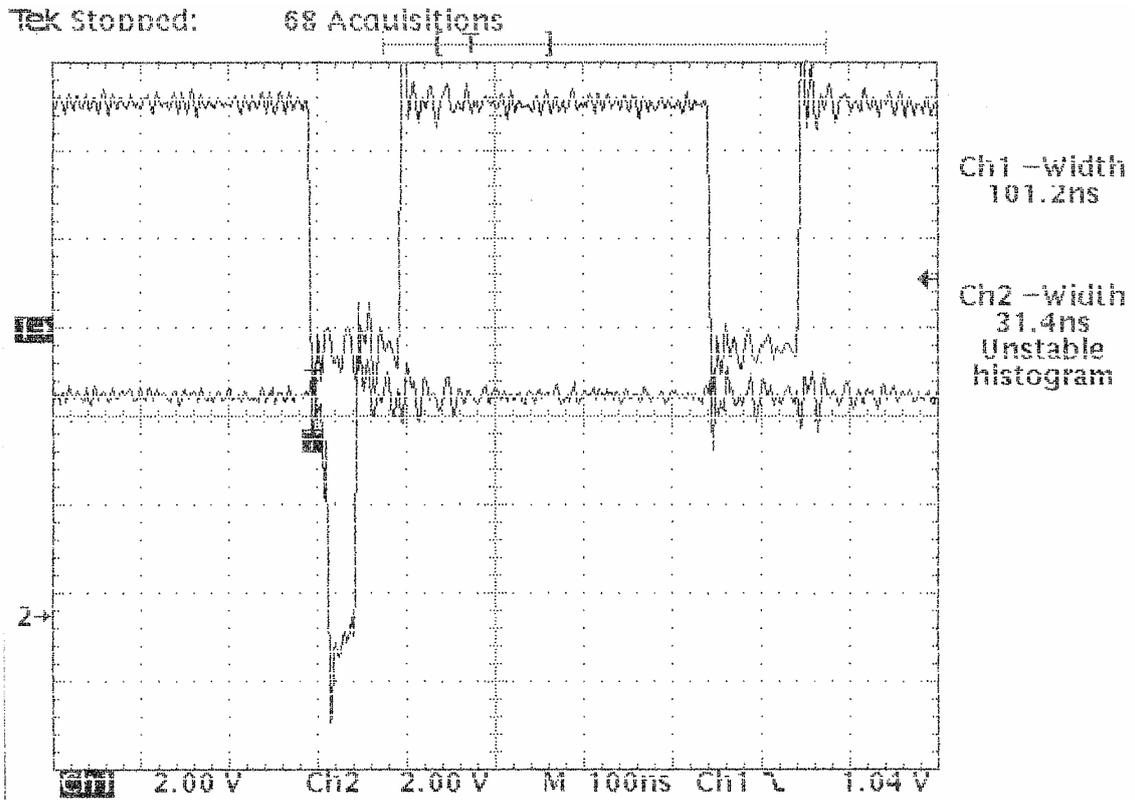
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11.2 Printout 02 (see step 3.38, 3.39)



Ch1: \CS1

Ch2: \BUSWR

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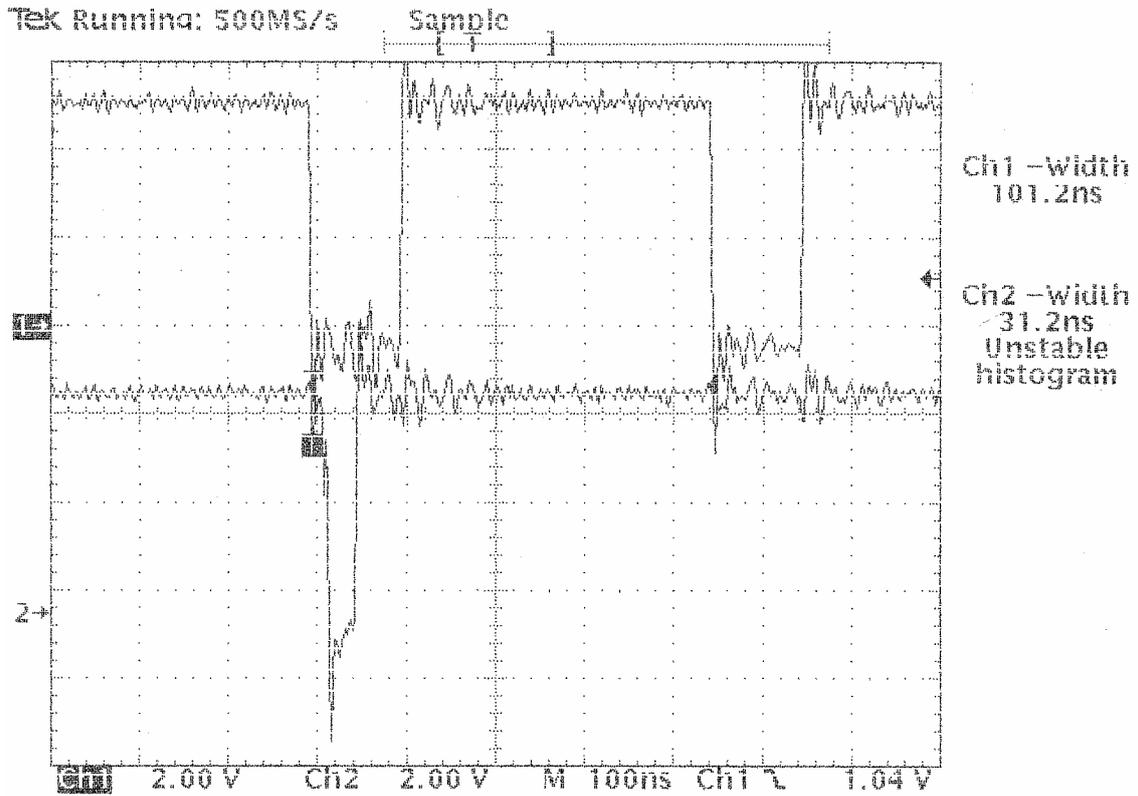
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11.3 Printout 03 (see step 3.56, 3.57)



Ch1: \CS2

Ch2: \BUSWR

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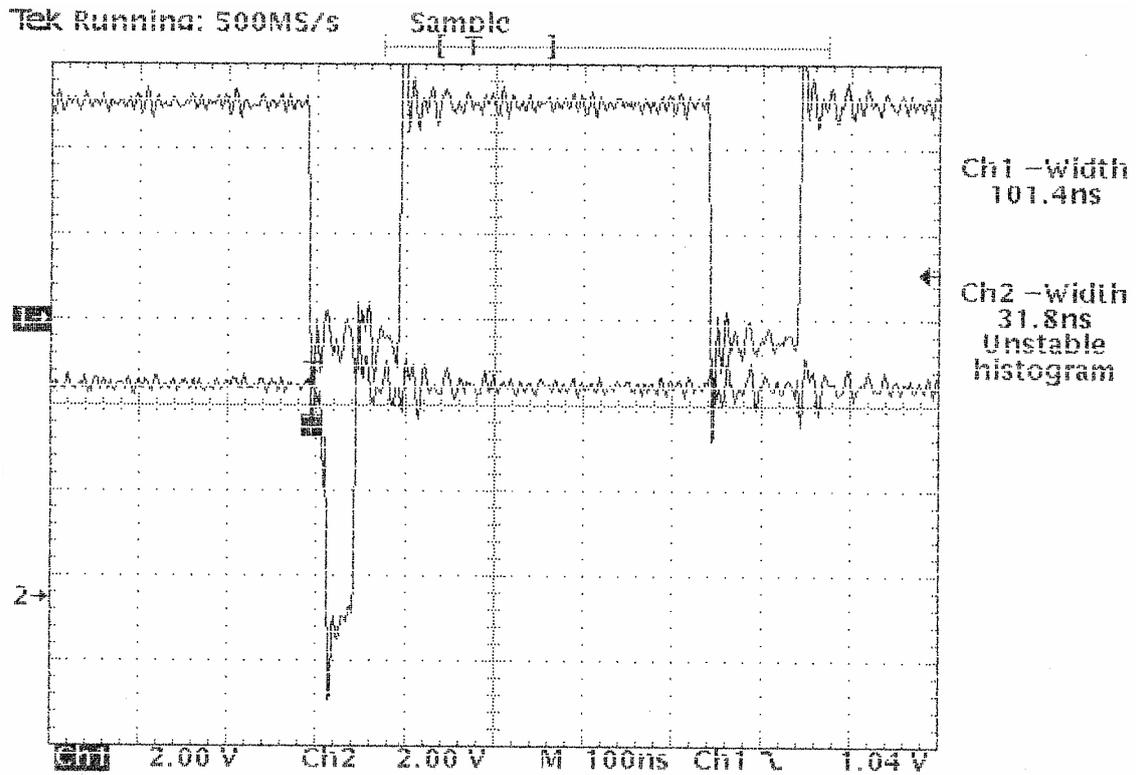
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11.4 Printout 04 (see step 3.74, 3.75)



Ch1: \CS3

Ch2: \BUSWR

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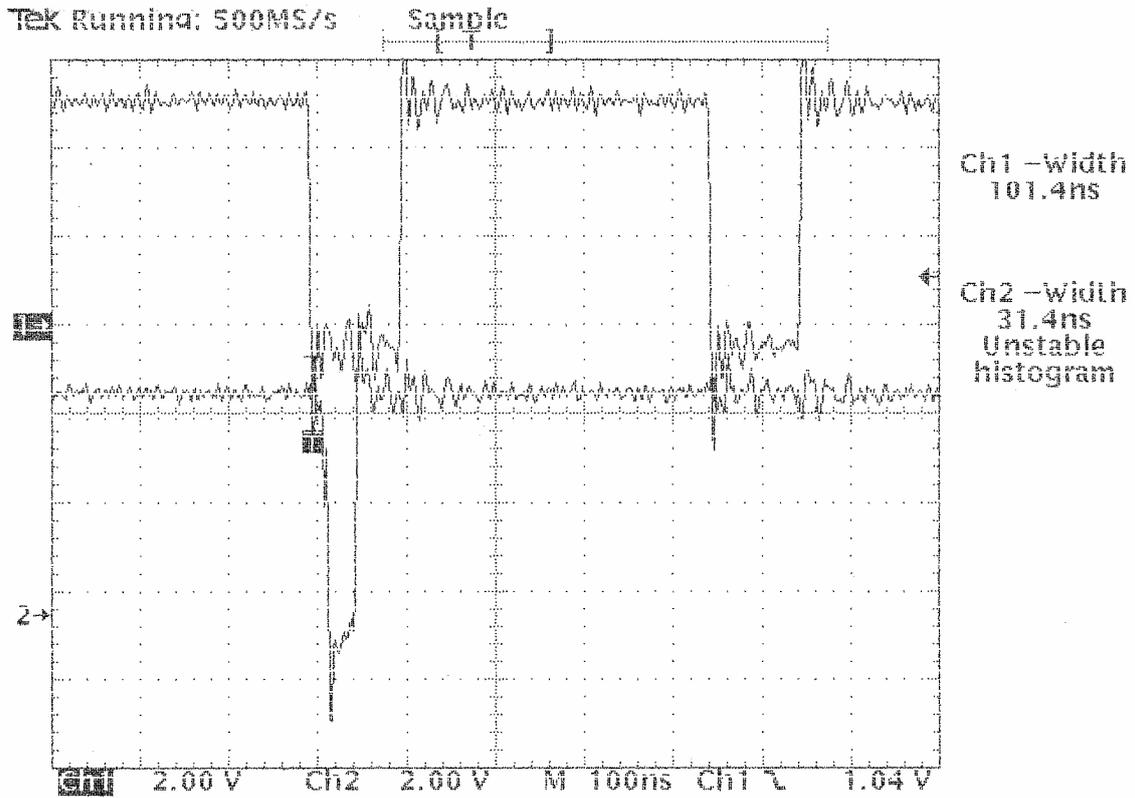
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11.5 Printout 05 (see step 3.92, 3.93)



Ch1: \CS4

Ch2: \BUSWR

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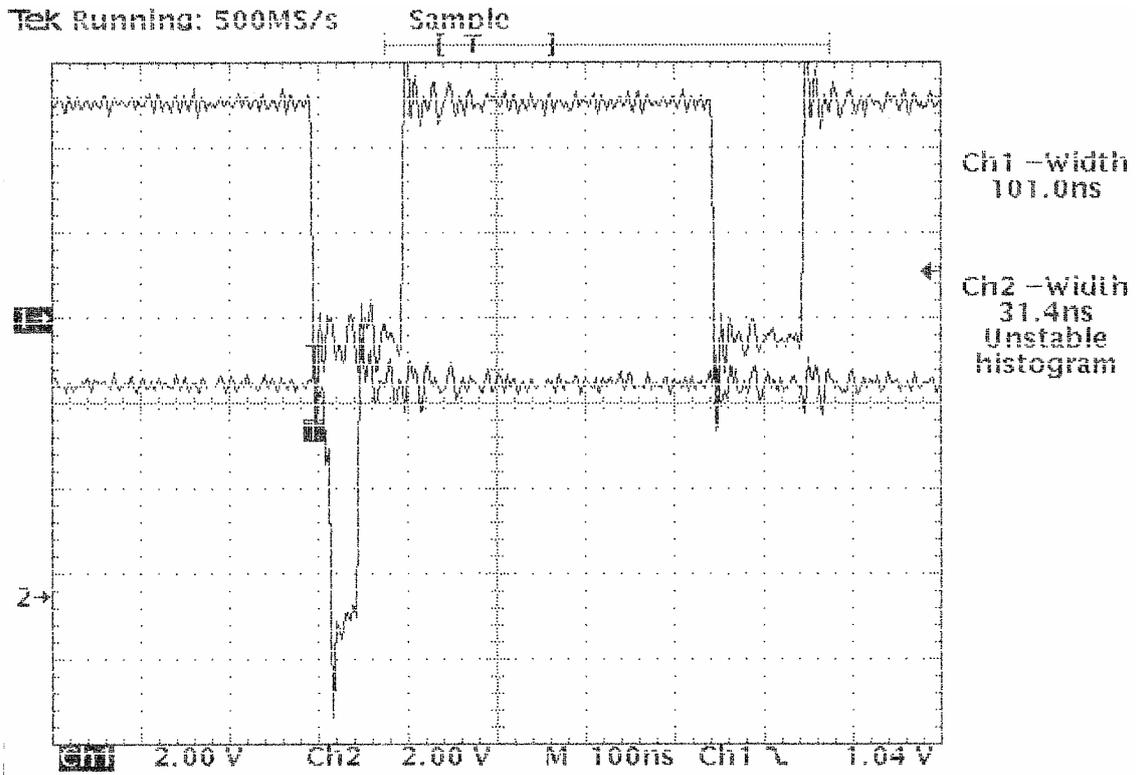
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11.6 Printout 06 (see step 3.110, 3.111)



Ch1: \CS5

Ch2: \BUSWR

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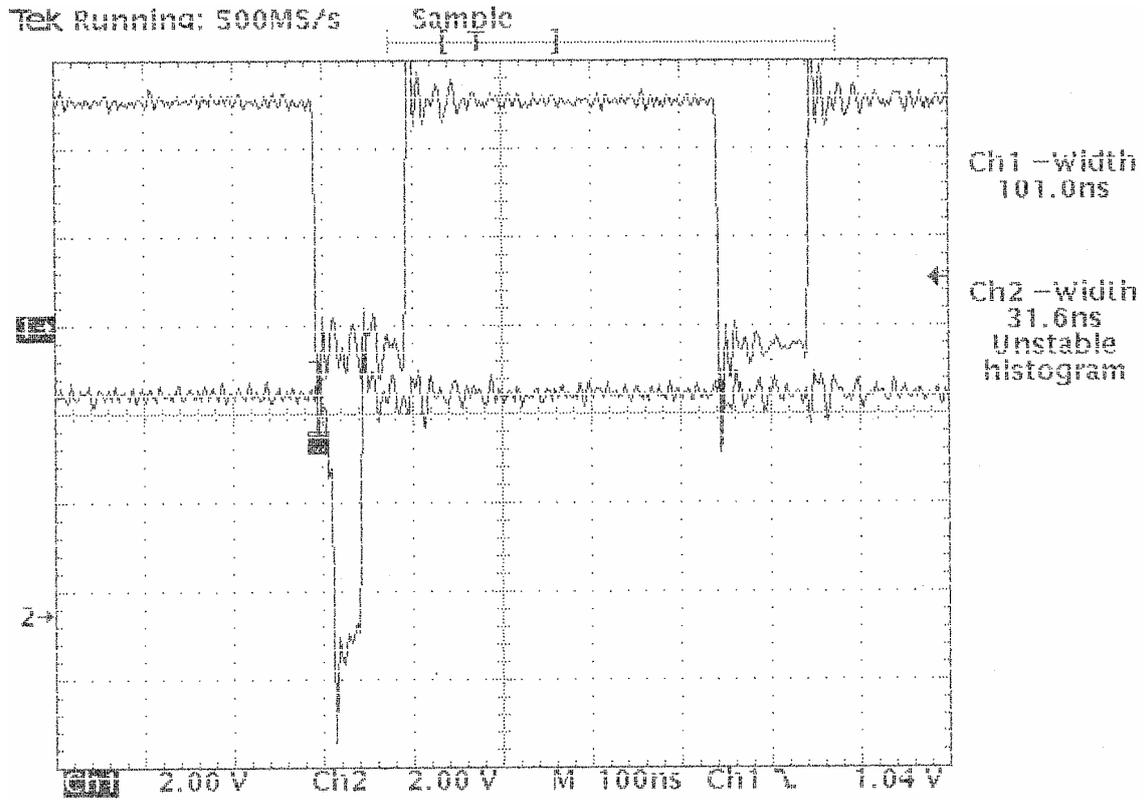
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11.7 Printout 07 (see step 3.128, 3.129)



Ch1: \CS6

Ch2: \BUSWR

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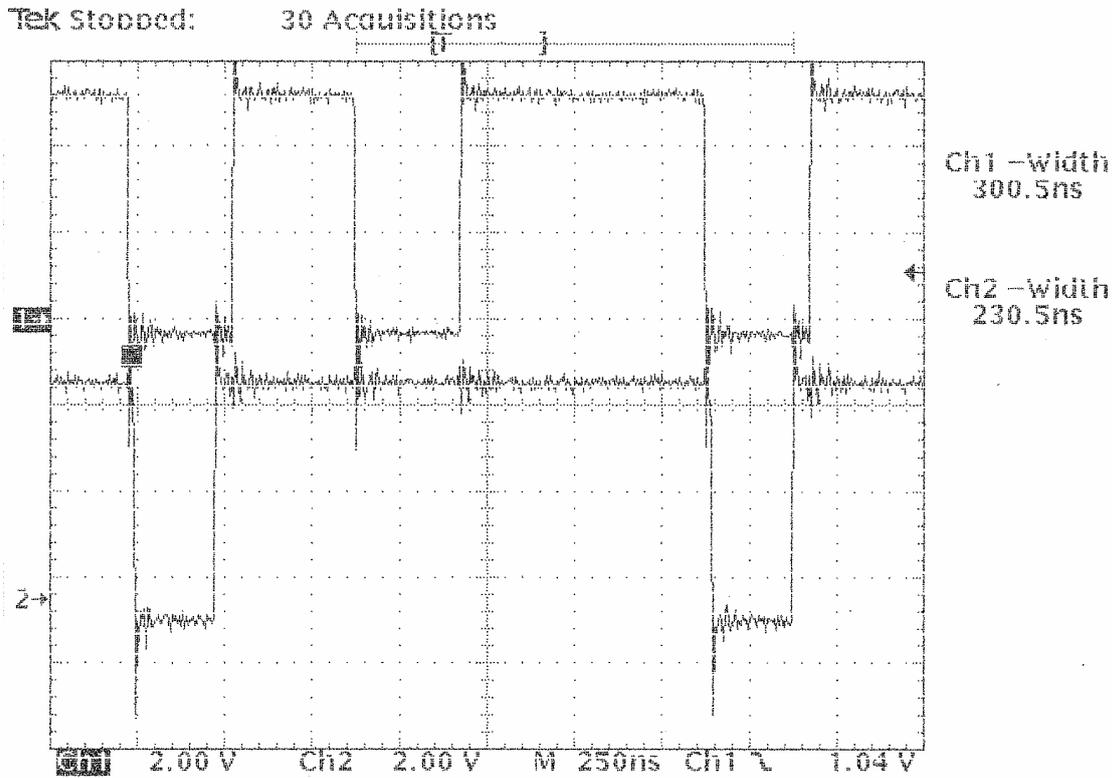
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11.8 Printout 08 (see step 3.146, 3.147)



Ch1: \CS7

Ch2: \BUSWR

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