User Manual

W51PC DCOM Interface V1.1

By WAVECOM ELEKTRONIK AG

PUBLISHED BY

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Printed: Wednesday, January 30, 2008, 12:51:15

Contents

Welcome

Congratulations on your purchase of a WAVECOM decoder. The product that you bought incorporates the latest technology in data decoding together with the latest software release available at the time of shipment.

Please, check our website http://www.wavecom.ch for software updates.

Always check the latest documentation on the installation CD or on our website.

We thank you for choosing a WAVECOM decoder and look forward to work with you in the future.

This chapter introduces WAVECOM, the field of activity of the company, and how you may benefit from the expertise of WAVECOM.

Professional Version

This documentation is only available in the professional version of the WAVECOM decoder software.

Professional versions are only available to government bodies.

WAVECOM maintains a mailing list of our professional customers. For registration details, see Appendix at the end of this manual.

Options

Different additional options are available from WAVECOM.

In the manual, options are marked with (Option).

Options are only available to government bodies.

Training

Please, note that when required WAVECOM is able to provide training on the WAVECOM XML interface. Training can be ordered to take place at the customer location or at our offices in Switzerland.

Source Code

Source code is available for professional users. Please, inquire to receive an offer from WAVECOM if you plan to add your own modes.

Company Profile

WAVECOM ELEKTRONIK GmbH was founded in 1985 in Hohentengen, Germany, close to the Swiss border. In 1991 the company moved to Switzerland and established itself as WAVECOM ELEKTRONIK AG. Now located in Buelach it is within close vicinity of Zuerich airport.

The company has focused on decoding and analysis systems for wireless data transmissions. The wide product range spans from professional, high performance systems to devices for private and amateur radio use.

The very high quality standards combined with high system performance are appreciated by all customers worldwide. A global network of authorized sales partners ensures that local assistance and basic level support can be provided in most places. More than 95% of all units sold are exported. The majority of the customers are government agencies, defense organizations and the telecommunication industry.

About 40% of the turnover is invested in research and development. The employees at WAVECOM ELEKTRONIK AG are mainly engineers with experience in DSP technology, computer and RF hardware development, software engineering and radio data transmission. Access to external know-how and human resources enlarges the capabilities for realizing projects. Manufacturing is outsourced to specialized companies within Switzerland which can handle today's needs for processing surface mount components and fine-pitch structures.

WAVECOM ELEKTRONIK AG does not have any juridical or financial links or connections to other companies or official bodies and is completely owned by its general manager, Mr. Christian Kesselring.

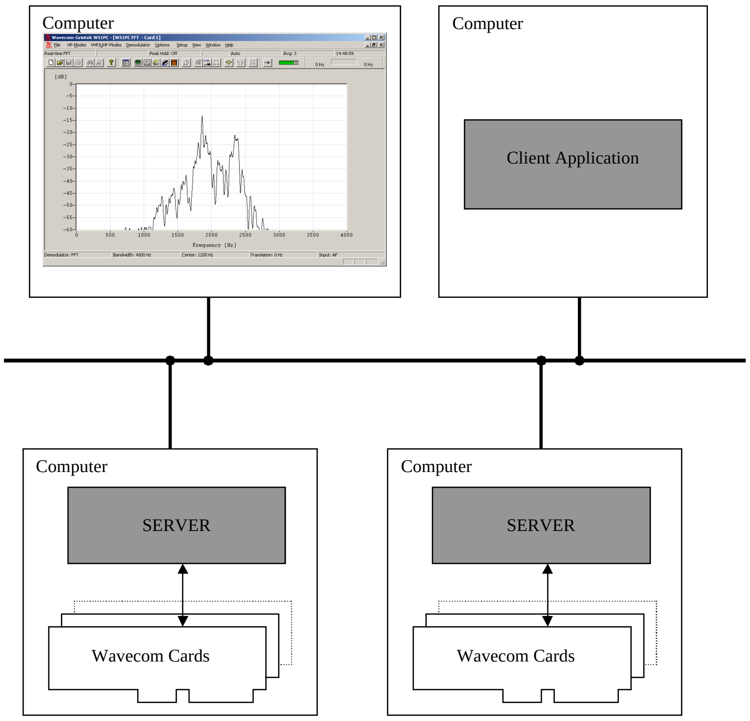
Revisions

Version	Date	Changes
1.0	28.Aug 2006	Removed from the W51 Manual and put in a separate document.
1.1	30.Jan 2008	HRESULT GetTextData([out] BSTR *Data) extended for codes that have more than one channel.

Introduction

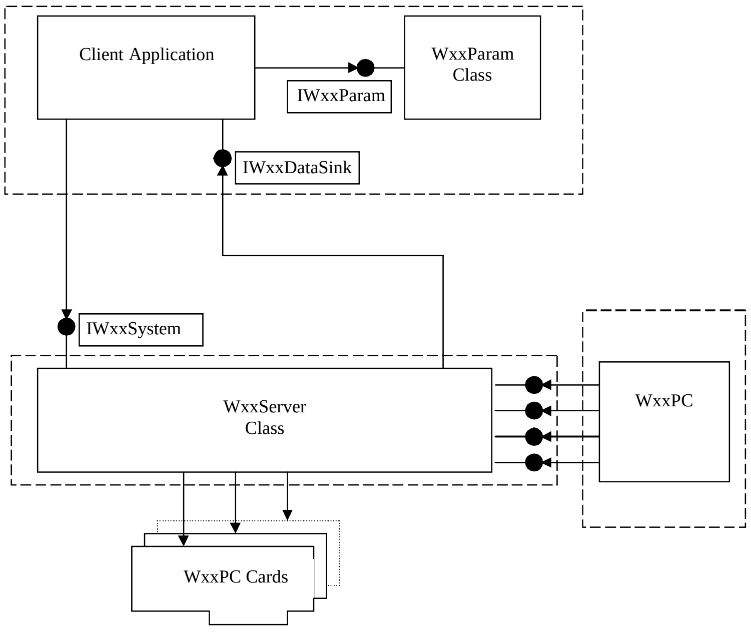
DCOM is no longer supported in future WAVECOM products. It still exists in the W4oPC, W41PC and W51PC. Please convert your existing W51PC software to the XML interface

The WAVECOM program consists of two parts. The first part is called the WAVECOM Client and contains the user interface, menus, dialogs and graphics. The second part, called the WAVECOM Server, contains the interface to the decoder card. The WAVECOM Server communicates with the decoder card and it always run on the machine containing the DSP card. Client applications use DCOM to connect to the WAVECOM Server from anywhere on the network.



The WAVECOM Server provides two interfaces. The first is a comprehensive interface providing all the functionality required by the WAVECOM Client application. The second interface is a simplified interface providing only the functions required for an external application. This interface is compatible with the OLE automation standard to allow applications written in various programming languages to interface to the WAVECOM Server.

Remote Control Interface

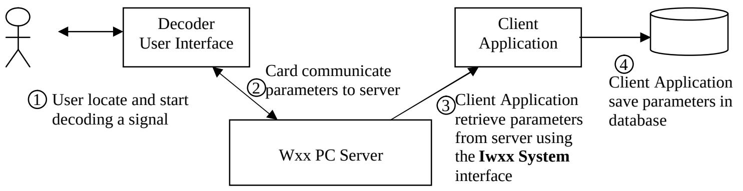


Interface diagram

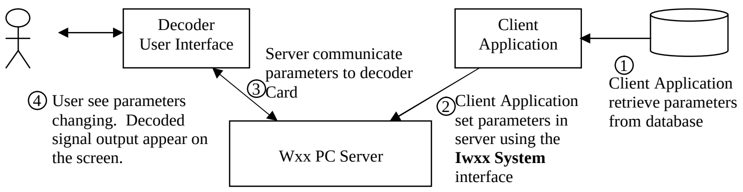
Class W51Server

W51Server is implemented as an out-of-process server. It can either be used as a Local Server (on the same machine) or a Remote Server (on another machine). The W51Server program supports the Iw51System interface for use by any client application.

Iw51System


Decoder User Interface
Client Application
Card communicate parameters to server
① User locate and start decoding a signal
②
③ Client Application retrieve parameters from server using the **Iwxx System** interface
④ Client Application save parameters in database
Wxx PC Server

Similarly, the client application can set the state of the decoder card.


Decoder User Interface
Client Application
Server communicate parameters to decoder Card
④ User see parameters changing. Decoded signal output appear on the screen.
① Client Application retrieve parameters from database
② Client Application set parameters in server using the **Iwxx System** interface
③
Wxx PC Server

The Iw51System interface is used to set or retrieve state and decoded data from the W51PC card. The state consists of parameters such as decoder mode, baud rate, frequency shift, etc. The client application can at any time retrieve the state of the decoder card as it was set up using the decoder user interface and the decoder user interface can retrieve the state as it was set up using the client application. This is because the decoder user interface and the client application share the same W51Server.

The list of parameters that make up the state of the decoder varies from mode to mode and is also changed from time to time as new modes and functionality are added to the decoder. To isolate the client application from these changes, the state of the decoder is stored as a “blob” of data. This is simply a variable length array of bytes. It is the responsibility of the W51Server to create this blob when sending it to the client application and to interpret the blob when it is received from the client application. All that the client application has to do is to ensure that it sends the blob back to the W51Server exactly the same way it was received. To allow the client application to interpret the parameters that are inside the “blob” a W51Param utility class is provided.

Iw51System Methods

Shown below is the IDL definition of the Iw51System interface. Each of the functions (or methods) will be described.

```
interface IW51System : IDispatch
{
  HRESULT Connect([in] BSTR CardName);
  HRESULT ConnectByNumber([in] long lCardNumber);
  HRESULT ActivateW51PC([in] BSTR ComputerName);
  HRESULT SetParam([in] BSTR Blob);
  HRESULT GetParam([out] BSTR* Blob);
  HRESULT GetSystemStatus( [out] BOOL*Idle,
               [out]BOOL*Traffic,
               [out] BOOL*Error,
               [out] BOOL*RQ,
               [out] BOOL*Auto,
               [out] BOOL*Sync,
               [out] BOOL*Phasing)
               [out] long*Level);
  HRESULT SetUpdateRate([in] long lUpdateRate);
  HRESULT GetTextData([out] BSTR *Data);
  HRESULT GetRawData(     [in] long cMax,
               [out] long*pcActual,
               [out size_is(cMax),length_is(*pcActual)] BYTE Data);
  HRESULT EnableCallBackText([in] BOOL Enable);
  HRESULT EnableCallBackRaw([in] BOOL Enable);
  HRESULT EnableCallBackStatus([in] BOOL Enable);
  HRESULT GetCardStatus([out] long *Status);
  HRESULT RawDataAsText([in] BOOL Enable);
  HRESULT SystemIsReadyForParamChange([out] BOOL *IsReady);
  HRESULT Reset();
  HRESULT Resync();
};
```

Description of methods in Iw51System:

HRESULT Connect([in] BSTR CardName);

The card name is provided as a BSTR. These card names can be changed using the Server Control application. This function initializes the card by downloading code to the card. This function has to be called before the card can be used. Calling connect with another card name will disconnect the current card and connect to the new card.

HRESULT ConnectByNumber([in] long lCardNumber);

This function enables you to connect to a card in the same way as the Connect() function does. The only difference is that instead of the card name being supplied, the card number is used. Card numbers 0 through 7 are valid. The function will fail if an invalid card number is specified.

HRESULT SetParam([in] BSTR Blob);

This function allows the client application to change the parameters on the card. The BSTR that is supplied must be created by using the W51Param utility interface or it can be a BSTR previously created with a call to GetParam.

HRESULT GetParam([out] BSTR* Blob);

Retrieves the parameters from the card. The parameters are returned as a BSTR.

HRESULT ActivateW51PC([in] BSTR ComputerName);

This function will launch the decoder User Interface on the remote computer specified in the ComputerName string. The server must be running on the remote computer for this function to work. The Server can be started by running the Server Control application.

To show you all the possible combination up to 3 computers are needed:

Remote Client	WAVECOM SERVER	W51PC Card	Command
PC#1	PC#1	PC#1	=CREATEOBJECTEX(clsidsystem,PC#1) ActivateW51PC("local") – or – ActivateW51PC("127.0.0.1") – or – ActivateW51PC("PC#1") – or – ActivateW51PC("IPof PC#1")
PC#1	PC#1	PC#2	=CREATEOBJECTEX(clsidsystem,PC#1) ActivateW51PC("PC#2") – or – ActivateW51PC("IPofPC#2")
PC#1	PC#2	PC#1	=CREATEOBJECTEX(clsidsystem,PC#2) ActivateW51PC("PC#1") – or – ActivateW51PC ("IPofPC#1")
PC#1	PC#2	PC#2	=CREATEOBJECTEX(clsidsystem,PC#2) ActivateW51PC("local") – or – ActivateW51PC("127.0.0.1")
PC#1	PC#2	PC#3	=CREATEOBJECTEX(clsidsystem,PC#2) ActivateW51PC("PC#3") – or – ActivateW51PC("IPofPC#3")

in addition to the Computer Name or IP address the **port number** used must be added to the computer name (PCABC:6500) or the computer address (xxxx.xxxx.xxxx.xxxx:2300). The port number must be setup on the WAVECOM Server Control screen. If a port number is not added, then the default port 33133 is used.

HRESULT GetSystemStatus([out] BOOL*Idle, [out] BOOL*Traffic, [out] BOOL*Error, [out] BOOL*RQ, [out] BOOL*Auto, [out] BOOL*Sync, [out] BOOL*Phasing, [out] long*Level);

Retrieves the system status of the card. All the parameters are of type BOOL and a TRUE or FALSE value is returned for each.

HRESULT SetUpdateRate([in] long lUpdateRate);

The rate at which call-back functions are called can be changed using this function. The **lUpdateRate** parameter indicates the delay between calls in milliseconds. The **lUpdateRate** parameter must have a value in the range 100 to 5000 milliseconds.

HRESULT GetTextData([out] BSTR *Data);

Retrieves the text data from the card. A buffer will store the text data received from the card and provide it when either the *GetTextData* function or the *NewTextData* call back function occurs.

For codes that have more than one channel, e.g. PICCOLO or ARQ-M2-242, special characters are inserted into the text data to separate the channels.

Example: **A{**text data chn a**}B{**text data chn b**}C{**text data chn c**}D{**text data chn d**}**.

Codes with only one channel don’t use these special characters

HRESULT GetRawData([in] long cMax,[out] long *pcActual, [out, size_is(cMax), length_is(*pcActual)] BYTE *Data);

Retrieves the raw data (as a bit stream) from the card. The **cMax** parameter indicates the maximum length of the buffer used to receive the data. The **pcActual** parameter indicates the actual length of the data received. **Data** points to the data.

HRESULT EnableCallBackText([in] BOOL Enable);

If EnableCallBackText is called with the **Enable** parameter TRUE the call back function *NewTextData* will be enabled. To disable the call back function, call EnableCallBackText with FALSE.

HRESULT EnableCallBackRaw([in] BOOL Enable);

If EnableCallBackRaw is called with the Enable parameter TRUE the call back function *NewRawData* will be enabled. To disable the call back function, call EnableCallBackRaw with FALSE.

HRESULT EnableCallBackStatus([in] BOOL Enable);

If EnableCallBackStatus is called with the Enable parameter TRUE the call back function *NewSystemStatus* will be enabled. To disable the call back function, call EnableCallBackStatus with FALSE.

HRESULT RawDataAsText([in] BOOL Enable);

Developers who prefer to work with Unicode strings instead of binary data can call this function to convert all the binary data to hex strings. After calling RawDataAsText(TRUE) every BYTE that would have been made available on the GetRawData() function will be converted to a two character hex string and become available on the GetTextData() function.

For example: The three bytes 01h, 1Ah, FFh will be converted to the string “011AFF” – a string of 6 Unicode characters.

HRESULT GetCardStatus([out] long *Status);

This function returns the card status as defined by the following values:

Value	Status
0	Card is being initialized
1	Card has been initialized and card is running
2	Some error occurred initializing the card
3	The decoder dsp program could not start
4	Card in use
5	No card
6	Error timeout
7	Error device driver
8	Error device conflict

HRESULT SystemIsReadyForParamChange([out] BOOL *IsReady);

This function allows the client application to check if a new blob can be send to the card.

HRESULT Reset();

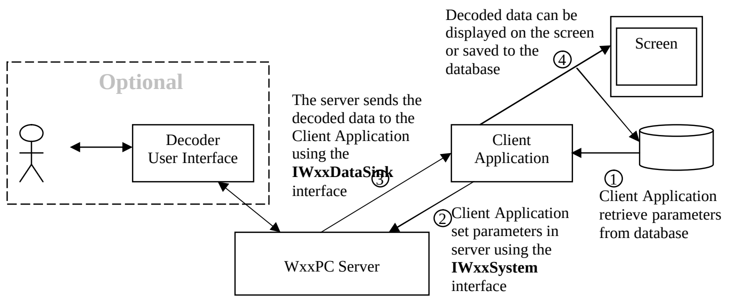
Clear the data buffers.

HRESULT Resync();

Forces a new synchronization in the current mode.

Iw51DataSink

The client application can use the Iw51DataSink interface to receive the decoded data from the decoder Card. The decoded data can be text, bitmap or signal data depending on the mode that the decoder card is set to. System information (i.e. traffic, idle etc.) can also be accessed using this interface. The W51DataSink interface represents the call-back functions from the Server to the client.



Optional
Decoder User Interface
WxxPC Server
The server sends the decoded data to the Client Application using the IWxxDataSink interface
3
Client Application
2 Client Application set parameters in server using the IWxxSystem interface
Decoded data can be displayed on the screen or saved to the database
4
Screen
1 Client Application retrieve parameters from database

The client application will use Iw51System interface to establish a connection with the server and to set up the mode of the decoder card. After that the server will call into the client application using the Iw51DataSink interface to send it the decoded data.

The types of data that can be returned are:

- TEXT (Unicode characters for all text modes)
- IMAGE (grayscale bitmap for fax modes)
- SIGNAL (array of integers for signal analysis mode)
- Parameters (e.g. baud rate)
- FFT (array of integers for FFT mode)
- New types possible in future…

Iw51DataSink Methods

This interface allows the server to communicate results to its clients.

```
interface IW51DataSink : IDispatch
{
  HRESULT NewTextData([in] BSTR Data);

  HRESULT NewRawData([in] long cMax,
               [in, size_is(cMax)] BYTE *nData,
               [in] long DataType);

  HRESULT NewSystemStatus( [in] BOOL Idle,
               [in] BOOL Traffic,
               [in] BOOL Error,
               [in] BOOL RQ,
               [in] BOOL Auto,
               [in] BOOL Sync,
               [in] BOOL Phasing,
               [in] long Level);
};
```

Three distinct types of data can be returned from the Server. These are text data, raw data (for example fax, bitmap etc.) and system status results. The rate at which the server calls the client application is called the update rate, and can be adjusted using the Iw51System interface's SetUpdateRate function.

Description of methods in Iw51DataSink:

HRESULT NewTextData([in] BSTR Data);

This is the call-back function that will be called when new text data is available. The text data is returned in a BSTR. This function can be enabled or disabled using the *EnableCallBackText* function on the system interface.

HRESULT NewRawData([in] long cMax, [in, size_is(cMax)] BYTE *nData,[in] long DataType);

Called when new raw data as bit stream data becomes available. The **cMax** parameter indicates the size of the data buffer, **nData** points to the data and **DataType** indicates the type of data. This function can be enabled or disabled using the *EnableCallBackRaw* function on the System interface.

HRESULT NewSystemStatus([in] BOOL Idle, [in] BOOL Traffic, [in] BOOL Error, [in] BOOL RQ, [in] BOOL Auto, [in] BOOL Sync, [in] BOOL Phasing, [in] long Level);

Call back function used to indicate the system status and level. All the system status parameters are returned as BOOL values that can be TRUE or FALSE. The level indicator parameter returns a value between 0 and 12. This function can be enabled or disabled using the *EnableCall-BackStatus* function on the system interface.

RawData format for FAX

From W51PC Software Version 6.2 on, fax data is transferred by the Ne-wRawData routine.

- 60 rpm = 1920 pixel/line
- 90 rpm = 1280 pixel/line
- 120 rpm = 960 pixel/line
- 180 rpm = 640 pixel/line
- 240 rpm = 480 pixel/line
- HELL = 28 pixel/line

Color Table for FAX modes

In the FAX modes (PRESS-FAX / WEATHER-FAX / METEOSAT / NOAA-GEOSAT) the values from 0 to 255 represent specific colors which are used for drawing the fax output. The colors (RGB values) for each value are listed in the following table. RGB(0, 0, 0) corresponds to black and RGB(255, 255, 255) corresponds to white

Class W51Param

The client application can use the W51Param class to extract parameters from the “blob” of state information returned by the server. The W51Param class is implemented as an in-process server.

ICW51Param

The Iw51Param interface takes a “blob” as input and then returns the value of any requested parameter as a string. The client application can then display these strings in a user-friendly way. The interface can also be used to set parameter values and to build “blobs” that can be stored in a database or sent to the Server.

ICW51Param Methods

```
interface ICW51Param : IDispatch
{
  HRESULT GetBlob([out] BSTR* Blob);
  HRESULT SetBlob([in] BSTR Blob);
  HRESULT SetParam([in] BSTR Name, [in] BSTR Value);
  HRESULT GetParam([in] BSTR Name, [out] BSTR *Value);
  HRESULT Reset();
};
```

Description of methods in ICW51Param:

HRESULT GetBlob([out] BSTR* Blob);

Retrieves the blob as a BSTR.

HRESULT SetBlob([in] BSTR Blob);

Sets the blob so parameters can be extracted.

HRESULT SetParam([in] BSTR Name, [in] BSTR Value);

Sets a parameter value. **Name** is the parameter name and **Value** is a BSTR containing the value of the parameter. The **Name** and **Value** strings are case sensitive.

HRESULT GetParam([in] BSTR Name,[out] BSTR *Value);

This function retrieves the value of a parameter. **Name** is the parameter name and **Value** is a pointer to the parameter value. The **Name** and **Value** strings are case sensitive.

HRESULT Reset();

Resets all the parameters to empty strings. Call this function to clear the contents of the blob stored in the object.

List of Parameters

List of parameters supported by W51System class

W51 Parameter Name	Legal Values
Afc	ON, OFF
Agc	ON, OFF, LOW-NOISE
Algorithm	VITERBI, FANO
Am-gain	0...100
Am-offset	0...2047
Auto	ON, OFF
Auto-speed	ON, OFF

Bandwidth	50…24000
Baud rate	AF-IN, IF-IN-VAR: 30.0...1200.0
IF-IN-10.7, IF-IN-21.4: 30.0.. 9600.0	Bit-inversion
0-31	Center
AF-IN, IF-IN-VAR: 500 .. 3500	IF-IN-10.7, IF-IN-21.4: 500...16000
Code-table	TABLE-0, TABLE-1
Cw-speed	20...400
Data-mode	See list of valid alphabet strings
Demodulation	DSP, M, AM, CW, GFSK, FFSK, FFT, MFSK, TIME, DTMF, BPSK, FTDM, QPSK, DPSK, ANAL, SUBTONE, 2DPSK, 4DPSK, 8DPSK, 16DPSK, SRC, OQPSK, OFDM, QAM
Display	ASCII, HEX, BAUDOT, ASCII/HEX, ASCII/HEX/BAUDOT, RAW, SIGNALING-INFO, SELECTED-TIME-SLOT, ALL-TIME-SLOTS, ALL-BLOCKS, RAW-BITS
Display-mode	ALL, VALID-ONLY, NO-ERROR
Drum-speed	60, 90, 120, 180, 240
Ecc	ON, OFF
FFT-Average-factor	1…64
FFT-Window	RECTANGLE, HAMMING, HANNING, BLACKMAN
Filter-response	SLOW, NORMAL, FAST
Frame-length	3, 4, 5, 6, 7, 8, 9, 22
Frame-format	2400-SHORT, 1200-SHORT, 600-SHORT, 300-SHORT, 150-SHORT, 75-SHORT, 2400-LONG, 1200-LONG, 600-LONG, 300-LONG, 150-LONG, 75-LONG, 3600-UNCODED , 2400-UNCODED, 1800-UNCODED, 1200-UNCODED, 600-UNCODED
Gain	0…100
Ias	ON, OFF
Input	AF-IN, IF-IN-VAR, IF-IN-10.7, IF-IN-21.4, EXT-DEM-IN
Ioc-module	288, 352, 576
Letfig-mode	NORMAL, LETTER, FIGURE, UOS
Lowpass-filter	1.0...100.0
Message-type	POCSAG-MIXED, POCSAG-ASCII, POCSAG-AUTO, POCSAG-TYPE3, DGPS-NORMAL, DGPS-RAW, DGPS-CORR, DGPS-ALL, HFACARS-HEADER-ONLY, HFACARS-DATA-WITHOUT-DETAIL, HFACARS-ALL-DATA, MIL-STANAG-ASCII-ASYNC, MIL-STANAG-ASCII-ASYNC-7DBIT-0STOPBIT, MIL-STANAG-ASCII-SYNC, MIL-STANAG-HEX, NMT450-ALLFRAMES, NMT450-MTXTOMS, NMT450-MSTOMTX, NMT450-BSTOMTX, NMT450-MTXTOBS, NMT450-MTXTOTMS
Mode	See list of valid mode strings
Mpt-format	ASCII, BINARY
Mpt-station	FIXED, MOBILE

Noisegate-mode	EABLED, DISABLED
Oscillator	3960000…4040000
Oscilloscope-Time	200us, 500us, 1ms, 2ms, 5ms, 10ms, 20ms, 50ms, 100ms
Oscilloscope-Gain	0...1600
Oscilloscope-Trigger-level	-99… 99
Oscilloscope-Trigger-mode	OFF, POSITIVE, NEGATIVE
Osi-level	0, 1
Parity	NO, EVEN, ODD, MARK, SPACE
Period	50…10000
Polarity	NORMAL, INVERSE
PSK-Filter	0...20
PSK-Ref-iq	100.0…3600.0
PSK-Sample-rate	2000, 4000, 8000
PSK-Symbol-rate	25.0...2400.0
PSK-Sync-mode	SYNC, ASYNC
PSK-Zoom	500, 1000, 4000, 12000, 24000
Repetition-cycle	4, 5, 8
Scan-mode	FAST, FULL
Shift	AF-IN, IF-IN-VAR: 50.…3500 IF-IN-10.7, IF-IN-21.4: 50…16000
Sreg	72, 128, OFF
Time-slot	1…22
Toggle	LOW, HIGH
Tone-duration	20.0...1000.0
Tracking-rate	1…15

Translation	AF-IN: -2000...16000
	IF-IN-VAR: 14000...1500000
	IF-IN-10.7: 10600000...10800000
	IF-IN-21.4: 21300000...21500000

Twinplex-f1<->f2	10...800
Twinplex-f2<->f3	10...800
Twinplex-f3<->f4	10...800
Twinplex-v1-mode	YYBB, YBYB, BYYB, BYBY, YBBY
Twinplex-v2-mode	YBYB, BYYB, BYBY, YBBY
Version	contains the version of the blob

List of valid W51 mode strings
ACARS
AIS
ALF-RDS
ALIS
ALIS-2
AMSAT-P3D
ARQ6-90

ARQ6-98
ARQ-E
ARQ-E3
ARQ-M2-242
ARQ-M2-342
ARQ-M4-242
ARQ-M4-342
ARQ-N
ASCII
ATIS
AUM-13
AUTOSPEC
BAUDOT
BULGASCII
CCIR-1
CCIR-7
CCITT
CIS-11
CIS-14
CIS-36
CIS-36-50
CIS-50-50
CODAN
COQUELET-13
COQUELET-8
COQUELET-80
CTCSS
CW-MORSE
DCS-SELCAL
DGPS
DSC-HF
DSC-VHF
DTMF
DUP-ARQ
DUP-ARQ-2
DUP-FEC-2
EEA
EFR
EIA
ERMES
EURO
FEC-A
FELDHELL
FLEX
FM-HELL

FMS-BOS
GOLAY
G-TOR
GW-PSK
GW-FSK
HC-ARQ
HF-ACARS
HF-AUTOCORRELATION
HF-BIT-CORRELATION
HF-BIT-LENGTH
HF-BIT-STREAM
HF-CLASSIFIER
HF-FFT/SONAGRAM
HF-FSK-ANALYSIS
HF-FSK-CODE-CHECK
HF-MFSK-ANALYSIS
HF-OSCILLOSCOPE
HF-PSK-PHASE-PLANE
HF-PSK-SYMBOL-RATE
HF-REAL-TIME-FFT
HF-SONAGRAM
HF-WATERFALL
HNG-FEC
ICAO-SELCAL
METEOSAT
MFSK-16
MFSK-20
MFSK-8
MIL-188-110-16TONE
MIL-188-110-39TONE
MIL-188-110A
MIL-188-110B
MIL-188-141A
MPT-1327
NATEL
NMT-450
NOAA-GEOSAT
NO-MODE
NO-MODE
PACKET-1200
PACKET-300
PACKET-9600
PACTOR
PACTOR-II
PACTOR-II-FEC

PICCOLO-MK12
PICCOLO-MK6
POCSAG
POL-ARQ
PRESS-FAX
PSK-125F
PSK-31
PSK-63F
RUM-FEC
SAT-A-TELEX
SAT-B
SAT-C-TDM
SAT-C-TDMA
SAT-M
SAT-MINI-M
SI-ARQ
SI-AUTO
SI-FEC
SITOR-ARQ
SITOR-AUTO
SITOR-FEC
SP-14
SPREAD-11
SPREAD-21
SPREAD-51
SSTV
STANAG-4285
STANAG-4415
STANAG-4481-PSK
STANAG-4529
SWED-ARQ
TWINPLEX
VDEW
VHF-AUTOCORRELATION-DIR
VHF-AUTOCORRELATION-IND
VHF-BIT-CORRELATION-DIR
VHF-BIT-CORRELATION-IND
VHF-BIT-LENGTH-DIR
VHF-BIT-LENGTH-IND
VHF-BIT-STREAM-DIR
VHF-BIT-STREAM-IND
VHF-FFT/SONAGRAM-DIR
VHF-FFT/SONAGRAM-IND
VHF-FSK-ANALYSIS-DIR
VHF-FSK-ANALYSIS-IND

VHF-FSK-CODE-CHECK-DIR
VHF-FSK-CODE-CHECK-IND
VHF-OSCILLOSCOPE-DIR
VHF-OSCILLOSCOPE-IND
VHF-PSK-PHASE-PLANE-DIR
VHF-PSK-PHASE-PLANE-IND
VHF-PSK-SYMBOL-RATE-DIR
VHF-PSK-SYMBOL-RATE-IND
VHF-REAL-TIME-FFT-DIR
VHF-REAL-TIME-FFT-IND
VHF-SELCAL-ANALYSIS-IND
VHF-SONAGRAM-DIR
VHF-SONAGRAM-IND
VHF-WATERFALL-DIR
VHF-WATERFALL-IND
VISEL
WEATHER-FAX
ZVEI-1
ZVEI-2
ZVEI-VDEW

These W51 modes and analysis tools may only be activated, i.e. data CANNOT be retrieved through the remote control interface

List of valid W51 data alphabet strings
ARABIC-BAGHDAD-70
ARABIC-BAGHDAD-80
ARABIC-MORSE
CYRILLIC-MORSE
GREEK-MORSE
HEBREW-MORSE
ITA1-LATIN
ITA2-BULGARIAN
ITA2-CYRILLIC
ITA2-DANISH-NORWEGIAN
ITA2-HEBREW
ITA2-LATIN
ITA2-LATIN-TRANSPARENT
ITA2-SWEDISH
ITA5-BULGARIAN
ITA5-CHINESE
ITA5-DANISH-NORWEGIAN
ITA5-FRENCH
ITA5-GERMAN
ITA5-SWEDISH
ITA5-US

LATIN-MORSE
SCANDINAVIAN-MORSE
SKYPER
SPANISH-MORSE
TASS-CYRILLIC
THIRD-SHIFT-CYRILLIC
THIRD-SHIFT-GREEK
UNDEF

Programming Examples

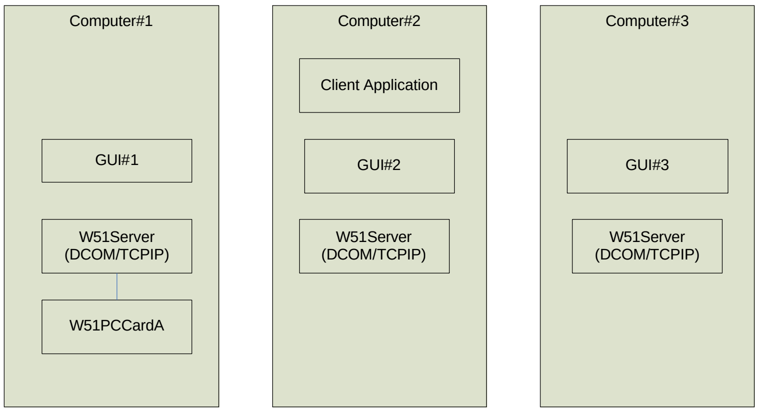
Visual FoxPro

```
oDecSystm  = CREATEOBJECTEX(clsidsystem , computer#1)
oDecParam  = CREATEOBJECTEX(clsidparam ,"")

oDecSys.connect("W51CardA")

oDecSystm.GetParam(@lcBlop)
oDecParam.SetBlob(lcBlop)
oDecParam.SetParam("Mode", mode)
oDecParam.GetBlob(lcBlop)
oDecSystm.SetParam(lcBlop)

oDecSys.ActivateW51("Computer#1")  && starts GUI#1
oDecSys.ActivateW51("Computer#2")  && starts GUI#2
oDecSys.ActivateW51("Computer#3")  && starts GUI#3
```



Visual Basic

```
' Class containing the data decoder handling code.
'==================================================

Private WithEvents m_objW51Server1 As W51SERVERLib.W51System


Public Sub ActivateDataDecoder1()

  '
===================================================================
========
  ' ActivateDataDecoder1
  '  -----------------------------------------------------------------
------------
  ' This subroutine is responsible for the activation of the first
data decoder
  ' driver instance.
  '
  ' Parameter Name    Dir Description
  ' -------------     --- -----------
  '
  '  -----------------------------------------------------------------
------------

  Dim I As Integer

  ' Kill any possible current instatiation.
  On Error Resume Next
  Set m_objW51Server1 = Nothing

  ' Create a new instantiation of it.
  Err = 0
  Set m_objW51Server1 = CreateObject("W51System.W51System.1")

 ' Connect to the card.
  m_objW51Server1.Connect Format$("One")

  ' Set the interface parameters.
  m_objW51Server1.SetParam ""
  m_objW51Server1.SetUpdateRate 1000
  m_objW51Server1.EnableCallBackText False
  Err = 0

End Sub

Public Sub m_objW51Server1_NewTextData(ByVal Data As String)
  '
===================================================================
========
  ' m_objW51Server1_NewTextData
  '  -----------------------------------------------------------------
------------
  ' This event is activated when the Data Decoder has detected new
text data.
  '
  ' Parameter Name    Dir Description
  ' -------------     --- -----------
  ' Data              IN  The textual data received.
  '  -----------------------------------------------------------------
------------

  ' Get the decoder number for the channel.
  If Len(Data) = 0 Then Exit Sub

  ' If paused ignore the data else update the log and the display.
  frmDisplay.Text1 = frmDisplay.Text1 & Data

End Sub
```

MATLAB

You can import your data to other software packages for further, automatic analysis in MATLAB. Tested with Matlab 6.5, Release 13.

```
% Instantiate w51PC
w51=actxserver('W51System.W51System.1')
w51.ConnectByNumber(0)
blob=invoke(w51, 'GetParam')
text=invoke(w51, 'GetTextData')

% change decoder output manually to "BITSTREAM" and get the data:
w51.RawDataAsText(1)
bitstream=invoke(w51, 'GetTextData');
```

Microsoft C

See the example on your CD-ROM.

Glossary of Terms

base16

Scheme used to transmit binary data. The hexadecimal number system is a base-16 numbering system. It is the numbering system used to condense binary bytes into a compact form for transmitting or analysis of computer data. It is composed of the numbers 0-9 and the letters A-F. Each “nibble” (4 bits) of a byte can be represented by one of the 16 digits.

base2

Scheme used to transmit binary data. Every binary bit is represented as a character of “0” or “1”. The data volume grows by factor 8, i.e. for every binary byte, a character string of 8 bytes is generated.

base64

Scheme used to transmit binary data. Base64 processes data as 24-bit groups, mapping this data to four encoded characters. It is sometimes referred to as 3-to-4 encoding. Each 6 bits of the 24-bit group is used as an index into a mapping table (the base64 alphabet) to obtain a character for the encoded data.

base64-mime

Scheme used to transmit binary data. Same principle as base64 with one little difference, it’s the way how the ends of the encoded strings looks like. Both techniques use the same character set but base64-mime follows the specification made for SMTP messages. It aligns the string to 4 characters and fills the unused with the padding character “=”, base64 cuts down the characters to the only needed ones depending on the number of bits.

DCOM

Distributed Component Object Model (DCOM) is a Microsoft proprietary technology for software components distributed across several networked computers to communicate with each other. It extends Microsoft's COM, and provides the communication substrate under Microsoft's COM+ application server infrastructure. It has been deprecated in favor of Microsoft .NET.

The addition of the "D" to COM was due to extensive use of DCE/RPC - more specifically Microsoft's enhanced version, known as MSRPC.

In terms of the extensions it added to COM, DCOM had to solve the problems of

Marshalling - serializing and deserializing the arguments and return values of method calls "over the wire".

Distributed garbage collection - ensuring that references held by clients of interfaces are released when, for example, the client process crashed, or the network connection was lost.

One of the key factors in solving these problems is the use of DCE/RPC as the underlying RPC mechanism behind DCOM. DCE/RPC has strictly defined rules regarding marshalling and who is responsible for freeing memory.

DCOM was a major competitor to CORBA. Proponents of both of these technologies saw them as one day becoming the model for code and service-reuse over the Internet. However, the difficulties involved in getting either of these technologies to work over Internet firewalls, and on unknown and insecure machines, meant that normal HTTP requests in combination with web browsers won out over both of them. Microsoft, at one point, attempted and failed to head this off by adding an extra http transport to DCE/RPC called

DTD

Can accompany a document, essentially defining the rules of the document, such as which elements are present and the structural relationship between the elements. It defines what tags can go in a XML document, what tags can contain other tags, the number and sequence of the tags, the attributes a tag can have, and optionally, the values those attributes can have.

RGB

A color perceived by the human eye can be defined by a linear combination of the three primary colors red, green and blue. These three colors form the basis for the RGB-colorspace.

Unicode

Unicode is a character code that defines every character in most of the speaking languages in the world. Although commonly thought to be only a two-byte coding system, Unicode characters can use only one byte, or up to four bytes, to hold a Unicode "code point" (see UTF-8 and UTF-16). The code point is a unique number for a character or some character aspect such as an accent mark or ligature. Unicode supports more than a million code points, which are written with a "U" followed by a plus sign and the number in hex; for example, the word "Hello" is written U+0048 U+0065 U+006C U+006C U+006F.

UTF-16

This is a fixed-length character encoding for unicode. It is able to represent any universal character in the Unicode standard. UTF-16 uses two bytes per character.

UTF-8

This is a variable-length character encoding for Unicode. It is able to represent any universal character in the Unicode standard, yet is backwards compatible with ASCII. UTF-8 uses one to four bytes per character, depending on the Unicode symbol. For example, only one byte is needed to encode the 128 US-ASCII characters in the Unicode range U+0000 to U+007F.

Well-formed

A textual object is a well-formed XML document if: Taken as a whole, it matches the production labeled document It meets all the well-formedness constraints given in this specification.

XML

The Extensible Markup Language (XML) is a subset of SGML that is completely described in this document. Its goal is to enable generic SGML to be served, received, and processed on the Web in the way that is now possible with HTML. XML has been designed for ease of implementation and for interoperability with both SGML and HTML.

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