

1000 Base T

Demonstration Guide



Purpose of this demo guide:

This guide shows how to configure the network interface card of a LeCroy WavePro 7Zi to generate compliant 1000_T output waveforms for live QPHY-ENET demonstrations.

Equipment needed:

1. TF-ENET kit including fixture, 2 x SMA cables, and a 6" ENET cable



2. WaveRunner Xi-A with QualiPHY and QPHY-ENET installed



3. WavePro 7Zi (used as DUT) with keyboard



4. LANCONF.exe software (posted on STFM)  LANCONF.EXE



5. Bootable IBM USB stick (or equivalent formatted boot drive)



WP7Zi scope

6" ENET cable

Step 1:
Connect 6" ENET
cable between
WavePro Zi and
TF-ENET fixture

TF-ENET

WavePro 7Zi (used as DUT)



WaveRunner Xi-A (running QPHY-ENET)



TF-ENET



Step 2:
Configure equipment as shown



AMIBIOS (C) 2006 American Megatrends, Inc.

MX945GME-LC #70681 BIOS V1.01

CPU : Intel(R) Core(TM)2 CPU

T7400 @ 2.16GHz

Speed : 2.16 GHz

Press DEL to run Setup

Press F11 for BBS POPUP

The MCH is operating with DDR2-667/CL5 in Single-Channel Mode

Initializing USB Controllers .. Done.

1024MB OK

USB Device(s) : 1 Mouse, 1 Storage Device

Auto-Detecting Pri Slave...IDE Hard Disk

Pri Slave : ST9160412AS 0002SDM1

Ultra DMA Mode-5, S.M.A.R.T. Capable and Status OK

Auto-detecting USB Mass Storage Devices ..

Device #01 : IBM Memory Key

01 USB mass storage devices found and configured.

PS2 Mouse not found

Step 3:

Insert the USB stick into the WavePro 7Zi and press the "DEL" key while WavePro 7Zi is booting, to enter the BIOS.

Phoenix cME FirstBIOS Pro Setup Utility

Main Advanced Security **Boot** Exit

Boot priority order:

- 1: ALL USB KEY
- 2: All IDE HDD
- 3: ALL IDE CDROM
- 4:
- 5: All PCI BEV
- 6:
- 7:
- 8:

Excluded from boot order:

- : PCI BEV:
- : IDE 0:
- : IDE 1: ST9160412AS-(S1)
- : IDE 2:
- : IDE 3:
- : IDE 12:
- : IDE 13:

Item Specific Help

Keys used to view or configure devices:
Up and Down arrows select a device.
<+> and <-> moves the device up or down.
<f> and <r> specifies the device fixed or removable.
<x> exclude or include the device to boot.
<Shift + 1> enables or disables a device.
<1 - 4> Loads default boot sequence.

F1 Help ↑↓ Select Item -/+ Change Values F9 Setup Defaults
Esc Exit + Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Step 4:

Set the boot priority for "ALL USB KEY" to be at the top of the list.

Starting PC DOS...

Current date is Sun 11-28-2010

Enter new date (mm-dd-yy):

Current time is 11:29:54.98p

Enter new time:

PC DOS Version 7.00

(C)Copyright Internatio

C:\>lanconf_

Step 5:

Reboot the WP7Zi (with the USB stick still installed) and type "lanconf" at the MSDOS prompt

[Select a Device]

Num	Description	De
-----	-------------	----

01)	Intel(R) 82566DM-2 Gigabit Network Connection	80
-----	---	----

Exit

Step 6:

Select the Intel Gigabit Network Connection

Exit = X

Blink Adapter = B

[LANConf Menu]

Registers (MAC and PHY)

Transmit and Receive

IEEE Tests

EEPROM/FLASH

Adapter Diagnostic Tests

PCI/Bus Configuration Menu

SU Menu

Keystroke Scripts

[Action Description]

Step 7:

Select "Registers (MAC and PHY)"

[Register Menu - PRO 1000]

- General MAC Registers Menu
- Interrupt MAC Registers
- Transmit And Receive Registers Menu
- Statistics MAC Registers
- Manageability Registers Menu
- LinkSec Statistics Registers
- Packet Buffer FIFO Menu
- PCI-Express MAC Registers
- PHY Registers Menu**
- Specific MAC Offset Location
- Specific Device Memory Location
- Specific System Memory Location
- MSI-X Memory
- Dump MAC registers

[Option Description]

Step 8:

Select "PHY Registers Menu"

[PHY Registers Menu]

Formatted Phy Registers

Raw PHY Registers

Specific PHY Register

[Action Description]

Step 9:

Select "Raw PHY Registers"

[PHY Registers]

0x0000	0140	0x0010	01A0
0x0001	7909	0x0011	4070
0x0002	02A8	0x0012	1600
0x0003	0390	0x0013	0210
0x0004	01E1	0x0014	0005
0x0005	0000	0x0015	F8FF
0x0006	0004	0x0016	0000
0x0007	2001		

Step 10:

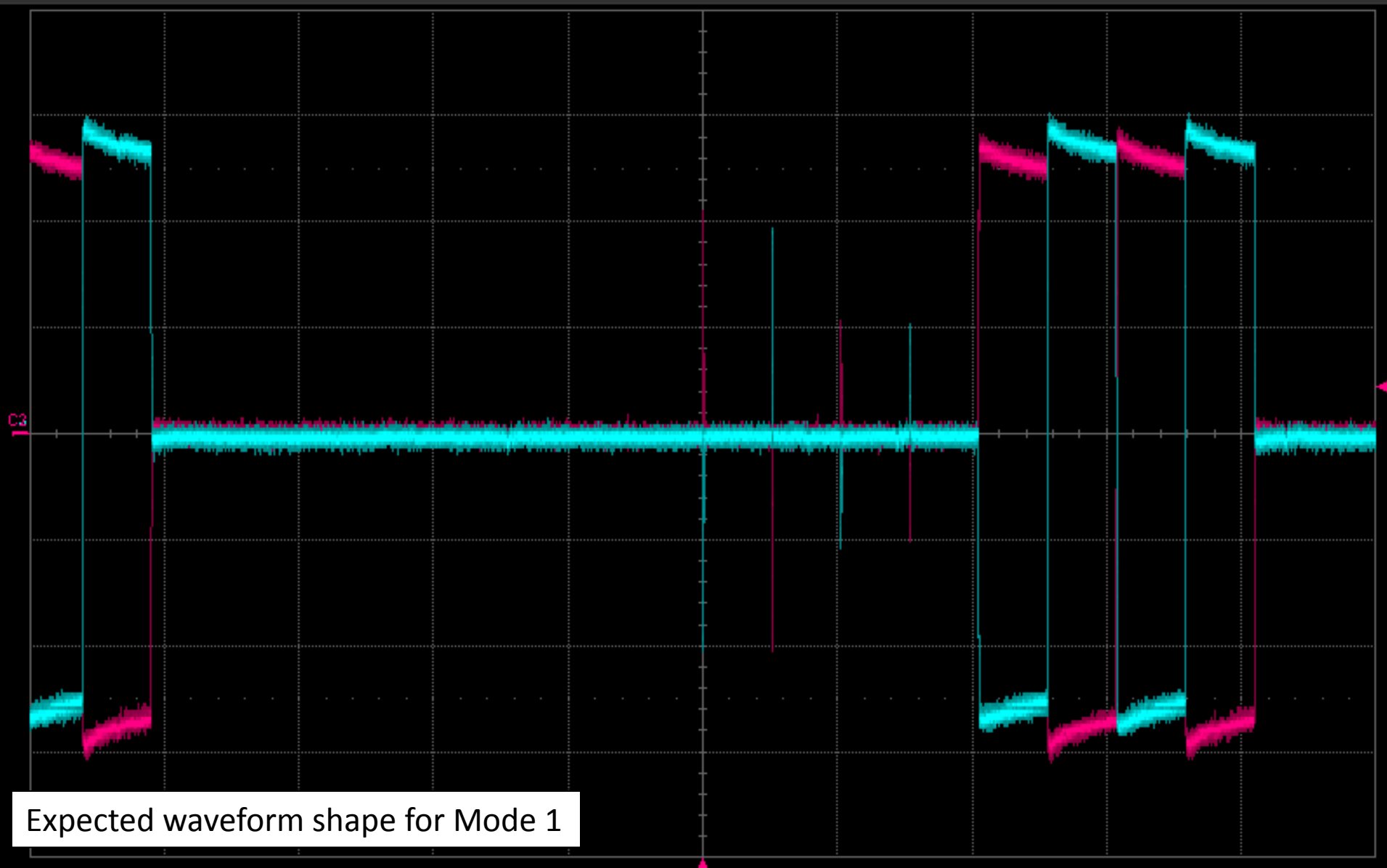
Set PHY register 0x0000 to be "0140". The DUT is now configured to perform a live demo. The next five steps will set the DUT into the five test modes when prompted.

0x0005	0000
0x0006	0004
0x0007	2001
0x0008	0000
0x0009	2B00
0x000A	0000
0x000B	0000
0x000C	0000
0x000D	0000
0x000E	0000
0x000F	3000

0x0014	0000
0x0015	F800
0x0016	0000
0x0017	0800
0x0018	0500
0x0019	0190
0x001A	0000
0x001B	0080
0x001C	2F40
0x001D	0000
0x001E	0000
0x001F	0000

Configuring 1000_T Mode 1:
Set PHY register 0x0009 to be "2B00"

PHY Page [F8] Set



Expected waveform shape for Mode 1

C2	DC50	C3	DC50
200 mV/div		200 mV/div	
0.0 mV ofst		0.0 mV ofst	

Timebase	0.00 μ s	Trigger	C2 DC
	2.00 μ s/div	Stop	86 mV
100 kS	5.0 GS/s	Edge	Positive

[Raw PHY Registers]

[PHY Registers]

0x0000	0140	0x0010	01A0
0x0001	7909	0x0011	4070
0x0002	02A8	0x0012	1600
0x0003	0390	0x0013	0210
0x0004	01E1	0x0014	0005
0x0005	0000	0x0015	F8FF
0x0006	0004	0x0016	0000
0x0007	2001	0x0017	0850
0x0008	0000	0x0018	0514
0x0009	4B00	0x0019	0191
0x000A	0000	0x001A	0000
0x000B	0000	0x001B	0080
0x000C	0000	0x001C	2F40
0x000D	0000	0x001D	0000
0x000E	0000	0x001E	0000
0x000F	0000	0x001F	0000

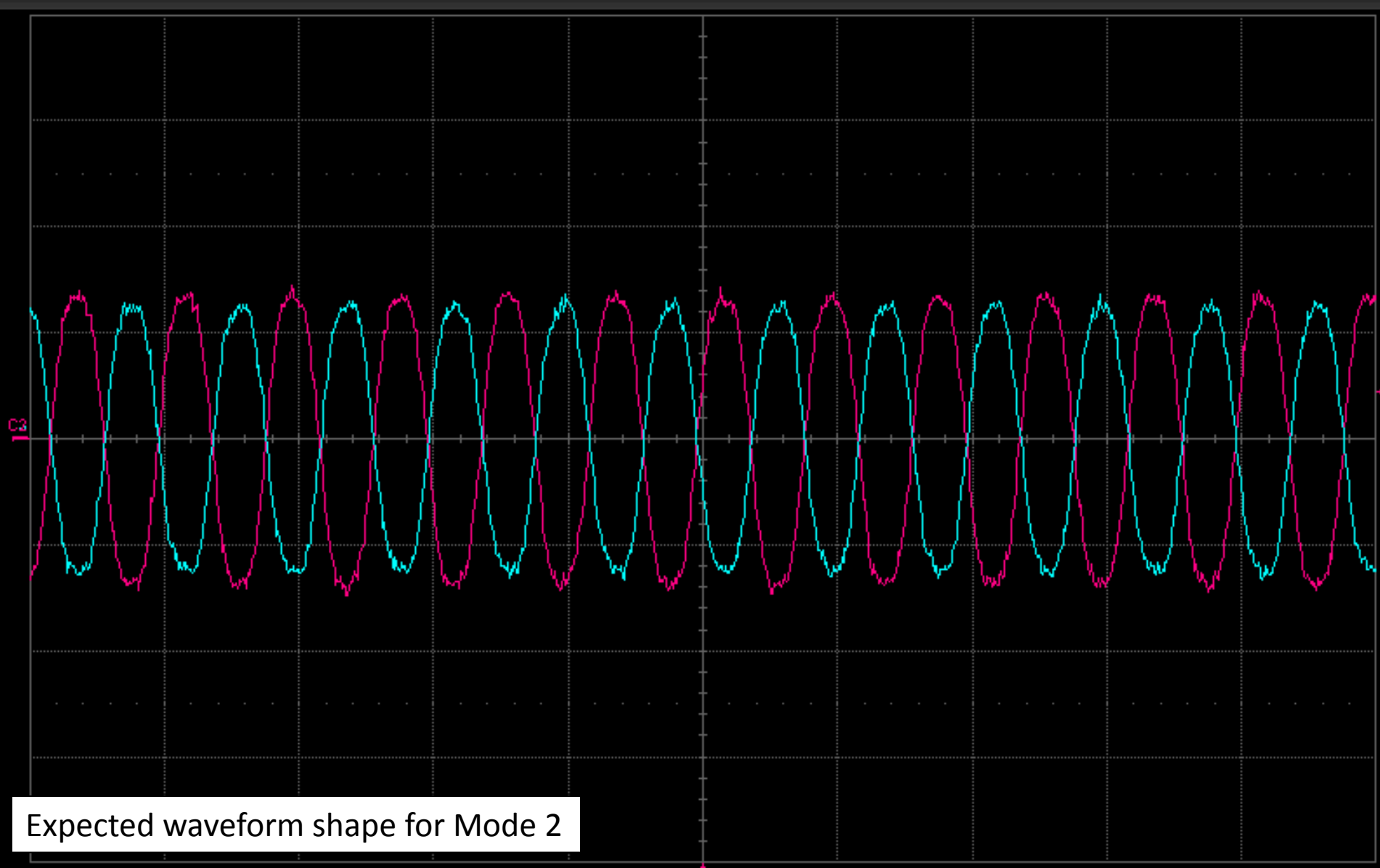
[PHY Detail]

PHY Address
PHY OUI:
PHY Model:
PHY Revision
PHY Vendor:

PHY Page:

Configuring 1000_T Mode 2:
Set PHY register 0x0009 to be "4B00"

[F8] Set Phy Address



Expected waveform shape for Mode 2

C2	DC50	C3	DC50
200 mV/div		200 mV/div	
0.0 mV ofst		0.0 mV ofst	

Timebase	0.0 ns	Trigger	C2 DC
	20.0 ns/div	Stop	86 mV
1.00 kS	5.0 GS/s	Edge	Positive

[Raw PHY Registers]

[PHY Registers]

0x0000	0140	0x0010	01A0
0x0001	7909	0x0011	4070
0x0002	02A8	0x0012	1600
0x0003	0390	0x0013	0210
0x0004	01E1	0x0014	0005
0x0005	0000	0x0015	F8FF
0x0006	0004	0x0016	0000
0x0007	2001	0x0017	0850
0x0008	0000	0x0018	0514
0x0009	6B00	0x0019	0191
0x000A	0000	0x001A	0000
0x000B	0000	0x001B	0080
0x000C	0000	0x001C	2F40
0x000D	0000	0x001D	0000
0x000E	0000	0x001E	0000
0x000F	3000	0x001F	0000

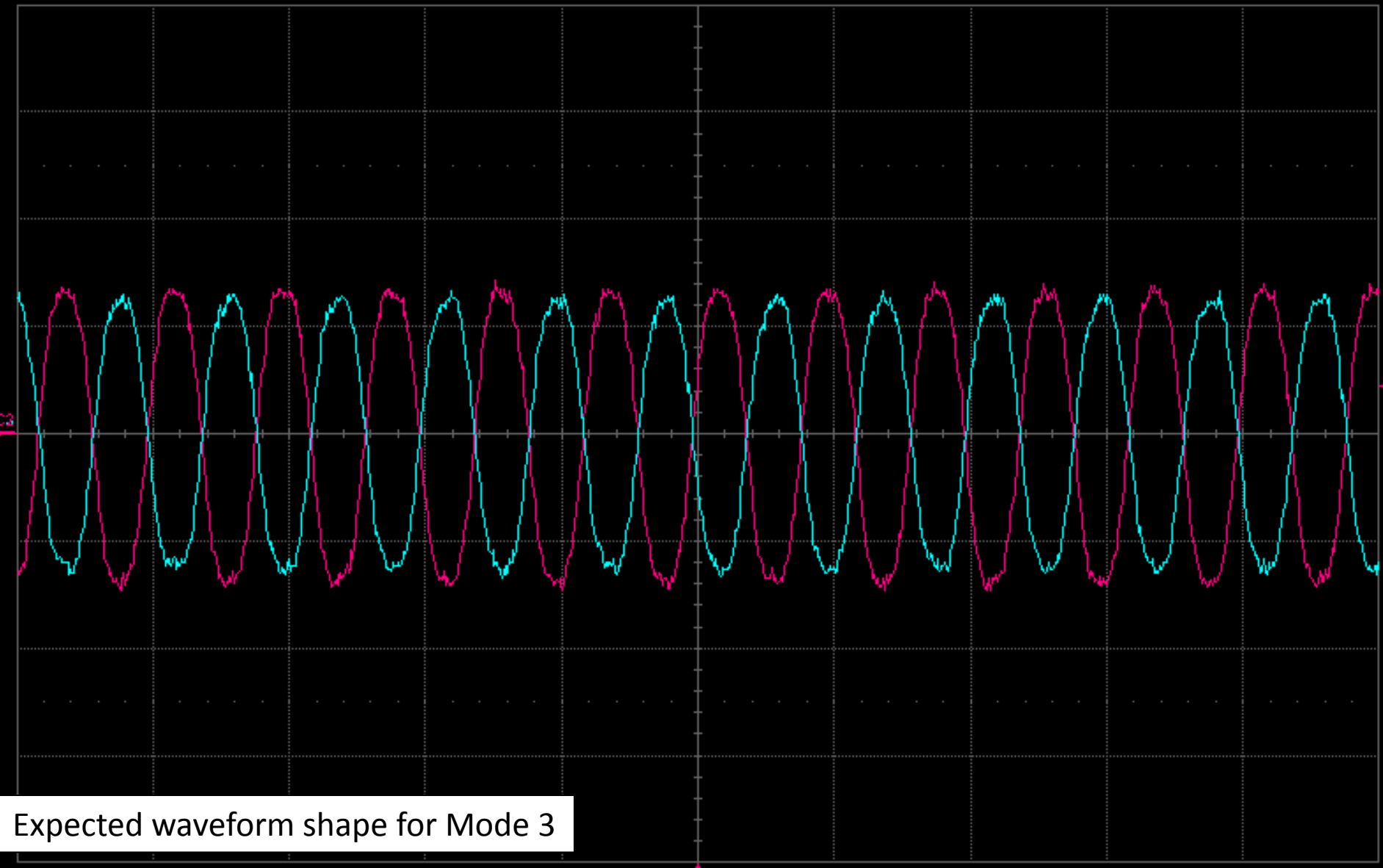
[PHY Details]

PHY Address: 0
PHY OUI: 0
PHY Model: 0
PHY Revision: 0
PHY Vendor: In

PHY Page: 0x

Configuring 1000_T Mode 3:
Set PHY register 0x0009 to be "6B00"

[F8] Set Phy Address
[F5] Refresh Screen [ESC] Exit



Expected waveform shape for Mode 3

C2	DC50	C3	DC50
200 mV/div		200 mV/div	
0.0 mV ofst		0.0 mV ofst	

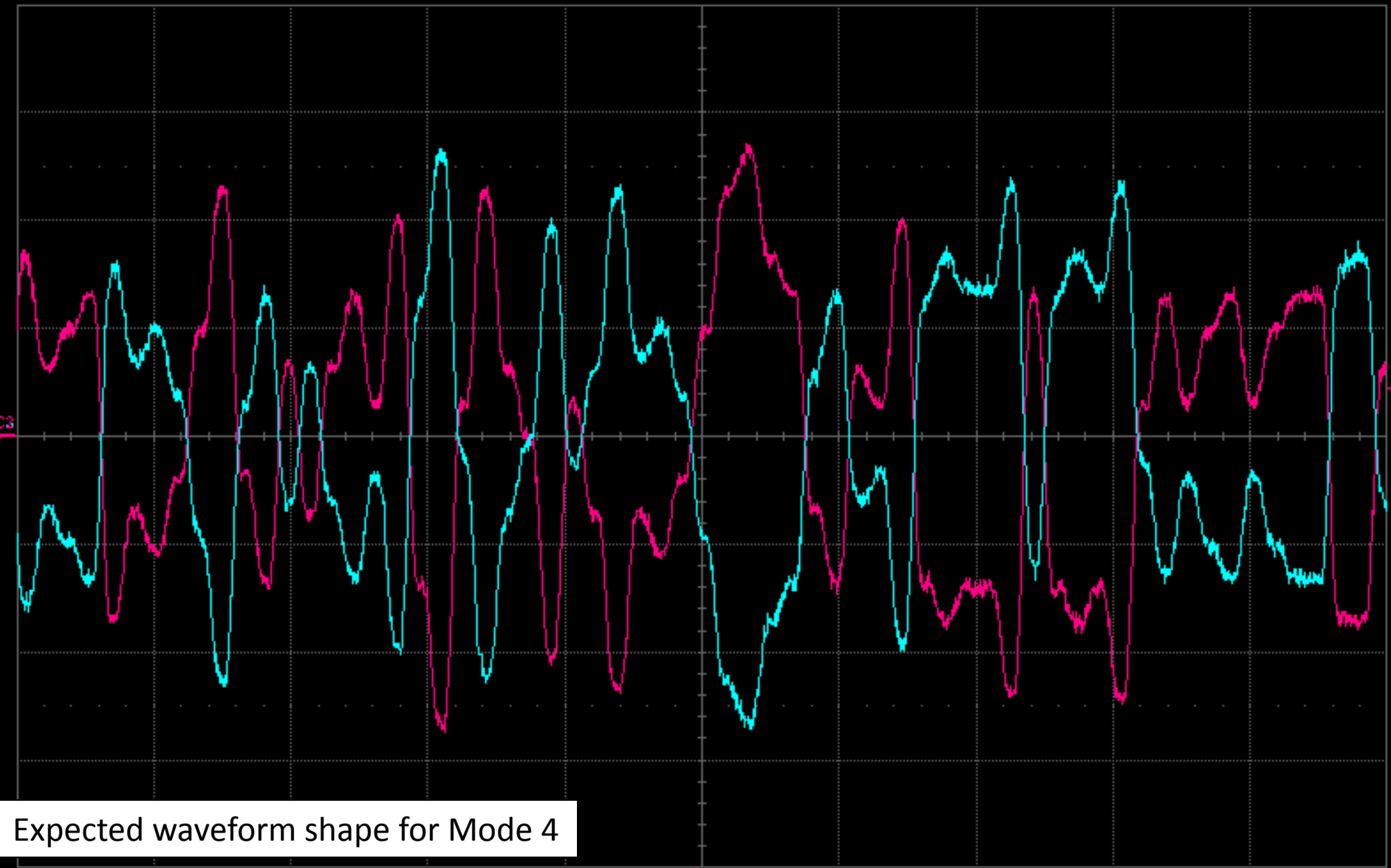
Timebase	0.0 ns	Trigger	C2 DC
	20.0 ns/div	Stop	86 mV
1.00 kS	5.0 GS/s	Edge	Positive

[Raw PHY Register

[PHY Registers]

0x0000	0140	0x0010	01A0	PH
0x0001	7909	0x0011	4070	PH
0x0002	02A8	0x0012	1600	PH
0x0003	0390	0x0013	0210	PH
0x0004	01E1	0x0014	0005	PHY
0x0005	0000	0x0015	F8FF	
0x0006	0004	0x0016	0000	PHY
0x0007	2001	0x0017	0850	
0x0008	0000	0x0018	0514	
0x0009	8B00	0x0019	0191	
0x000A	0000	0x001A	0000	
		0x001B	0000	
		0x001C	2F40	

Configuring 1000_T Mode 4:
Set PHY register 0x0009 to be "8B00"



Expected waveform shape for Mode 4

C2	DC50	C3	DC50
200 mV/div		200 mV/div	
0.0 mV ofst		0.0 mV ofst	

Timebase	-2 ns	Trigger	C2 DC
50.0 ns/div		Stop	86 mV
2.50 kS	5.0 GS/s	Edge	Positive

[PHY Registers]

0x0000	0140	0x0010	0120
0x0001	7909	0x0011	C220
0x0002	02A8	0x0012	0E00
0x0003	0390	0x0013	0206
0x0004	0001	0x0014	0005
0x0005	0000	0x0015	F213
0x0006	0004	0x0016	0000
0x0007	2001	0x0017	0850
0x0008	0000	0x0018	0514
0x0009	1B00	0x0019	0191
0x000A	0000	0x001A	0000
0x000B	0000	0x001B	0080
0x000C	0000	0x001C	0040
0x000D	0000	0x001D	0000
0x000E	0000	0x001E	0000
0x000F	3000	0x001F	0000

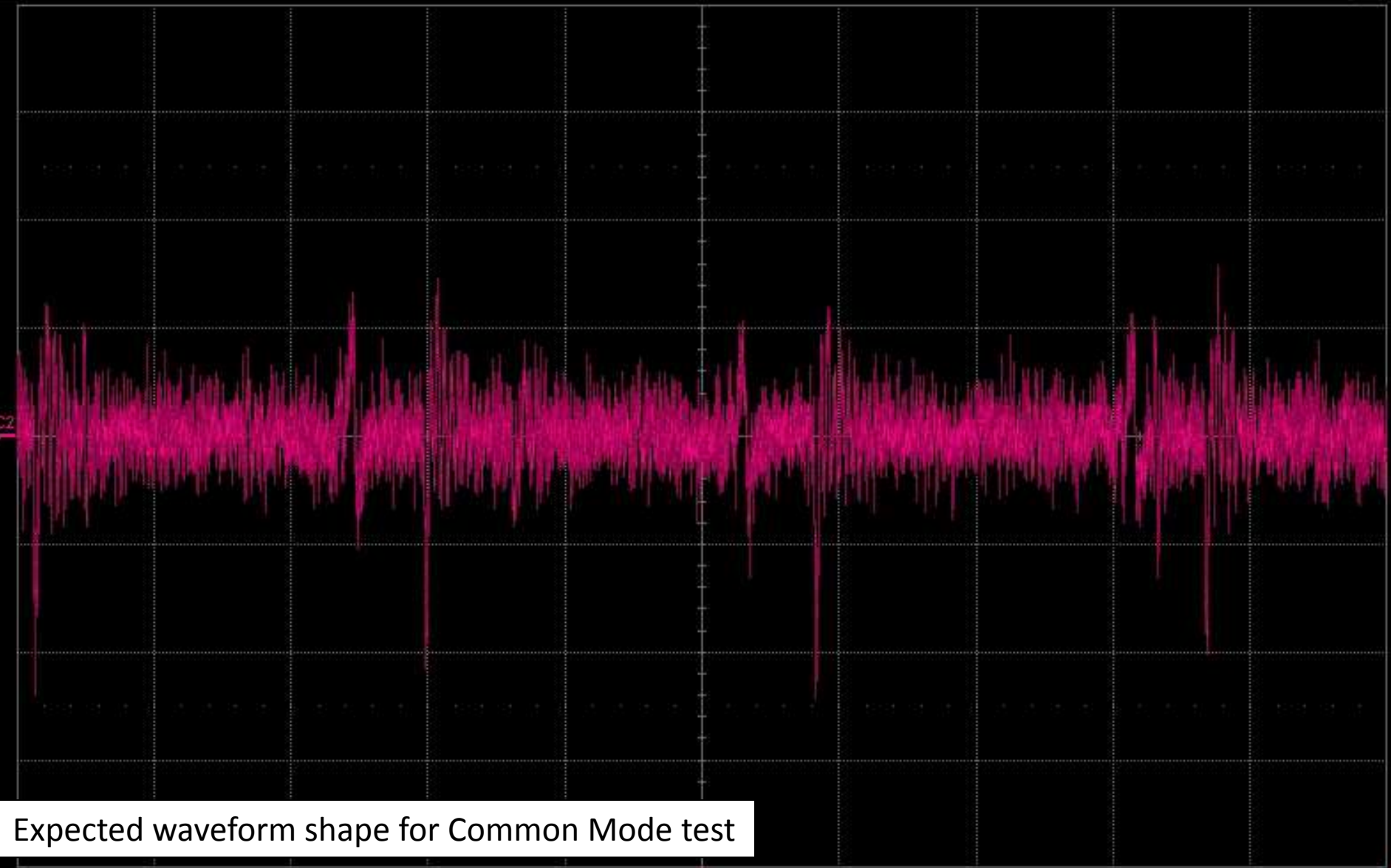
[PHY Data

PHY Address
PHY OUI:
PHY Model:
PHY Revision
PHY Vendor

PHY Page:

Configuring 1000_T Common Mode:
Set PHY register 0x0009 to be "1B00"

[F8] Set Phy Address



Expected waveform shape for Common Mode test

C2 DC50
 10.0 mV/div
 0.00 mV ofst

Timebase	0.00 μ s	Trigger	C2 DC
	2.00 μ s/div	Stop	-41.0 mV
100 kS	5.0 GS/s	Width	Negative