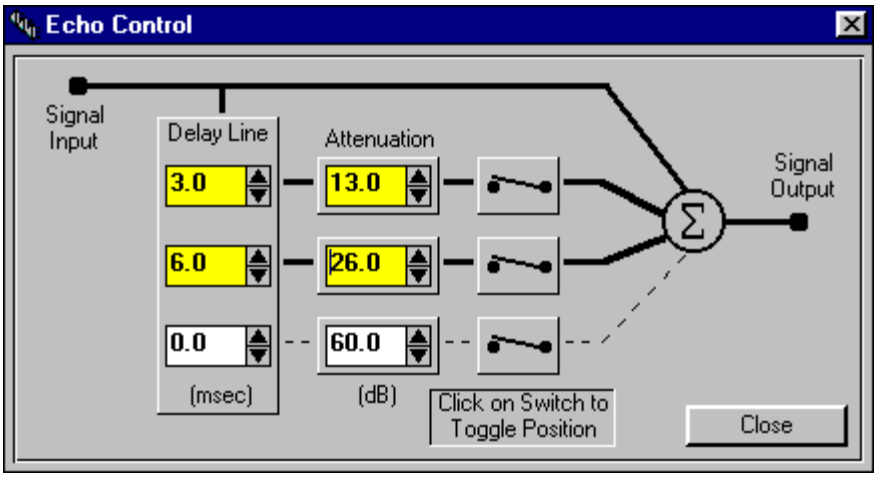
New Features

CID1500 vrs 2.21

FSK Based Caller ID Simulator Software

1) Signal Echo Generation Capabilities

The new CID1500 program supports the generation of up to three signal echo's at arbitrary delays and attenuation levels. This new capability allows for CPE testing to the proposed TIA standards for Caller ID. The echo's can be enabled for any signal generated by the software as well as external signals injected at the BNC audio input. For each of the three possible signal echo's, the delay can range from 0 to 20 milliseconds, while the attenuation of each echo can be programmed to be in the range of 0 to 60 dB. The following figure shows the setup for creating two echo's at time delays of 3.0 and 6.0 milliseconds with attenuation's of 13.0 and 26.0 dB respectively.



2) Support for the Australian Caller ID System

The CID1500 now implements the Australian Caller ID signaling methods separately from the Bellcore and ETSI standards. The message layer aspects are identical to that of the Bellcore standards; however, the physical signaling layer allows for some signaling methods that are different from Bellcore. These include sending the FSK data before the first ring, with or without a pre-data transmission signal. The new signaling types for the Australian standard are:

Type I (on hook)

- Transmit data after ringing burst, followed by normal or distinctive ringing
- Transmit data after an OSI, followed by normal or distinctive ringing
- Transmit data after a line reversal, followed by normal or distinctive ringing
- Transmit data, followed by normal or distinctive ringing
- Transmit data after an OSI, with no ringing
- Transmit data after a line reversal, followed by a 2nd line reversal after the data
- Transmit data with no pre-data or post-data events

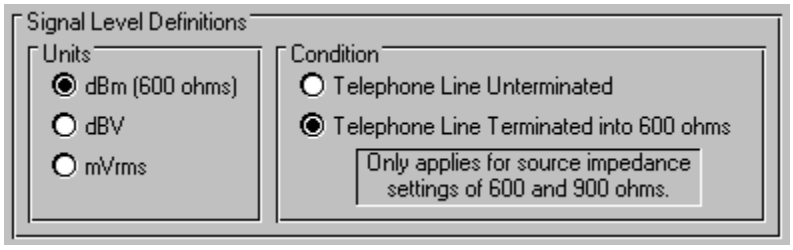
Type II (off hook)

- Send SAS/CAS tone, wait for ACK, then transmit data (same as Bellcore)

Note that older versions of the TSPC hardware (rev 2.2b and earlier) can not support the generation of an OSI. However, this can be overcome for the older hardware by using an external relay controlled via a digital output control line present at the rear DB9 pin connector. See the section: Auxiliary Digital Outputs and Inputs for more information.

3) Specify Signal Levels in dBm, dBV, or mVrms

It is now possible to specify the units for any signal level in terms of dBm, dBV, or mVrms. Additionally, these levels can be referred to telephone lines that are either unterminated or terminated into 600 ohms. Normally for the Bellcore standard, signal levels are defined in units of dBm into a 600 ohm termination. However, for the ETSI Caller ID standard, signal levels are specified in units of dBV for an unterminated telephone line. In either case, it is now possible to change the settings at any time within the program. To alter the current settings, selected the [MORE OPTIONS] item from the [CONFIGURATION] menu.



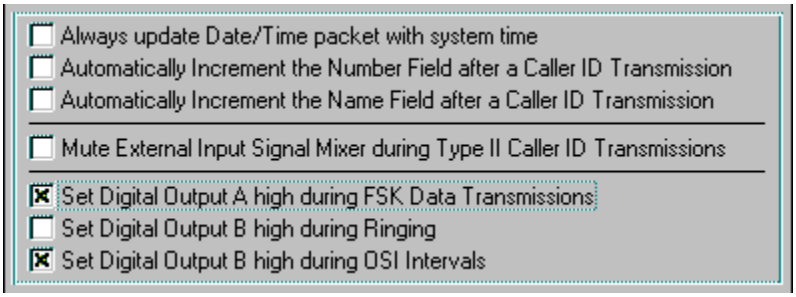
4) Auxiliary Digital Outputs and Inputs

The DB9 connector at the rear of the TSPC can be used as an auxiliary digital output and input port.

Outputs

Two digital output signals are available that can be set high or low by scripting commands, or they can be programmed to indicate certain activities. The two signals termed Output A and Output B can be set high during FSK data transmission, ringing, or

OSI signaling. This feature can be enabled or disabled in the [MORE OPTIONS] settings panel under the [CONFIGURATION] menu. Output A can be set to be active during FSK data transmissions, while output B can be set active during times of ringing or OSI signaling. For earlier hardware that does not support the generation of OSI for the Australian standard, output B can be used to control an external relay that breaks the circuit to the CPE in order to simulate an OSI. Other uses for these output signals include the ability to trigger external equipment (oscilloscopes, logic analyzers, emulators) during the FSK or ringing portions of a Caller ID transmission.



In addition to the above options, the two digital outputs can be set high or low via the scripting language.

Inputs

Two digital inputs are available on the DB9 connector that can be used to control the execution of a script language program. The new BRANCHIF command can be used to branch the execution point of the script program if either of the digital inputs are currently at a high level.

How to use the DB9 pin connector

The DB9 connector allows for the use of up to 2 digital outputs, 2 digital inputs, and a +5V supply from the PC. The digital outputs are only active when Pin 7 is connected to ground. This serves as a output port enable. The outputs are driven from 5V 'HC CMOS logic. Pin 3 is defined as Output A, while pin 4 is Output B. The two available inputs are at pins 8 (Input A) and 9 (Input B). The input voltages should be limited to ground and +5V in order to prevent damage to the internal 'HC CMOS buffers. Both Input A and Input B have 10 kohm resistors to ground in order to prevent floating inputs.

Pin definitions:

- Pin 1: +5V (can draw up to 0.5A from this pin) (internally fused)
- Pin 2: Reserved Output (do not use)
- Pin 3: External Output A ('HC CMOS 5V output)
- Pin 4: External Output B ('HC CMOS 5V output)
- Pin 5: Ground
- Pin 6: Reserved Output (do not use)
- Pin 7: Digital Output Enabled (connect to ground to enable outputs)
- Pin 8: External Input A ('HC CMOS 5V input)
- Pin 9: External Input B ('HC CMOS 5V input)

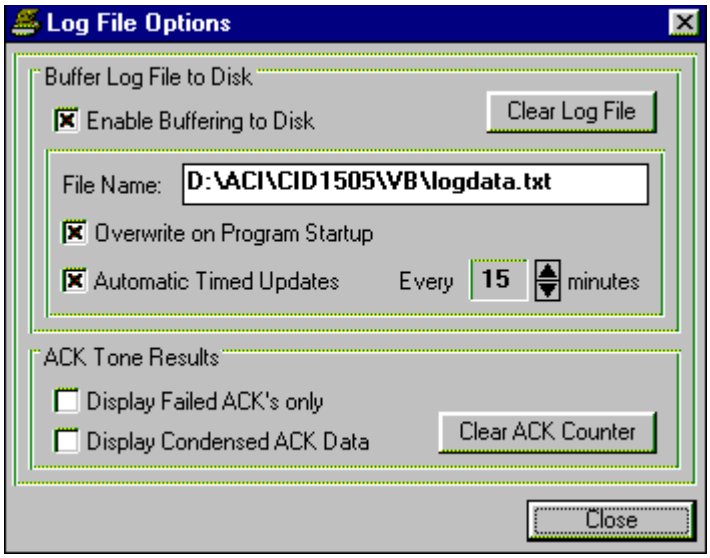
5) Enhancements to the Data Log File

The Data Log which holds the results of any Type II Caller ID transmissions and the progress of the script programs has been improved in a number of areas.

An ACK counter displayed across the top of the data log window shows a running count of the total number of Type II Caller ID transmission sent. Included with this is the number of ACK tones that were classified as being valid or passed, and the number which failed to meet the specified criteria.

Scripting commands can be used to branch program execution if the last Type II transmission resulted in a passed or failed ACK tone. The values of the ACK counter can be displayed on the screen or written to the log file using scripting commands.

Also present on the data log window are two command buttons to clear the contents of the log window and display a control panel for the data log file. Pressing the Clear Log button will erase the contents of the data log file, while pressing the Options command button will bring up the following display.



The Log File Options control panel defines if and how the data log will be buffered to a disk file and the display format for Type II Caller ID transmission. Since the data log window will only display the last 32 kbytes of data, an option can be enabled to write all of the data log contents to a file on disk. This will prevent any loss of data that can not be held in the data log window. The log file size is only limited by the space available on the selected storage drive. The file name and path can be specified as well as an option to overwrite the log file at program startup and to force timed updates. The option to overwrite the log file at program startup keeps the log file size in check, otherwise it will

continue to grow as the program is used, and eventually exceeding the available storage space. Normally, the log file will be written to when more than 10 kbytes of new data has been collected. However, the Automatic Timed Updates will force the log file to be updated at least once within the specified time interval. This interval can range from 1 to 30 minutes.

Also included as part of the options panel, are settings to control the display format for Type II Caller ID transmissions. If the Display Failed ACK's Only setting is enabled, then only ACK's that do not meet the specified criteria will cause output to be written to the log file. The Display Condensed ACK Data setting will, if enabled, reduce the amount of information written to the log file. Only the DTMF digit and time stamp will be shown if this option is enabled.

6) Enhancements to the Scripting Language

Multi-Module Support

Script programs can now be composed of up to 32 different modules. Each module can contain up to 32 kbytes of program text. Complex scripting programs can be divided up into separate modules for ease of code maintenance. Program control can be passed between modules by using a new branching command. A new file structure is used to save the script program to disk; however, the CID1500 program will still be able to read script programs composed on earlier versions for backward compatibility. Also, the speed of the syntax checking scan has been greatly increased. Along with this, the syntax checking scan is only performed on the scripting modules that have changed.

New Command: SET

The SET command can be used to control various aspects of the CID1500 program that could not be previously altered by the script program. The following items can be changed using the SET command:

a) FSK Modulator Signal Drop-outs:
The feature of programming FSK signal drop-outs can now be done within the scripting program using the following command syntax. The start time and duration are specified in milliseconds.

Syntax: SET DROPOUT (segment name) (start time) (duration)

b) FSK Modulator Enable:
The FSK modulator can be enabled or disabled for Caller ID transmissions by using the following script command.

Syntax: SET FSK (on/off)

c) Mark and Space Tone Levels:
Normally, the FSK modulator mark and space tone levels are defined by their total signal level and twist level. However, at times it is more convenient to be able to set the mark and space tone levels directly. The following syntax of the

SET command allows this. The command will cause the current settings of the total FSK signal level and twist level to be re-calculated for the specified mark tone level and space tone level.

Syntax: *SET MSLEVEL (mark level) (space level)*

d) Enabled or Disable Echo Generation
The following syntax for the SET command can control the settings for the new echo generator. Each of the three taps can be set to a delay and attenuation value, or turned off.

Syntax: *SET ECHOTAP (1/2/3) (delay value) (attn. value)*
SET ECHOTAP (1/2/3) OFF

e) Set the Signal Level Units
The units used to define the various signal levels throughout the program can be changed using the following command. The units can be set to either dBm, dBV, or mVrms referring to either a terminated or unterminated telephone line.

Syntax: *SET LEVELUNITS (dBm/dBV/mVrms) (term/unterm)*

f) Set Digital Outputs High or Low
Either of the two auxiliary digital outputs can be set high (on) or low (off) with the following command. See the section: Auxiliary Digital Outputs and Inputs for more information.

Syntax: *SET OUTPUTA (on/off)*
SET OUTPUTB (on/off)

New Command: CLEAR

The CLEAR command can be used to clear or reset various settings within the CID1500 program. The following items can be changed using the CLEAR command.

a) Zero the Type II Caller ID ACK Counter
The ACK counter, which counts the number of good or bad ACK tones received from the CPE, can be reset to zero using the following syntax.

Syntax: *CLEAR ACKCOUNTER*

b) Restore all Program Default Settings
The following command restores all of the default settings associated with the currently selected standard. It resets all of the parameter values as well as the message layer settings. This command mimics the [RESTORE DEFAULTS] option in the [CONFIGURATION] menu.

Syntax: *CLEAR ALL*

c) Clear the Contents of the Data Log
The Data Log window and its associated buffer file can be cleared with the following command.

Syntax: *CLEAR LOG*

New Command: BRANCHIF

The script program can now execute branches based on various conditions using the BRANCHIF command. If the specified condition is true, then the script program will branch to the specified label. The target label can occur in the same module, or in any of the other 32 possible script modules. Labels are set using the LABEL command. The syntax for the branch command is as follows:

Syntax: *BRANCHIF (condition) (label)*

The possible conditions are:

ALWAYS	Causes an unconditional branch to the label
ACKPASS	Causes a branch if the last ACK received was valid
ACKFAIL	Causes a branch if the last ACK received was not valid
ONHOOK	Causes a branch if the CPE is currently on-hook
OFFHOOK	Causes a branch if the CPE is currently off hook
INPUTA	Causes a branch if digital input A is at a high state
INPUTB	Causes a branch if digital input B is at a low state

New Command: TONEGEN

The TONEGEN command is used to control the arbitrary dual tone generator. Up to two arbitrary tone frequencies and levels along with noise can be controlled using this command. The syntax is similar to the PARAMETERS command, which is used to adjust the Caller ID transmission characteristics.

Syntax: *TONEGEN (parameter name) (operator) (value)*

The parameter name can be one of the following

TONE1_LEVEL	Level of tone #1 in the currently selected units
TONE1_FREQ	Frequency of tone #1 in Hz
TONE1_ENABLE	Turns on or off tone #1
TONE2_LEVEL	Level of tone #2 in the currently selected units
TONE2_FREQ	Frequency of tone #2 in Hz
TONE2_ENABLE	Turns on or off tone #2
NOISE_LEVEL	Level of noise generator in the currently selected units
NOISE_ENABLE	Turns on or off the noise generator

The operator, which effects how the selected parameter value will be changed, can be one of the following.

=	Set to specified value
+=	Increment by specified value
-=	Decrement by specified value
*=	Multiply by specified value

The tone generator can be activated when Caller ID transmissions are not in progress. At the start of a Caller ID transmission (Type I or Type II), the tone generator will be stopped. Upon the termination of the Caller ID transmission, the tone generator will be restarted with its previous settings.

New Command: FSKGEN

Like the TONEGEN command, the FSKGEN command is used to control the operation of the FSK modulator at times when no Caller ID transmissions are in progress. This command can be used to control the bit pattern generated by the FSK modulator as well as starting or stopping it. The level, frequencies, baud rate and other parameters of this idle mode FSK generator are still controlled by the same parameters that define its operation during a Caller ID transmission. These can be changed in the Advanced Setting window, or by the PARAMETERS script command. The following aspects of the FSK modulator can be controlled by the FSKGEN command.

a) Mode of Operation

The FSK modulator can operate in one of two basic modes of operation. These are single shot or continuous mode. In single shot mode, the FSK modulator will generate the specified data stream and then terminate after the last bit has been sent. In the continuous mode of operation, once the modulator reaches the end of the specified bit pattern, it begins to repeat the same bit pattern over indefinitely. The setting of the FSK modulator's mode effects the execution of the script program. In single-shot mode, once the FSK modulator has started, the script program execution is halted until the bit pattern has been sent. At that time further script commands are processed. In the continuous mode of operation, the script program execution continues to process commands while the FSK modulator is active.

Syntax: FSKGEN MODE (single/continuous)

b) Type of Bit Pattern

The TYPE keyword specifies what type of bit pattern is to be generated by the FSK modulator. This can be selected from one of 5 different possibilities. These are:

MARK	Send Mark Bits Only
SPACE	Send Space Bits Only
ALTERNATE	Alternate Mark and Space Bits
USER	Send a User Defined Bit Pattern
EXTERNAL	External Data Modulation

Syntax: FSKGEN TYPE (type of pattern)

The USER type of bit pattern is defined with the DATA keyword. If the EXTERNAL type of bit pattern is selected, then the state of the FSK modulator depends on the input level at digital Input B (pin 9). If Input B is high, a mark tone will be generated, otherwise a space tone will be generated.

c) User Defined Bit Pattern

For the USER bit pattern, the DATA keyword is used to specify what bit pattern is to be generated. The syntax for the command is.

Syntax: *FSKGEN DATA "text string"*

The text string is used to define the bit pattern at an ASCII, hexadecimal, or binary level. For example, the following text string:

"{ASCII} [fe 8c b5] <01100101>"

Defines a bit pattern that starts with 5 ASCII characters ("A", "S", "C", "I", and "I") starting with 1 start bit and ending in 1 stop bit with the data sent LSB to MSB. This is immediately followed by the hexadecimal bit pattern given by 0xfe, 0x8c, and 0xb5 (MSB to LSB), which is then immediately followed by the binary pattern of 01100101.

The type of brackets used in the text string define what encoding method is used.

{ }	ASCII Characters
[ ]	Hexadecimal Bytes (0 to 9, and a, b, c, d, e, f)
< >	Binary Bits (0 or 1)

Note that "nesting" of data types is not allowed.

d) Specifying the Number Of Bits

If either the MARK, SPACE, or ALTERNATE bit pattern types has been selected, and the FSK modulator mode is single shot, then the BITS keyword is used to specify how many bits should be generated. The following syntax is used to define the number of bits to generate from 1 to 8192.

Syntax: *FSKGEN BITS (number of bits)*

e) Starting or Stopping the FSK Modulator

The FSK modulator is started or stopped with the command lines.

Syntax: *FSKGEN GO*
FSKGEN STOP

If the FSK modulator is in single shot mode, then the STOP command has no purpose, as the script program execution will be halted until the last bit has been sent. Then the FSK modulator will automatically turn off and the script program execution will continue. However, in the continuous mode of operation, the script program will continue to execute statements after the GO command. In this case the STOP command can be used to terminate the FSK modulator.

Note that starting a Caller ID transmission will terminate the FSK modulator, if it is active. Also, once the FSK modulator has been started with the GO command, any changes to its settings will not take effect until the next time it is started.

New Command: WAIT

The WAIT command can be used to insert a programmed delay into the script program. The time delay can range from 0 to 30 seconds, with a resolution of approximately 50 milliseconds. The syntax for this command is.

Syntax: *WAIT (time delay)*

Enhancement to the PAUSE Command:

The PAUSE command is currently used to halt the script program until it is restarted by either pressing the start button (F6), or the F9 key to cause a branch to a specified label. A new option to the PAUSE command allows for the use of auxiliary inputs A or B to control further execution of the script program. The syntax for this modified PAUSE command is as follows.

Syntax: *PAUSE [EXT]*
PAUSE (label) [EXT]

In the first case, with the [EXT] modifier, a high input level at auxiliary input A will cause the script program to continue execution. This has the same effect as pressing the start button or F6. In the second case, where an optional label has been added, a high level at input A will still cause the script execution to continue. However, if input B is high, then the script program will branch to the specified label. This has the same effect as pressing the F9 key. In this manner, Input A and Input B can be used to control the script program execution instead of using the start button (F6 key) and F9 key.

Enhancement to the PRINTSCREEN and PRINTLOG Command:

The PRINTSCREEN and PRINTLOG commands can be used to display the contents of the ACK counter to either the screen or the data log file. The syntax for this command is.

Syntax: *PRINTSCREEN [ACKCOUNTER]*
PRINTLOG [ACKCOUNTER]

7) Other Changes and Improvements

External Data Input for the FSK Modulator

The FSK modulator can be configured to accept an external data stream as its modulation source. This can be useful for evaluating FSK decoders by using external bit error rate testing equipment. By using external bit error rate testers, a very comprehensive suite of tests can be conducted to determine the performance of a FSK demodulator. The external data should be applied to digital Input B on the rear DB9 connector. With a high input level, the mark tone will be generated, while with a low level input, the space tone will be generated. The mark and space levels and

frequencies can be set to any arbitrary value when using the external data input option. To enable this setting, select the “External B Input” bit pattern setting for the FSK modulator in the Tone Generator window. Then press the Start button.

Running a Script Program at Startup

Script or configuration files can be loaded automatically at program startup by specifying them on the command line as follows:

CID1500 s=(script file name and path)
CID1500 c=(config file name and path)

However, a new option allows the script file, or the script file embedded in the configuration file to be loaded and executed upon program startup. This is accomplished by modifying the command line as follows:

CID1500 sr=(script file name and path)
CID1500 cr=(config file name and path)

This feature can be useful for production environments where a testing script or configuration file can be executed automatically upon program startup.

Increase in the Maximum Number of Mark Stuffing Bits

The maximum number of mark stuffing bits has been increased to 150 from 60. This increase accommodates testing to the proposed TIA Caller ID standard.