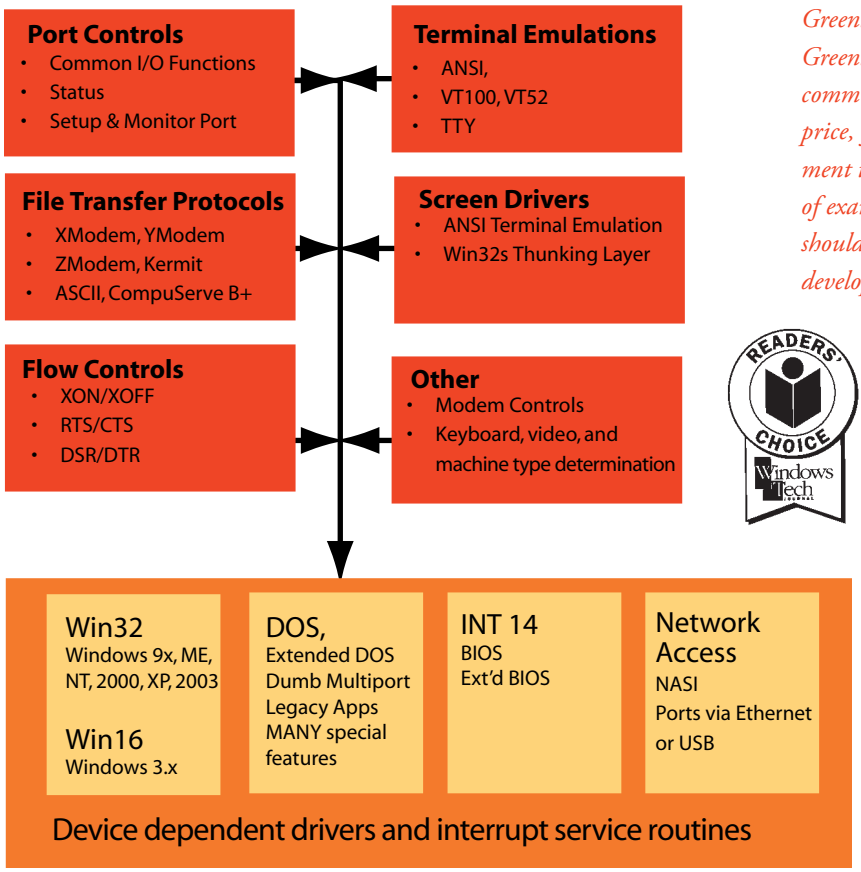
# Greenleaf Comm++ 3.0

C++ Serial Communications Library for Windows, DOS with Hot Features

## *Major Features in Comm++ 3.06*

Greenleaf Comm++ paves the way to robust OOP programming of serial communicatons in applications for a wide range of platforms—you get platform independence. Comm++ includes abstract base and derived classes which perform all of the functions needed for communications jobs. Comm++ removes the grunt work—so you can get your job done easier, faster, even better.

- ❑ Supports Windows XP, 2000, Server 2003 NT 4, 98 SE, 95 OSR2, ME, and with compatible compiler, DOS, Extended DOS, OS/2, and Windows 3.1x.
- ❑ Pure C++ class library with an arsenal of over 460 public methods on the API—gives you the industry's finest and most extensive shot at both rapid development and extending the library to meet your particular needs.
- ❑ ANSI, VT100, VT52, and TTY terminal emulations. Comprehensive screen driver classes provide maximum flexibility for terminal emulations and your application. TextWindows for Windows 3.x MDI and NT, proprietary Vid for OS/2, Windows Console apps, and DOS.
- ❑ XModem/CRC, XModem-G, -1K, -1K-G, YModem, YModem-G, YModem Batch, ZModem with crash recovery, 16 or 32 bit CRCs, abort on lost carrier, many other features.
- ❑ Kermit, CompuServe B+, and ASCII file transfers with options.
- ❑ Performance to 460 Kbaud, unlimited number of ports.
- ❑ Recursive subdirectory search engine supports wildcard file transfer specifications.
- ❑ XON/XOFF, RTS/CTS, and DSR/DTR handshaking.
- ❑ Drives Digi DigiChannel and other multiport boards from major suppliers. Most intelligent multiport boards are supported in Windows.
- ❑ Supports Borland PowerPack and VROOM, 16 and 32 bit Tenberry Software DOS/16M and DOS/4G, Phar Lap TNT 7.0 and Run 286 DOS Extenders.
- ❑ Supports Visual C++ 5,6, 7.1, Symantec C++, Borland C++ 5.02, Borland C++Builder 3,4,5, and 6, and Visual Basic.
- ❑ Over 40 functions just for modem control.
- ❑ Extensive support for 16550 and higher UART FIFO modes.
- ❑ Complete set of video and keyboard routines with Ctrl-Break handler.
- ❑ Hundreds of compilable example programs included, all with source, for DOS and Windows.
- ❑ BUILD utility lets you quickly rebuild any of the libraries and DLLs using your compiler—enhances maintainability.




*Greenleaf Comm++is unique. It is big. It is bold. And it is from Greenleaf, creator of the world's first versatile, complete PC async communications package, Greenleaf CommLib. For one affordable price, you get support for all popular PC platforms and development tools. You get world class support, free source code, hundreds of examples, and utilities to let you easily rebuild the libraries should you wish to. You get the combined expertise of world-class developers, great support, and no royalties.*

*Get it. Now. It will make your day! Yessss!*

READERS' CHOICE Windows Tech

## Languages

- Visual C++ 5,6 targets Win32
- Visual C++ 1.52 targets DOS
- Borland C++ 5.02 targets DOS or Windows
- Borland C++Builder 3 - 6 targets Windows
- Symantec C++
- Libraries available on special request for Watcom 10
- Visual Basic (some functions)
- Language independent DLLs
- Static libraries

## Platforms

- **Development: Windows 9x, Me,2000,XP,2003**
- **Target: Windows 9x,Me,2000,XP,2003**
- **Target DOS / Extended DOS using Borland 5.02 or Microsoft Visual C++ 1.52**

## A few Comm++ Classes

| | |
|---|---|
| GFComLink | Abstract communications link |
| GFDevice | Register based hardware device |
| GFUart | Abstract hardware UART |
| GFI8250 | UART: 8250, 16550, 16750 .... |
| GFSerint | Serial interrupt service for UART |
| GFDigiPC | Digi Non-intelligent multiport board |
| GFSmartArnet | Intelligent Arnet board |
| GFSmartDigiBoard | Intelligent Digi multiport board |
| GFSmartStarGate | Intelligent Star Gate board |
| GFComOS2 | Serial port class for OS?2 |
| GFComWin3 | Serial port class for Windows 3.x |
| GFComWin32 | Serial port class for Win32: Windows 9x, Me, 2000, XP, 2003 |
| GFNasi | Serial port class for Novell NASI support |
| GFBIOS | BIOS driver for DOS |
| GFExtendedBIOS | Extended BIOS driver for DOS |
| GFSerial | Port foundation class ties hardware to data format, line control, etc. |
| GFDataFormat | Data format (data bits, parity, stop bits) |
| GFLineStatus | Access to line and modem status |
| GFScreenDriver | Base class for building screen drivers |
| GFScreenVid | Compiler-independent text mode driver |
| GFScreenTW | Screen driver for TextWindows™ |
| GFScreenDW | Screen driver for Greenleaf DataWindows |
| GFScreenZDsp | Screen driver for Symantec video functions |
| GFTeletype | TTY terminal emulation |
| GFAnsiTerminal | ANSI terminal emulation class |
| GFVT100 | VT100 terminal emulation |
| GFVT52 | VT52 terminal emulation |
| GFFileIO | File I/O for transfers, etc. |
| GFModem | Smart modem control / status class |
| GFMonitor | Monitors file transfers |
| GFTransfer | Abstract base file transfer class |
| GFTranstxt | ASCII file transfer class |
| GFXmodem | XModem file transfer |
| GFXmodem-1K | XModem with 1K option |
| GFXModem-1K-G | XModem with 1K and G options |
| GFYmodem | YModem file transfer |
| GFYmodemG | YModem (batch) file transfer with G option |
| GFZmodem | ZModem file transfer class |
| GFKermit | Kermit file transfer class |
| GFCompuServeBPlus | Compuserve B+ file transfer |
| GFCheckSum | Calculate 8-bit checksum |
| GFCheck2Byte | Calculate 16-bit checksum |
| GFCrc16 | Calculate 16-bit CRC |
| GFCrc32 | Calculate 32-bit CRC |
| GFCCITTCrc16 | Calculate 16-bit CCITT CRC |

## Power and Versatility

This class library provides powerful tools for all aspects of asyncronous comm programming for all major PC based platforms. You can combine basic character mode I/O with Hayes modem controls, add ANSI, VT100, VT52, or "glass teletype" TTY terminal emulation, select an appropriate screen driver, and the appropriate platform driver—and you're off!

You can drive any number of simultaneous ports on standard or intelligent multiport boards, select a handshaking mode—and invoke the file transfer protocol of your choice. The result: a top-of-the-line communications application!

You can also add new classes and methods and use our BUILD utility to compile the libraries and/or DLLs with your compiler.

## Sophisticated Building Blocks

Comm++ begins with abstract base classes which can represent any kind of serial communications—not necessarily hardware, not necessarily using a UART—and builds onto this infrastructure support for the 16550 and compatible UART devices, support for various Digi and other dumb and intelligent multiport boards, support for your choice of terminal emulation and screen driver, add industry standard file transfer handlers, and you're off to a successful completion of your project—on time, under budget, and exceeding specifications.

## Ease of Use

Below is a short program that runs under MS-DOS, providing full-duplex 9600 baud communications on COM1.

```
#include <stdio.h>
#include "compplib.hpp"

void main()
{
    int c;
    GFI8250 sio( COM1 );
    GFSerial cp( &sio );    // open the port
    for ( ; ; ) {
       if ( gfkbhit() )
       {
          c = getkey();
          if ( c == ESC )
              return;
          else
              cp << c;  // output to port
       }
       cp >> c;          // get char from port
       if ( c != GF_TIMEOUT)
          pubc( c, stdout )       // display it
    }
}
```

To display on an ANSI terminal emulation, do this:

```
Add:      GFScreenVid vid;
Change:   GFSerial cp( &sio )
To:       GFAnsiTerminal cp( &vid, &sio );
```

## Documentation and Support

Includes Windows Help, dozens of demo and example programs.

There are no gimmicks or special charges, just free unlimited support via Web, email, and phone when warranted. No royalties. Just a single computer license per copy of Comm++.

There is a lot more information about Comm++ on the web, including more complete lists of functions, starting at http://www.GreenleafSoft.com/Products/CommPP/CommPPSummary.asp.

You can also download the Comm++ documentation from http://www.GreenleafSoft.com/CommPP/CommPP-Documentation.zip

Best of all, it's from Greenleaf, the guys who brought you Greenleaf CommLib, recognized industry standard!

# Some of Comm++'s over 460 functions / methods:

## Port Open, Close, Configure

GFBIOS, GFComOS2 class, GFComWin3, GFExtendedBIOS, GFI8250, GFSmartDigiBoard, GFSmartStarGate, and GFSmartArnet classes
Open or close ports for all platform dependent classes
Idle routines for all of the platform dependent classes
Set 16550 UART interrupt trigger level

## Serial Port Control functions

Has break signal been received?
Has receiver buffer overflow occurred?
Get state of CTS, DSR, DTR, or RI signal
Has CD, CTS, DSR, or RI changed state?
Check for framing error
Get handshake mode parameters
Has receiver overrun occurred?
Get or set line break condition
Check for parity error
Send break signal
Set XON/XOFF, RTS/CTS or DSR/DTR handshaking
Read current status from port (UART or device driver)

## Data Format functions

Get or set baud rate
Get or set number of data bits in word
Get or set stop bits
Set parity

## Modem Control functions

Dial phone number
Auto answer mode: ON or OFF
Hang up phone line
Reset modem
Redial last number dialed
Define delay character for modem commands
Tell modem to echo or not echo commands
Read characters from modem, with a timeout
Send initialization string to modem
Tell modem to go on-hook or off-hook
Define abort key
Check for modem abort conditions
Tell modem to use numeric or verbal result codes
Indicate speaker control method

## File Transfer Protocols

Kermit, XMODEM, XMODEM-1K, XMODEM-1K-G, YMODEM, YMODEM-G, ZMODEM, CompuServe B+, ASCII
Open files for transfer
Close transferred files
Read file transfer data blocks or bytes
Write file transfer data blocks or bytes
Print received characters
Set transfer abort key
Abort the transfer
User-supplied file transfer message routine
Receive a file using protocols
Send a file using protocols
Set data types for transfers using protocols
Set directory recursion flags for transfers using protocols
Set strip path options for transfers using protocols
Send a file using ASCII (no protocol)
Set line feed strip for ASCII transfer (no protocol)
Set directory recursion flag for ASCII file transfer (no protocol)

## Terminal Emulation functions

Redefine keyboard for ANSI, VT52, or VT100 terminals
Receive a character, and interpret ANSI ESCape sequences, with timeout
Receive a character, and interpret VT52 ESCape sequences, with timeout
Receive a character, and interpret VT100 ESCape sequences, with timeout

## Screen Drivers:

Flush display
Clear display
Read character and attribute from display
Read number of columns or rows in display
Insert character or line in display
Invert screen colors
Backwards tab
Set or clear all tabs
Clear tab stops in current column
Set video attributes
Move cursor to home position
Move cursor left, right, up or down n columns
Delete character or line
Erase to end of line, end of page, or start of line
Hide cursor
Set maximum number of rows and columns
Move cursor to y, x
Set origin coordinates
Write string to display
...and many more

## TextWindows Video functions

Initialize TextWindows (TW)
Define and display a window
Define and display a floating pop-up menu
Read a line of input in a pop-up dialog box
Print formatted text to a window
Output single character to text window
Output formatted text or string to window
Yield time for other programs to execute
...and many more

## Keyboard Functions

Test, enable, or disable ctrl-break processing
Test for enhanced keyboard
Get keyboard code (extended code set)
Determine if a key has been pressed
Keyboard code fetch
Get keyboard shift status

## Miscellaneous Functions

Calculate 8-bit or 16-bit checksum on buffer
Calculate 16-bit or 32-bit CRC on buffer of data
Calculate 16-bit or 32-bit CRC on character data
Convert error number to text description
Determine if running on Micro Channel hardware
Determine machine or submodel type
Modify hardware interrupt priority level
Check Windows run mode
Yield time slice when running in DESQview, or so other Windows programs can run
Allocate or delete a block of memory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- Supports Microsoft Visual C++ 5 & 6, Borland C++ 5.02, C++Builder 3...6, Symantec C++ and Visual C++ (develop on Win32, target MSDOS)
- Libraries available (contact us) for Watcom C++ 10
- For Windows 9x, Me, 2000, XP, and Server 2003. Also target DOS, 16- and 32-bit Extended DOS using Borland C++ 5.02 or Visual C++ 1.52
- Hundreds of compilable example programs included, all with source for Windows and DOS
- FREE, well annotated, source code---ANSI C++ and some assembler
- BUILD utilities script driven let you compile libraries
- Supplied libraries include DOS static libraries, Windows static and dynamic libraries for GUI and Console, Release and Debug
- Coded for optimum granularity and speed. Libraries included for all memory models
- Product includes Windows Help plus 500 page PDF documentation
- FREE Web and email based support with telephone support as needed.
- We accept MasterCard, VISA, American Express. Terms available upon credit approval.
- Did we forget to say THERE ARE NO ROYALTIES? Well, there are none.

## We do the grunt work...