INNOVATIVE TECHNOLOGY LTD

SSP DLL FUNCTIONS

A Windows® dynamic linked library file to allow easy development of SSP protocol on PC based systems.

Version 1.0

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Revision History

Issue Number	Date	Author	Comment
1.0	9/12/2003	T.Beswick	Initial document

Introduction.

To facilitate the implementation of SSP protocol on PC based systems, Innovative Technology Ltd have developed a DLL with a set of functions to allow easy access to the SSP commands and file downloading facility. Using this DLL, the programmer does not have to worry about packet formatting and CRC Generation; they are handled within the DLL.

The following shows descriptions, Visual Basic® declarations and some simple examples on how to use the functions. For a more detailed example of the implementation please see the Visual Basic® sample programs available from Innovative Technology.

Note.

This document is provided as a guide to the programmer. It is the users responsibility to test his/her implementation of the DLL to ensure the required operation. Innovative Technology Ltd does not accept liability for errors or omissions contained within this document and changes made from issue to issue.

Main Functions

OpenPort

Function title: OpenPort
Parameters: Port number (integer)
Return value: 1 if Port open successfully, 0 if error opening Port.
Function Description: To open a serial port ready for communication.
Visual Basic® declaration:
Public Declare Function OpenPort Lib "InnTechSSP.dll" (ByVal iPort As Integer) As Integer

Example usage for Visual Basic®:

```
Dim iPort As Integer
   If OpenPort(iPort) <> 1 Then
      MsgBox "Error opening communication port", vbCritical, app.ProgramName
      Exit Function
   End If
```


CloseComm

Function title: CloseComm
Parameters: None
Return value: None
Function Description: Closes the open serial communications port.
Visual Basic® declaration:
Public Declare Function CloseComm Lib "InnTechSSP.dll" () As Integer

Example usage for Visual Basic®:

```
CloseComm
```


Command

Function title: Command
Parameters: Command structure, UDT
Return value: UDT containing return data. The datalen parameter is the number of bytes in the data array. The data array, array1 contains the return data.
Function Description: Sends an SSP command to an open serial port. The UDT data structure is loaded with the data length (how many bytes in the command array). The command array contains the command and any data. rxStatus is set to the SSP address of the slave device (defaults to 0)
Visual Basic® declaration:
Public Declare Function Command Lib "InnTechSSP.dll" (Src As UDT) As UDT

Example usage for Visual Basic®:

```
Public Const POLL_CMD = &H7
Public Const OK = &HF0

' the user defined structure
Public Type UDT
   rxStatus As Integer
   datalen As Byte
   array1(254) As Byte
End Type

Dim Cpy As UDT, Src as UDT

   ' send Poll command
   Src.datalen = 1
   Src.array1(0) = POLL_CMD
   Cpy = Command(Src)
   If Cpy.array1(0) <> OK Then
      MsgBox "Validator comms error", vbCritical, App.ProductName
      CloseComm
      Exit Function
   End If
   ' Cpy.Array1 now contains the event list for the slave
```


Download Functions

DownloadFile

Function title: DownloadFile
Parameters: filename (string), Port number (integer)
Return value: number of blocks or error code
Function Description: Will download an ITL ssp download file to a slave device. The entire header checking and handling is done within the DLL. This function will open the passed filename, check the header is valid, test for a connection to a validator and then start the download process thread, which will then run in the background. After the thread has been started, the function will return the number of blocks to download or (if this number is >= OPEN_FILE_ERROR) an error code.
If an error code is returned, the background thread is terminated. When the total number of blocks has been downloaded (or an error has occurred), then the thread terminates. The user can test the download process at intervals using the GetDownLoadData function. The normal procedure would be to call the DownLoadFile function with a valid filename and comport number and then, if a valid number of blocks has been returned, start a timer to check to download progress using the GetDownLoadData function.
Visual Basic® declaration:
Public Declare Function DownloadFile Lib "InnTechSSP.dll" (ByVal szName As String, ByVal iport As Integer) As Integer

Example usage for Visual Basic®:
(See the example Visual Basic® program SSPFileDownload for complete listing)

GetDownLoadData

Function title: GetDownLoadData
Parameters: None
Return value: number of current download block or error code
Function Description: Function to return the current status of the download process thread. Will return the number of the current download block or if this number is >= OPEN_FILE_ERROR, then this is an error code. A successful download will return DOWNLOAD_COMPLETE.
Visual Basic® declaration:
Public Declare Function GetDownloadData Lib "InnTechSSP.dll" () As Integer

Example usage for Visual Basic®:
(See the example Visual Basic® program SSPFileDownload for complete listing)

Utilities.

SetRetryParameters

Function title: SetRetryParameters
Parameters: Data structure
Return value: always 0.
Function Description: To set up SSP retry parameters. At start up , DLL will have retry parameters set to 10 tries at 1 second intervals. Using this command, the user can adjust these. The retry time can be set to multiples of 1 second (minimum time 1 second). This can be useful for providing a faster time-out when checking for an initial validator connection. It is recommended that the user reset the parameters to default values of 10 retries at 1 second intervals when polling the slave device, especially when polling the NV4 validator as this device has to turn off serial interrupts during time-critical operations so will not respond to commands some times.
Visual Basic® declaration:
Public Declare Function SetRetryParameters Lib "InnTechSSP.dll" (rRtry As RTRY) As Integer

Example usage for Visual Basic®:

```
Public Type RTRY
   rDelay As Byte
   rRetries As Byte
End Type

Dim i as integer
Dim rRtry as RTRY

   rRtry.rDelay = 1
   rRtry.rRetries = 3
   i = SetRetryParameters(rRtry)
```


SetDTR

Function title: SetDTR
Parameters: DTR value, integer
Return value: Integer,1 if DTR set, 0 if error.
Function Description: To set or reset the DTR pin on the serial port connector. This may be useful for some hardware interfacing projects when communicating with a slave device using SSP. Open the serial port and set the DTR value to 1 to set DTR pin high, clear the DTR value parameter to set pin low.
Visual Basic® declaration:
Public Declare Function SetDTR Lib "InnTechSSP.dll" (ByVal iDTR As Integer) As Integer

Example usage for Visual Basic®:

```
Dim iPort As Integer, i as integer

   If OpenPort(iPort) <> 1 Then
      MsgBox "Error opening communication port", vbCritical, app.ProgramName
      Exit Function
  End if
 i = SetDTR(0) ‘ clears the DTR Pin
 i = SetDTR(1) ‘ sets the DTR pin
```


FlipSeq

Function title: FlipSeq
Parameters: None
Return value: Integer, always 1.
Function Description: Flips over the next sequence bit. So if the DLL were going to send a 1 with the next command, it would now send a zero. This command was only useful during diagnostic programming of the DLL, but has been included here as a utility.
Visual Basic® declaration:
Public Declare Function FlipSeq Lib "InnTechSSP.dll" () As Integer

Example usage for Visual Basic®:
Dim i as integer

i= FlipSeq

GetLastRxPacket

Function title: GetLastRxPacket
Parameters: None
Return value: UDT structure
Function Description: When called, returns a UDT structure containing a datalength byte and an array of bytes which are the full SSP formatted packet of the last received ssp command (from slave). Useful for creating log files of packet data.
Visual Basic® declaration:
Public Declare Function GetLastRxPacket Lib "InnTechSSP.dll" () As UDT

Example usage for Visual Basic®:

```
' the user defined structure
Public Type UDT
   rxStatus As Integer
   datalen As Byte
   array1(254) As Byte
End Type

Dim cpy as UDT

        cpy = GetLastRxPacket
        ‘cpy.array contains the full SSP packet
```


GetLastTxPacket

Function title: GetLastTxPacket
Parameters: None
Return value: UDT structure
Function Description: When called, returns a UDT structure containing a datalength byte and an array of bytes, which are the full SSP formatted packet of the last transmitted ssp command (to slave). Useful for creating log files of packet data.
Visual Basic® declaration:
Public Declare Function GetLastTxPacket Lib "InnTechSSP.dll" () As UDT

Example usage for Visual Basic®:

```
' the user defined structure
Public Type UDT
   rxStatus As Integer
   datalen As Byte
   array1(254) As Byte
End Type

Dim cpy as UDT

        cpy = GetLastTxPacket
        ‘cpy.array contains the full SSP packet infomation
```


Visual Basic® declaration module for DLL Functions

```
Public Const DOWNLOAD_COMPLETE = &H100000
' error code definitions
Public Const OPEN_FILE_ERROR = &H100001
Public Const READ_FILE_ERROR = &H100002
Public Const NOT_ITL_FILE = &H100003
Public Const PORT_OPEN_FAIL = &H100004
Public Const SYNC_CONNECTION_FAIL = &H100005
Public Const SECURITY_PROTECTED_FILE = &H100006

Public Const DATA_TRANSFER_FAIL = &H100010
Public Const PROG_COMMAND_FAIL = &H100011
Public Const HEADER_FAIL = &H100012
Public Const PROG_STATUS_FAIL = &H100013
Public Const PROG_RESET_FAIL = &H100014
Public Const DOWNLOAD_NOT_ALLOWED = &H100015

'dll function to open a comms port (iPort)
Public Declare Function OpenPort Lib "InnTechSSP.dll" (ByVal iport As Integer) As Integer
' dll function to close a comms port
Public Declare Function CloseComm Lib "InnTechSSP.dll" () As Integer
' dll function to set port baud rate
' dll function to send an SSP command and recieve a reply
' the command is sent and returned in the form of a structure (UDT)
' rxStatus is not used when sending, datalen is the number of command bytes
' array1 contains the array bytes
Public Declare Function Command Lib "InnTechSSP.dll" (Src As UDT) As UDT

Public Declare Function SetRetryParameters Lib "InnTechSSP.dll" (rRtry As RTRY) As Integer
' sets/resets the DTR pin (0 and 1)
Public Declare Function SetDTR Lib "InnTechSSP.dll" (ByVal iDTR As Integer) As Integer
' set the sequence byte (0 or &h80)
Public Declare Function FlipSeq Lib "InnTechSSP.dll" () As Integer
Public Declare Function GetLastRxPacket Lib "InnTechSSP.dll" () As UDT
Public Declare Function GetLastTxPacket Lib "InnTechSSP.dll" () As UDT


Public Declare Function DownloadFile Lib "InnTechSSP.dll" (ByVal szName As String, ByVal iport As Integer) As long
Public Declare Function GetDownloadData Lib "InnTechSSP.dll" () As long

' the user defined structure
Public Type UDT
   rxStatus As Integer
   datalen As Byte
   array1(254) As Byte
End Type

Public Type RTRY
   rDelay As Byte
   rRetries As Byte
End Type
```

