TEMPO Program Update Release Notes

November 21, 2009 - Release B

Contents

1. Reflective Computing Web Site

We are pleased to announce our new web site. The home page URL is:

```
www.ReflectiveComputing.com
```

The web site is used to distribute Program Updates and other information to TEMPO users.

2. Program Update Distribution via Web Site

Program Updates are distributed via our web site.

There are number of benefits in distributing Program Updates from our web site. Firstly, the download and installation procedure is simpler because only one .FZ file is downloaded for each of your TEMPO systems. Secondly, you have access to the most recent and previous Program Updates at any time; our web site is available 24 hours a day, 7 days a week. You no longer need to archive copies of your Program Updates because you can get them any time you want from the web site.

Program Updates can be downloaded by going to the URL:

```
www.ReflectiveComputing.com/ProgramUpdates
```

In order to download Program Updates, you must have a valid login and password. If you have not been assigned a login and password, please contact Reflective Computing.

After logging in, you are presented with a list of Program Updates. Click to download the one you want. When you are finished download the updates, log off the web site and install your updates.

3. Program Update Organization

A single .FZ file is available on the web site for each of your TEMPO systems. Thus, if you have four TEMPO systems, you should download four files (i.e., tempo1.fz, tempo2.fz, tempo3.fz and tempo4.fz). Each FZ file contains a complete set of all the files you need for that TEMPO system.

The downloaded FZ file must be copied to the appropriate TEMPO client computer and installed (see Installing Program Updates, below) before the changes take affect.

4. Installing Program Updates

Follow these steps to install a Program Update on your TEMPO client computer. For purposes of this example, we will assume you are on your TEMPO 1 system.

1. Close all TEMPO software programs that are running, including TEMPOW.EXE, NCM.EXE, SETUPTN.EXE etc.
2. Rename your current TEMPO directory to TEMPO.*n*, where *n* is 1, 2, 3, ... The specific *n* will vary from one TEMPO system to another, depending on how many Program Updates have been installed on that system. Check the C: drive for older copies of TEMPO.*n* to determine the next *n* to use. For example, if this is the first Program Update, *n=1.* Open a Command Window and

type:

```
cd \
rename tempo tempo.1
mkdir tempo
```

The intent here is to make it easy to revert back to the previous TEMPO software (see below).

3. Download the program update file (i.e., tempo1.fz) from Reflective Computing's web site and copy to the C:\TEMPO directory.
4. Flip and unzip the files. For example, for TEMPO 1, open a Command Prompt and type:

```
cd \tempo
copy tempo.1\flip.exe      Copy the FLIP.EXE from the previous TEMPO
flip tempo1.fz             Answer yes to unzip and yes to delete zip
```

5. Run SETUPTN and remake your diskettes. We recommend that you use new diskettes or newly formatted diskettes and preserve the old ones in case you want to revert back to the older version.

Note 1. Some users store their files in the C:\TEMPO directory. This practice is discouraged because it means those files need to be copied from the old TEMPO directory to the new one every time a TEMPO Program Update is installed.

Note 2. Be sure to unflip just the .FZ files you downloaded. The command FLIP *.fz will unflip and unzip all .FZ files in a directory, whether or not they have been newly downloaded. If older .FZ files exist in the TEMPO directory, you should avoid using *.FZ in the FLIP command.

5. Reverting To Previous TEMPO Software

If for any reason you want to revert back to the previous software version, you open a Command Prompt and type the following commands.

```
cd \
rename tempo tempo.new
rename tempo.1 tempo
```

The original software is now in C:\TEMPO and the new software is in C:\TEMPO.NEW.

6. Incompatibilities with the Previous Release

This release is upwardly compatible from the previous release except where noted.

NOTE: See the note below on PCL Compiler Enforces Character Limit on Length of Protocol Variable Names.

7. PCL Compiler Enforces Character Limit on Length of Protocol Variable Names

The TEMPO Reference Manual documents that the PCL compilers considers only the first 31 characters of PCL variables for purposes of distinguishing variables. Previous to this release, the PCL compiler erronously distinguished variable names based on characters beyond the 31 character limit. So protocol

variabes that are identical in the first 31 characters but differ in subsequent characters were previously treated as different variables.

Beginning with this release, the PCL compiler increases the maximum number of characters in a protocol variable from 31 to 41 characters.

In addition, PCL now enforces the 41 character limit. Protocol variables that exceed 41 characters will produce a PCL error message.

This change to the PCL compiler may require some users to change their protocols in order for the protocols to PLOAD successfully.

Protocols that relied on differences in variable names beyond the 41 character limit will have to be changed. Such variables will have to be renamed so that they are distinct in the first 41 characters.

8. New PCL Functions: ln() and log10()

Two functions for computing logarithm have been added to PCL: ln() and log10(). Both functions accept one float argument. If the input argument is less than or equal to FLT_EPSILON (=1.192092896e-07F), -FLT_MAX (=-3.402823466e+38F) is returned. Both functions return a value between -FLT_MAX and FLT_MAX, inclusively:

```
float fout, fin;

fout = ln(fin);                  // Compute natural logarithm of fin
fout = log10(fin);               // Compute logarithm base 10 of fin
```

The ln() function returns the natural logarithm of its argument (logarithm base e).

The log10() function returns the logarithm base 10 of its argument.

For example, ln(1) == 0 and ln(e) == 1. log10(1)=0 and log10(10)=1.

Caution is advised when using the ln() and log10() functions because they can consume a significant amount of computer time. Some computers may be too slow to execute them within a single process cycle. If you find that the LOST data count (in the SHOW S display) increases when you call these functions, your computer is not fast enough to complete the computation of these functions within a single process cycle. In such cases, we recommend you increase your process cycle time (i.e., reduce SPEED or increase ASETS) or use a faster computer. If you are calling these functions multiple times within a single process cycle, try inserting NEXTTICKs between the calls to spread the computation over several process cycles.

9. TEMPOW and COBALT Multiple Monitor Support

TEMPOW and COBALT now support computers with multiple monitors. When porting protocols from one system to another which has a different number of monitors or a different size monitor, TEMPOW and COBALT attempt to position and size each window in an appropriate location on the new system. For instance, if the original TEMPOW protocol ran on a computer with two monitors and the PCF (CCF) and PRO files are copied and run on a computer with one monitor, TEMPOW (COBALT) will move the

windows that were on the old computer's second monitor to the first monitor. If the monitors have different spatial resolutions, each window will be proportionally resized for the new system.

10. Kernel "Unknown Instruction" Problem Corrected

With instruction caching enabled (see SETUPTN's INSTRUCTION's help page), in certain circumstances the kernel would encounter an "Unknown Instruction" in a process and suspend the process. A message like this was displayed when tjos happened:

134123: Unknown Instruction. Process XYZ terminated.

This problem has been corrected.

11. SORTWKR, SORTMGR: Output Format Has Been Changed

The SORTWKR node is a part of the Symphony Suite. It performs spike sorting on an input channel and outputs SSEPOCHs containing two channels of data: the original analog epoch and the sorted event codes. The order of these channels has been changed. The sorted spike data is now in channel 1 and the original analog data is in channel 2.

The SORTMGR node is a part of the Symphony Suite. It is a controller/viewer that displays the output of one or more SORTWKR nodes. It has been updated to accept the new output format from SORTWKR.

12. SETUPTN pArg=0 bug fixed

The SETUPTN program had a race condition bug that intermittently would cause the program to display a dialog saying "Internal error pArg=0; contact Reflective Computing" when creating diskettes.

This problem has been corrected.

13. SETUPTN Success Dialog Modified

When creating diskettes, SETUPTN now displays the elapsed time in the "Successfully created" dialog that is displayed when the diskette has been created successfully.

14. New Parameters in TN File: SystemNumber and Owner

The TN file now contains two new parameters for each server: the server/configuration/SystemNumber and the server/passwords/owner parameters. These parameters are automatically added to all configurations by SETUPTN.

The SystemNumber parameter is a 1-based number indicating the TEMPO or COBALT server number.

The Owner parameter contains an identifier that Reflective Computing uses to identify the owner of the software.

These parameters are used by Symphony applications to identify servers.

The user should not change them.

15. COBALT Client Messages Improved

The COBALT client has many improved error messages which explain in more detail the nature of the error and what to do to correct the problem.

16. COBALT SPEED Command

The SPEED command now checks the validity of the SPEED based on the ACHANNELS, ASETS and the particular PCI-DAS1602 board installed. If there is an inconsistency, a message is displayed that explains the problem.

17. New Exit Dialog in TEMPOW and COBALT

When exiting TEMPOW or COBALT clients, it is typically desirable to stop the server's acquisition clock (see the STOP client command). TEMPOW and COBALT clients now present a dialog when the user attempts to exit while the clock is running. The dialog asks the user if they want to stop the clock before exiting, exit with the clock running or cancel the exit request.

18. COBALT Startup Sequence Improved

The start up and shut down sequence performed by COBALT client has been improved to handle various error situations and to recover from various failures.

19. New Dialog For SORTMGR Parameters

The SORTMGR program has a new dialog that allows the user to set various parameters and template details. To access the Parameters Dialog, right click click on an empty portion of a graph window and select Properties in the popup menu. Parameters such as the duration of the Sort Window, the Trigger offset and template details such as individual anchors can be viewed and changed from this dialog.

20. Protocol Symbol Table Reduced in Size

The memory space required in the SYMBOLTABLE for each protocol variable has been reduced from 12 bytes to 8 bytes. For large protocols, this results in a savings of approximately 10 K bytes of conventional memory.

21. Protocol Hash Table Removed From Memory

The Protocol Hash table is used by the PCL compiler to improve compile time speed. It was not used by the KERNEL so it has been removed from the TEMPONET kernel. The savings is about 20 Kb of conventional memory for large protocols.

22. Protocol Name Table Removed From Memory

The Protocol Name table contains the names of protocol variables and string constants. This table has been moved from conventional memory to extentended memory (XMS). The savings for larger protocols is approximately 65 K bytes.

23. SETUPTN Displays Diskette Creation Time

SETUPTN dislays the time it takes to create diskettes in MM:SS format.

24. TEMPO Kernel TimeLink Messages Inhibited for Non-COBALT Protocols

When TEMPO Server is configured for one or more COBALT systems, TimeLink warning messages are displayed periodically when TEMPO Server detects a failure to communicate with a COBALT server. With such a configuration, some users want to run both COBALT and non-COBALT protocols and not have to start their COBALT server to suppress the TimeLink error messages.

TEMPOW now detects whether the currently loaded protocol has included COBALT.PRO. If not, then TEMPOW instructs the server to inhibit TimeLink messages. Now the user can run non-COBALT enabled on a COBALT enabled server and not receive unwanted TimeLink messages.

25. TEMPOW and COBALT No Longer Require Passwords

TEMPOW.EXE and COBALT.EXE no longer check for a password. The TEMPO diagnostic has been modified to not require it.

Our policy regarding multiple client licenses has not changed: If you would like to run multiple TEMPOW clients on a TEMPO server, you must purchase a multi-client license.

You may, however, continue to send us the CLIENT.LOG produced by the TEMPO diagnostic for TEMPO and COBALT client computers.

26. SORTWKR and SORTMGR Support Run Compression

The SORTWKR now offers run compression. A run is a consecutive sequence of CLOSE or MATCH produced by a template during the template matching process. Certain waveforms such as the spike pulses produced by the BACH window discriminator result in templates that are unable to identify the exact time of a spike. The result is a series of CLOSE and MATCH around time time of the spike.

The SORTWKR now detects runs and replaces them with a CLOSE or MATCH at the point in the run that had the minimum distance to the template. This dramatically improves the SORTWKR's ability to temporally locate square waves produced by the BACH window discriminator.

The user can control the maximum length of runs that are compressed or disable run compression on a per-template basis.

See the SORTER.PDF documentation for more information on run compression.

27. CHANINFO Structure Contains Data Range and Voltage Ranges For Every Channel

The CHANINFO structure (see CHANINFO.H) now includes data range and voltage range for each channel.

The SSEPOCHs emitted by TEMPO and COBALT includes a CHANINFO structure for each channel in the SSEPOCH.

28. PCI-DIO-48H boards with PLX Chip

All of the TEMPO software has been updated to support the newer PCI-DIO48H boards (2009) from Measurement Computing. These boards use the PLX 9030 PCI Controller Interface chip. The older PCI-DIO48H boards, which use the AMCC PCI Controller Interface chip will continue to be supported by the TEMPO software.

Measurement Computing has made this change due the the lack of availability of the AMCC chips. The older boards work without problems.

The older boards and the newer boards can be mixed in any combination on the same or difference computers.

There is no user action required for this change. The TEMPO software automatically detects which version of the PCI-DIO48H your computers are using.

29. Microsoft Bug Caused TEMPOW.EXE To Reject Password

The Microsoft 32 bit C/C++ compiler has a bug related to daylight savings time. This bug caused TEMPOW.EXE program prior to this release to reject all passwords. See the MSBUGFIX.TXT handout or our Technical Bulletins on this issue on our web site for more information.

As of this Program Update, the TEMPOW.EXE no longer checks for a password. So if you added the TZ environment variable as a workaround for a previous release of TEMPOW.EXE, we suggest you undo that change after you install this release. To undo that change, simply delete the TZ environment variable.

To delete the TZ environment variable, on Windows XP, follow these steps:

1. Click Start/Settings/ControlPanel
2. Double click System
3. Click Advanced
4. Click EnvironmentVariables button
5. Under User Variables for *user,* select the TZ environment variable.
6. Under User Variables for *user*, click the Delete button.
7. Click OK a number of times to close all windows.
8. Reboot client computer.
9. Run your TEMPOW client as usual.

After 07Nov09, TZ environment variable should be cleared. See our web site Technical Bulletins for the latest information on this issue.

Reflective Computing would like to give special thanks to Matt Kaufman, Dr Krishna Shenoy at the Stanford University and Mike Page at Great Island Software for their help in resolving this issue. It is very much appreciated.

30. Fixed #Sn Corruption in Strings

The NAMETABLE is a memory structure in the kernel that holds strings such as the names of protocol symbols and the string constants you specify in your protocol. The CCLEAR command was not zeroing the NAMETABLE. This resulted in a rare case where strings output by the protocol contained the sequence "#S*n*", where *n* is an integer.

This problem has been corrected.

Reflective Computing would like to give special thanks to Johnny Wen, Dr Taka Sanada and Dr Greg DeAngelis at the University of Rochester for their many hours of testing and help in resolving this issue. It is very much appreciated.

31. Miscellaneous Problems Corrected

The following problems were not reported by any TEMPO users but have been corrected in the software.

CCLEAR was not zeroing instruction cache memory (in XMS). The instruction cache is now zeroed when CCLEAR is executed.

A minor definition in one of KSRV's network packets resulted in wasting two bytes. This has been corrected so all bytes in the packet are used.

TEMPO and COBALT's network communcation has an optimization which reduces traffic when large blocks of zero bytes are downloaded to the server, such as in array data. The optimization now takes into account even byte boundary restrictions imposed by XMS.

Duplicate text was removed from a TEMPOW/COBALT dialog that warns TEMPOW.EXE (or COBALT.EXE) are running from a non-TEMPO directory.

32. Current Software Versions and Set Numbers

The TEMPO software is distributed as a matched set. When installing a Program Update, insure that the TEMPO software on all computers are updated from the same distribution.

TEMPOW	13.01 Set 45.14
COBALT	13.01 Set 45.14
SYMPHONY	8.0 Set 1.0
SETUPTN	12.02
KSRVU,KSRVB	13.01 Set 45.14
All TEMPO Kernels	12.01 Set 45
All COBALT Kernels	12.01 Set 10
PCL	12.05 Set 45
KINFO	12.01 Set 45
HTB	10.1
VDOSYNC	12.01
BUGER	12.01

All DIAGNOSTIC 13.23 Set 45