

# **Port Message Viewer v6+**

# User's Guide

for Microchip Evaluation Boards

Supporting

MOST<sub>®</sub> Media Oriented Systems Transport

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## Preface

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#### INTRODUCTION

This chapter contains general information that will be useful to know before using the *Port Message Viewer v6*+. Items discussed in this chapter include:

- Document Layout
- Conventions Used in this Guide
- Warranty Registration
- The Microchip Website
- Customer Change Notification Service
- Customer Support
- Recommended Reading
- Document Revision History

#### DOCUMENT LAYOUT

This user's guide describes how to use the *Port Message Viewer v6+*. The document is organized as follows:

- Chapter 1. "Introduction" This chapter introduces the *Port Message Viewer* v6+ and provides an overview of various features.
- Chapter 2. "Installation" This chapter describes the installation process.
- Chapter 3. "Navigation through the Main Window" This chapter describes how to access and use the *Port Message Viewer v6+* and gives examples of the available functionality.

### **CONVENTIONS USED IN THIS GUIDE**

Within this manual, the following abbreviations and symbols are used to improve readability.

Example	Description
BIT	Name of a single bit within a field
FIELD.BIT	Name of a single bit (BIT) in FIELD
ху	Range from x to y, inclusive
BITS[m:n]	Groups of bits from m to n, inclusive
PIN	Pin Name
SIGNAL	Signal Name
msb, Isb	Most significant bit, least significant bit
MSB, LSB	Most significant byte, least significant byte
zzzzb	Binary number (value zzzz)
0xzzz	Hexadecimal number (value zzz)
zzh	Hexadecimal number (value zz)
rsvd	Reserved memory location. Must write 0, read value indeterminate
code	Instruction code, or API function or parameter
Multi Word Name	Used for multiple words that are considered a single unit, such as: Resource Allocate message, or Connection Label, or Decrement Stack Pointer instruction.
Section Name	Emphasis, Reference, Section or Document name.
VAL	Over-bar indicates active low pin or register bit
х	Don't care
<parameter></parameter>	<> indicate a Parameter is optional or is only used under some conditions
{,Parameter}	Braces indicate Parameter(s) that repeat one or more times.
[Parameter]	Brackets indicate a nested Parameter. This Parameter is not real and actually decodes into one or more real parameters.

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Technical support is available through the web site at: http://microchip.com/support

#### **RECOMMENDED READING**

This user's guide describes how to use *Port Message Viewer v6+*. Other useful documents are listed below. The following Microchip documents are available and recommended as supplemental reference resources.

#### [1] OS81092 MOST ToGo Evaluation Board Hardware Data Sheet

DS60001222A: 2013. www.microchip.com.

#### DOCUMENT REVISION HISTORY

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Initial release of Port Message Viewer v6+ User Guide for Microchip Automotive Infotainment Systems Evaluation Boards.

#### Revision d6 (04/2007)

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**PORT MESSAGE VIEWER V6+** 

## **Chapter 1. Introduction**

In a MOST<sup>®</sup> device, the communication between the INIC and the local controller (the External Host Controller or EHC) is done via a protocol called the Port Message Protocol. This protocol is defined in the respective API User Manual for the INIC. In Microchip evaluation boards, the EHC firmware provides a spy functionality for Port Messages such that they are sent out a Serial Port, either an RS232 port or a USB port running a CDC Class Serial Port Emulation, along with a time stamp in an ASCII format as shown below:

000:00:00:717> s40.00.07.01.14.50.20.00.01.01p

These messages along with other informative debug output text, such as from the Net-Services Trace Module, error messages, and general program flow messages are sent out the Serial Port of the Evaluation board. Any terminal program such as HyperTerminal or TeraTerm can be used to view the output.

*Port Message Viewer v6*+ is a specialized terminal program that can interpret the port messages and show them in a more human-readable format. *Port Message Viewer v6*+ uses an XML MOST function catalog to interpret the messages, just like the Optolyzer Suite software. In fact, it uses the same Optolyzer Suite component to interpret the messages. Now the above message, when interpreted is:

000:00:00:717> s40.00.07.01.14.50.20.00.01.01p 000:00:00:717> EHC--->INIC.00.DeviceMode.Set.DeviceMode=Master

Now we can see that the above Port Message was a command to INIC to set its DeviceMode to Master. In addition to just interpreting the Port Messages, Port Message Viewer provides utilities to filter messages, save the raw and/or formatted (interpreted) output to a file. Also, a saved raw file can be reopened and 'played back' as if it were coming from a live session.

The Port Message spy functionality of the Evaluation boards comes from the Microchip  $I^2C$  driver itself. Since customer's may choose not to implement this functionality in their driver, *Port Message Viewer v6*+ can also interpret the output of a third party  $I^2C$  spy tool, that being the Beagle<sup>TM</sup> from *TotalPhase* (www.totalphase.com).

This document provides Port Message Viewer v6+ users with information about:

- Installation
- · Navigating through the main window
- Reading decoded Port Messages
- · Filtering specific Port Messages
- Loading a Protocol Syntax File
- Loading I<sup>2</sup>C device setup file

When starting *Port Message Viewer v6*+, it is assumed the user has properly installed the software and an appropriate target board is connected to the PC.



## **Chapter 2. Installation**

 Before using *Port Message Viewer v6+*, The *OptoLyzer Components* software <u>must</u> be installed. This software has been provided within the files directory. Click here on Optolyzer\_Components\_V03\_02\_09.exe then follow instructions to install as shown in Figure 2-1 below:

#### FIGURE 2-1: OPTOLYZER FILE DOWNLOAD

File Dow	rnload - Security Warning
Do you	want to run or save this file?
	Name: OptoLyzer_Components_V03_02_08.exe Type: Application, 238MB From: <b>www.smsc.com</b>
	<u>R</u> un <u>S</u> ave Cancel
1	While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. <u>What's the risk?</u>

2. Now install *Port Message Viewer v6*+ by clicking here on setup.exe then follow instruction to install as shown in shown in Figure 2-2:

#### FIGURE 2-2: PORT MESSAGE VIEWER V6+ SETUP





## **Chapter 3.** Navigation through the Main Window

The main window of the *Port Message Viewer v6*+ is divided into seven primary sections, including:

- Com Port and/or Beagle selection
- Protocol Syntax
- · File Save/Retrieval
- Display/Filter Control
- Raw Port Message Input and Translated / Filtered Output
- · Device Setup
- Search Messages

Figure 3-3 illustrates the main window and outlines the primary sections of the *Port Message Viewer v6*+. The window may be stretched horizontally and/or vertically to increase the visible portion of messages without the use of scroll bars.







### 3.1 COM PORT AND BEAGLE I<sup>2</sup>C/SPI CONTROL FIELD

The Com Port and Beagle Control Field in the Port Message Viewer main window provides a drop-down menu which shows all available PC serial ports and Total Phase Beagle I<sup>2</sup>C/SPI devices. Figure 3-4 shows each part of the Com Port and Beagle Control Field. The user must select the com port or Beagle device which is connected to the target INIC board. The com port baud rate must also be selected and must match the target board baud rate. The Beagle device must be connected to the INIC Control SDA, SCL and Ground pins. Once the appropriate com port and baud rate or Beagle device are selected, connection to the target board is achieved by selecting the *Open Port* button.

**Note:** To support communication between software and hardware, the baud rate of the target board and *Port Message Viewer v6+* must be the same. With a Serial Port connection, 115 kbaud is typically the highest rate supported, using a direct RS232 com port. For higher speeds, a USB-to-RS232 converter is required.





#### 3.1.1 Protocol Syntax Field

The Protocol Syntax field in the Port Message Viewer main window allows the user to select the desired protocol syntax file for the application. These files are standard MOST Function Catalog XML formatted files and are used by *Port Message Viewer v6+* to translate the raw messages into readable output. Select the *Open Protocol File* button to browse a directory for a particular protocol syntax file. Figure 3-5 shows the Protocol Syntax Field.



**Note:** Protocol syntax files are provided with Microchip boards and will be located in the application directory.

#### 3.1.2 File Save/Retrieval

Current contents of the display window can be saved at any time to a text file by clicking on either the *Save Raw Data* or *Save Formatted Data* buttons and specifying a filename.

Raw data captured from a target board and saved in a text file can be retrieved using *Open Input File*. Once the file is opened, the raw data is displayed and translated in this window using the selected protocol syntax file. This feature allows *Port Message Viewer v6*+ to be useful when offline (not connected to a target board). Figure 3-6 shows the Port Message display window. The formatted data file is useful for cutting and pasting sections into email or documentation. Other programs like HyperTerminal can be used to save raw format text files, and those can be opened and interpreted with Port Message Viewer v6+, but the following header must be added to the text file:

//- Device Raw Data Header Row - Do Not Modify/Delete -//



#### FIGURE 3-6: PORT MESSAGE DISPLAY WINDOW

**Figure 3-7** shows an example of raw information output displayed in the display window from an Evaluation board with no interpretation. This is the output that would be seen on a general purpose terminal program such as HyperTerminal. This is also the format of the data saved to a file in Raw Data format. This window is also where decoded messages are displayed. The selected protocol syntax file (in the *Protocol Syntax Field*) is used to translate raw messages into readable text.

	M Port Message Viewer - V 5.9	
rint statements	Port: CUM1 V Baud Rate: 115200 V Open Port No Ports Open Open Device Setup File	Enabled
mbedded in the code for	Protocol File: Eval110_FCat_1v0.xml Open Protocol File Device Setup File: MTG_Eval32_devices.xml	₽
debugging	Dpen Input File Save Raw Data Save Formatted Data	
purposes		
	Raw Cree Status/Cmd ICM MCM MDP IOCM I2C Devices Hold Scroll Font	Clear
	The	Turne
		Type
	01.03.000 S40.00.03.02.12.443	dw aw
	Creating Network IN socket for DAC	aw
Message	01:03:098 01:04:00.00.01.14.40.32.00.1A.02.00.00.01.4.02.00.01.02.03.04	aw
Timestamps	01:03:108 \$41.0 <u>0.03.02.1</u> 2.44.p R	aw
	01:03:112 341-00.07.01.14.40.30:00.01.01 n R	aw
	01:03:117 \$40.00.03.02.12.44.p Start of I <sup>2</sup> C Read Message	aw
	Socket successfully created, Socket Handle is 0x01	aw
		aw
	01.03.120 340.00.00.01.14.40.22.00.02.01.00.0 Start of I <sup>2</sup> C Write Message	dw law
	01:03:136 s41:00:07:01:14:40:50:00:01:00 b B	aw
	01:03:140 \$40,00.03.02.12.44,p R	aw
	Got Valid Socket connection status, Connection Handle = 0x00 R	aw
	01:03:150 \$40.00.0B.05.04.02.F0.22.01.11.1C.00.01.01.p R	aw
	Setting cipher frame size R	weight
	01:03:158 s48.00.00.01.2C.D0.20.00.07.20.01.01.00.00.00.p R	aw
	U1:U3:154 \$49.00.03.02.22.44.p R	aw
	5 etting cipher exchange key Fi	aw
	01/03/179 <49.00.03.02.20.00.11.20.01.07.00.00.00.01.02.03.04.00.00.07.00.03.04.00.0 B	
	Settina cipher nonce	law

FIGURE 3-7: RAW MESSAGE EXAMPLE

The user can also filter Port Messages of interest in this window by selecting/deselecting the corresponding Port Message type, as shown in Figure 3-8.

#### FIGURE 3-8: DISPLAY WINDOW WITH ONLY ICM AND MCM FILTERS

5	Selects which p filtered f	ort messages are irom view								
✓ Raw	✓ Time	Status/Cmd	V ICM	мсм	MDP	<b>IOCM</b>	<b>12C Devices</b>	Hold Scroll	Font	Clear

Figure 3-9 shows the raw and interpreted output from an Evaluation board. This output highlights each type of Port Message that has been selected (as shown in Figure 3-8 above).

FIGURE 3-9:

RAW AND INTERPRETED OUTPUT EXAMPLE

Port: COM1	Baud Rate: 115200 💌 Open Port No Ports Open Open Device Setup File	🗹 Enable
Protocol File:	Eval110_FCat_1v0.xml Open Protocol File Device Setup File: MTG_Eval92_devices.xml	[۶
nout File:	Onen Innut File Save Raw Data Save Formalted Data	
ripor r no.		
🖌 Raw	V Time V Status/Cmd V ICM V MCM V MDP V IDCM V I2C Devices Hold Scroll Font	Clear
Time	Message	Туре
01:00:288	s41.00.08.01.14.40.EC.00.05.FF.0C.0F.00.1C.p	Raw
01:00:288	EHC <inic.00.b andwidth.status.assignbwinit="FF.AssignBW=0C.TotalBW=0F.AssignBWFree=001C&lt;/td"><td>ICM</td></inic.00.b>	ICM
01:00:293	s40.00.03.02.12.44.p	Raw
01:00:293	EHC>ICM.Status.Success	Status/Cmd
01:03:049	s41.00.21.06.04.01.02.F0.22.01.11.12.00.16.01.00.00.01.02.03.04.05.06.07.08.09.04.0B.0C.0D.0E.0F.10.11.12.13.p	Raw
01:03:049	EHC<02F0: AudioAmp.01.Connect.StartResult:010000010203040506070809040B0C0D0E0F10111213	MCM
01:03:060	s40.00.03.02.02.44.p	Raw
01:03:060	EHC>MCM.Status.Success	Status/Cmd
	Creating INIC MediaLB socket - OUT to DAC - MediaLB channel = 0x000A	Raw
01:03:071	\$40.00.0D.01.14.40.32.00.07.00.01.00.00.14.00.04.p	Raw
01:03:071	EHC>INIC.00.CreateSocket.StartResult.PortD=MediaLBPort.CfgParam={Direction=Out,DataType=SyncData,SocketBlockwidth=0014,CfgParamMediaLB	ICM
01:03:077	s41.00.03.02.12.44.p	Raw
01:03:077	EHC <icm.status.success< td=""><td>Status/Cmd</td></icm.status.success<>	Status/Cmd
01:03:081	s41.00.07.01.14.40.30.00.01.00.p	Haw
01:03:081	EHEXINICUU UrgeteSocket.Hesuit.SocketHandle=UU	ICM
01:03:085	s40.00.03.02.12.44.p	Raw
01:03:085	EHU>UM.Status.Stuccess	Status/Umd
	Socket successfully created, Socket Handle is UXUU	Haw
01 00 000		Haw
01:03:098	540.00.20.01.14.40.22.00.14.02.00.00.04.02.00.01.02.03.04.05.06.07.08.09.08.09.00.00.00.06.01.12.13.30 EUC. 10.01.20.00.0446.04.04.04.04.04.04.04.04.06.06.04.06.06.04.08.09.08.09.04.05.04.04.04.04.04.04.04.04.04.04	Haw
01:03:098	EHL>Init_ub_tratesocket.starmesult_FortU=inetworkFort.utg=atam=(Uirection=in,Uata) ype=syncblata,socketblockwidtn=u014,UtgFataminw=(FreatL 41 0 02 00 21 44 -	ILM Daw
01.03.100	541.00.03.02.12.44,D	Challon / Card
01:03:100	ETLC+UM-304025-3000055	D suu
01.03.112	S41.00.07.01.14.40.02.00.01.01.0 EUPC-INIC NO CoasteSacket Basel SocketHandlo-01	ICM
01:03:112	ETTEX "MICLOCUESSESSUCKET ISSUESSUCKET ISS	Baw
01:03:117	FILE States Surgers	Status/Cmd
01.03.117	Socket successfully created, Socket Handle is 0x01	Raw

#### 3.1.3 Display Filter and Control

As the ASCII data comes in to *Port Message Viewer v6*+, each line is saved in an internal database. If the line is a port message, then the message is interpreted via the Function Catalog and saved in the database along with the raw text data. In addition to translating the message, *Port Message Viewer v6*+ also categorizes the message according to its source / destination FIFO, based on data in the header of the message. The filter section allows the user to select which data from the database is shown in the display section. There are additional general controls here for controlling the display, such as clearing or freezing the screen. In order to capture new Port Messages, the *Enabled* check box must be selected.

Filter and viewer options include (see Figure 3-8 for image of selectable filters):

- Raw When selected all of the ASCII data coming in the Serial port will be shown. If not selected, the raw data is not shown, and only the enabled translated Port Messages will be seen.
- *Status/Cmd* When selected the FIFO Status and Command messages between the EHC and INIC will be shown. These messages are used for flow control by the low level drivers and are useful for debugging. Once the low level drivers are working correctly, these messages become 'noise' in the output stream as they don't convey any application information. Thus it is useful to be able to disable these translated messages in the display.
- *ICM* ICMs (or INIC Control Messages) are messages between the EHC and INIC, specifically messages to or from the local FBlock INIC.
- IOC IO Control Messages are messages to or from an IO Companion device, specifically its IOC FBlock.
- *MCM* MOST Control Messages (MCMs) are messages to or from other FBlocks on the network. Most of these messages are sent across the network, but could also be to application FBlocks on the local device as well.
- MDP MOST Data Packets (MDPs) are asynchronous data packets such as those sent by MOST High Protocol on the single asynchronous channel on the network.
- *Time* When selected, timestamps will be displayed with the captured messages if timestamps are available.
- *PC Devices* Allows user to call-out and view other I<sup>2</sup>C devices on the same I<sup>2</sup>C bus as INIC such as the Codec, Power Management Control or EEPROM.
   I<sup>2</sup>C device descriptions are described in Section 3.1.4.

For example, in Figure 3-8, only ICM and MCM Port Messages will be displayed in the window. All other Port Messages will be filtered from view.

For  $I^2C$  write messages shown (e.g. *s40*), the window displays the decoded messages (Figure 3-9) with a right arrow to indicate the message was sent to INIC from the EHC. For  $I^2C$  read messages (e.g. *s41*), the decoded message is displayed with a left arrow to indicate the message was sent from INIC to the EHC.

Current contents of the database can be saved at any time to a text file by clicking on either the *Save Raw Data* or *Save Formatted Data* buttons and specifying a filename. The *Save Raw Data* option only saves the original ASCII data from the database. These files can later be opened with the Input File function. The *Save Formatted Data* option saves data according to the currently selected filters. The *Clear* button is used to clear the display window of all Port Messages which clears the local database as well. In order to capture new Port Messages, *Enabled* must be selected. Selecting the *Hold Scroll* option keeps the display from moving as new data comes in and is added to the bottom of the screen.

Figure 3-10 shows when filters are set so only ICM and MCM Port Messages are decoded and displayed in the display window. All other messages will be filtered from view.





## 3.1.4 I<sup>2</sup>C Interpretation

Figure 3-11 shows Codec traffic with I<sup>2</sup>C interpretation.

#### FIGURE 3-11: CODEC TRAFFIC WITH I<sup>2</sup>C INTERPRETATION

Time	Message	Туре
0:00:00:898	898 MIS: RX of Local.INIC.00.NIState.Status (len = 1 bytes)	Raw
0:00:00:902	NS CB: Device Class is 0	Baw
0:00:00:904	s40.00.03.02.12.44p	Baw
0.00.00.906	s41 00 09 01 14 50 5C 00 03 03 00 00p	Baw
0.00.00.908	TASK MOST: NetServices Supervisor State: MSVAL S. ON	Baw
00.00.911	TASK MOST Network has reached state Netfini	Baw
0.00.00.914	TASK MOST: Hardware Version is 0v10	Baw
00.00.916	TASK MOST. Product Version is 1.6.4	Baw
0.00.00.919	-51 7 51 0 b	Baw
0.00.00.010	soft / Provide Touch 1 ED Output Control	12CDevice
0.00.00.010		Baw
0.00.00.020	sourier top ENEX. DialetTouch LEDOutoutControl	12CDevice
0.00.00.320	Description the Codes	Down
0.00.00.321		naw Baw
0.00.00.324		ndw IOCD - vice
0.00.00.324	Ent->>DDDDDCLdbckSettings	IZCDEVICE
0:00:00:925		Haw
00:00:00:925	ERU>CUDEC.125_Settings	IZLUevice
00:00:00:926	830.02.45.0Fp	Haw Ioco
00:00:00:926	ERL>LUDEL.Power_Settings	IZLUevice
00:00:00:927	ssulus.ar.arp	Haw
00:00:00:927	EHL>UUDEU.AnalogMixer	I2LDevice
JU:UU:UU:929	s30.04.02.02p	Raw
00:00:00:929	EHU>UUDEU.HeadphoneAmp	I2CDevice
00:00:00:930	\$30,10,00,00p	Raw
00:00:00:930	EHU>UUDEU.AnalogMixer	I2CDevice
00:00:00:931	\$30.11.00.00p	Raw
00:00:00:931	EHC>CODEC.MixerVolume	I2CDevice
00:00:00:933	s30.12.00.00p	Raw
00:00:00:933	EHC>CODEC.Tone	I2CDevice
00:00:00:934	s30.13.00.00p	Raw
00:00:00:934	EHC>CODEC.Mute	I2CDevice
00:00:00:935	s30.14.00.00p	Raw
00:00:00:935	EHC>CODEC.Mixer	I2CDevice
00:00:00:937	s30,20,00,00p	Raw
00:00:00:937	EHC>CODEC.Volume	12CDevice
00:00:00:938	s30.21.00.00p	Raw
00:00:00:938	EHC>CODEC.PGA_Settings	12CDevice
00:00:00:939	s30.22.00.00p	Raw
0:00:00:939	EHC>CODEC.ADC Setup	I2CDevice
00:00:00:940	s30.23.00.00p	Raw
00:00:00:940	EHC>CODEC.AGC Settings	I2CDevice
00:00:00:942	Codec opened OK	Raw
	Initializing and	Baw
00:00:00:944	s31 13 31 00 00b	Raw
00.00.00.044	EHCZ-CODEC Mute	10CD - view

#### 3.1.4.1 I<sup>2</sup>C DEVICE SETUP

The device setup file is an XML file that can assign names to  $I^2C$  devices at specific addresses. At a minimum the INIC  $I^2C$  address needs to be specified. Other  $I^2C$  devices such as EEPROM and Codecs can be added to the file so their names show up in the translated output. In addition, many such devices have a register address as the first parameter. These registers can also be named and will show up in the output. An example of the XML device setup file, shown in Example 3-1, provides a means for the user to specify the addresses and registers of the devices they are interested in decoding.

Messages containing the addresses of any devices listed in the device setup XML file in use will be decoded and in its place the device name and register name (if any) will be shown in the message display window.

#### EXAMPLE 3-1: XML DEVICE SETUP FILE

```
<devices>
<device>
  <dev_addr>40</dev_addr>
  <dev_name>INIC</dev_name>
  <registers>
  </registers>
</device>
<device>
  <dev_addr>48</dev_addr>
  <dev_name>IOC</dev_name>
  <registers>
  </registers>
</device>
<device>
  <dev_addr>30</dev_addr>
  <dev_name>CODEC</dev_name>
  <registers>
    <reg_addr>00</reg_addr>
    <reg_name>ClockSettings</reg_name>
    <reg_addr>01</reg_addr>
    <reg_name>I2S_Settings</reg_name>
    <reg_addr>02</reg_addr>
    <reg_name>Power_Settings</reg_name>
    <reg_addr>7F</reg_addr>
    <reg_name>Reset</reg_name>
  </registers>
</device>
<device>
  <dev_addr>A0</dev_addr>
  <dev_name>EEPROM</dev_name>
  <registers>
  </registers>
</device>
```

</devices>

#### 3.1.5 Search Messages

The Search Messages dialog box as shown in Figure 3-12 allows the user of *Port Message Viewer v6*+ to search the messages shown in the display window. When text is input into *Look For* field, criteria is selected from the drop down list box then the *Find* button is selected, the *Message* column will be searched.

The following lists the options under the pull-down criteria menu.

- Partial Match: any portion of the value in the Message column matching the *Look For* text box text will be found.
- Regular Expression: the value in the Message column will be searched for the pattern specified in the *Look For* text box.
- Match Whole Line: the entire value in the Message column must match the *Look For* text box text.

Searches are not case sensitive. Patterns for regular expressions are those used by the *Microsoft .Net Framework*. Select the *Find* button again to look for the next entry.

👫 Search Messages	
Look For: Partial Match Partial Match Regular Expression	Find

#### FIGURE 3-12: SEARCH MESSAGES DIALOG

NOTES:



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