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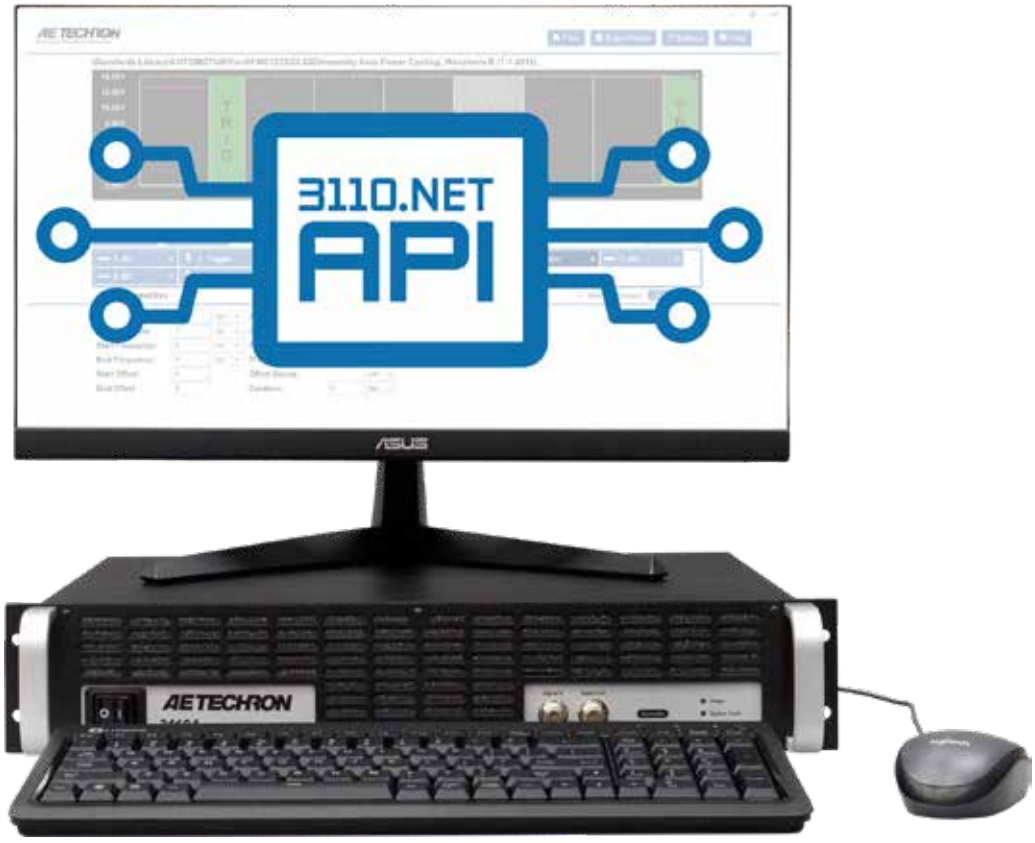

3110.NET API

Remote Control Software Guide

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Three-Year, No-Fault Warranty

SUMMARY OF WARRANTY

AE TECHRON INC., of Elkhart, Indiana (Warrantor) warrants to you, the ORIGINAL COMMERCIAL PURCHASER and ANY SUBSEQUENT OWNER of each NEW **AE TECHRON INC.** ***product, for a period of three (3) years from the date of purchase, by the original purchaser (warranty period) that the product is free of defects in materials and workmanship and will meet or exceed all advertised specifications for such a product. We further warrant the new AE Techron product regardless of the reason for failure, except as excluded in the Warranty.***

ITEMS EXCLUDED FROM WARRANTY

This AE Techron Warranty is in effect only for failure of a new AE Techron product which occurred within the Warranty Period. It does not cover any product which has been damaged because of any intentional misuse, or loss which is covered under any of your insurance contracts. This warranty does not extend to any product on which the serial number has been defaced, altered, or removed. It does not cover damage to loads or any other products or accessories resulting from **AE TECHRON INC.** product failure. It does not cover defects or damage caused by the use of unauthorized modifications, accessories, parts, or service.

WHAT WE WILL DO

We will remedy any defect, regardless of the reason for failure (except as excluded), by repair or replacement, at our sole discretion. Warranty work can only be performed at our authorized service centers or at our factory.

Expenses in remedying the defect will be borne by **AE TECHRON INC.,** including one-way surface freight shipping costs within the United States. (Purchaser must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other customs fees for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

When you notify us or one of our authorized service centers of your need for warranty service, you will receive an authorization to return the product for service. All components must be shipped in a factory pack or equivalent which, if needed, may be obtained from us for a nominal charge. We will take corrective actions and return the product to you within three weeks of the date of receipt of the defective product, or will make available to you a product of equal or better performance on temporary loan until your product can be repaired or replaced and returned to you. If the repairs made by us are not satisfactory, notify us immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES

You are not entitled to recover from us any consequential or incidental damages resulting from any defect in our product. This includes any damage to another product or products resulting from such a defect.

WARRANTY ALTERATIONS

No person has the authority to enlarge, amend, or modify this warranty. The warranty is not extended by the length of time for which you are deprived of the use of this product. Repairs and replacement parts provided under the terms of this warranty shall carry only the unexpired portion of this warranty.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

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There is no warranty that extends beyond the terms hereof. This written warranty is given in lieu of any oral or implied warranties not contained herein. We disclaim all implied warranties, including, without limitation, any warranties of merchantability or fitness for a particular purpose. No action to enforce this Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.
This statement of warranty supersedes any others contained in this manual for AE Techron products.

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Contents

1 3110.NET API

The 3110.NET API Remote Control Software is a drop-in class for users that want to control the 3110 or 3110A remotely. The distribution includes the executable utility program in the \bin\Release folder as well as the source code for the example utility in the 3110A_Remote_Control – Release ver 1.0 folder.

1.1 Disclaimer:

The utility source code is provided as an example to provide a roadmap for consuming the class library. While it is highly functional, it is not intended as production code and not all functions are as smooth as might otherwise be the case.

1.2 Caution:

Changing the LAN EOL character on the 3110 will break the RemoteControlClient in its current form.

1.3 Summary

This document describes the AE Techron.NET project for communication with a single 3110 or 3110A Standards Waveform Generator over a LAN using TCP Sockets. The USB or zip file contains RemoteControlClient.dll Class Library, the source for an example implementation, and the documentation. The AE Techron class is intended as part of a larger integration into the user's control system (constructed by the user).

1.4 Using Recommended setup:

If using a Visual Studio project, copy RemoteControlClient.deps.json, .dll, and .pdb into the project.

- Add a Dependency to RemoteControlClient.dll.
- Add this to the top of the source file to clear up a conflict with System.IO:

```
using Directory = _3110A_Remote_Control.RemoteControlClient.Directory;
```

2 Available Data and Method Calls

Once the class library has been added to a project, these functions are available:

2.1 App. Config File Settings

App.config file contains settings for these values:

```
<_3110A_Remote_Control.Properties.Settings>
    <setting name="ResponseTime" serializeAs="String">
        <value>200</value>
    </setting>
    <setting name="IPaddress" serializeAs="String">
        <value>10.123.8.44</value>
    </setting>
    <setting name="DebugEnabled" serializeAs="String">
        <value>false</value>
    </setting>
</_3110A_Remote_Control.Properties.Settings>
```

Set these up before launching the utility or the RemoteControlClient. The “IPaddress” is the IP address of the 3110.

Responsiveness after initialization is very good. The ResponseTime setting is to allow the 3110 to respond to a request. In testing it was reliable at 150 msec and above but not reliable at 120 msec. Network speed and traffic will affect this value. A static IP is recommended to avoid having to set the IP based on DHCP. Note that flagging the IP as static on the 3110 does not make it static on the network.

Building the file structure from the 3110 should be done at initialization and, in testing, took about 50 seconds to complete.

3 RemoteControlClient Class

The RemoteControlClient class is included in the class library and is the main functionality.

3.1 Public RemoteControlClient

The object is instantiated with this constructor call:
Public RemoteControlClient (string ipAddress, int port = 8182)

- Port 8182 is the default port for the TCP client on the 3110A. The ipAddress is set from the App.config file.

3.2 RootNode

RootNode is a public Property that returns the 3110's root directory node for the files. RootNode is read only.

3.3 ResponseTime

ResponseTime is a public Property that sets/gets the wait time for the 3110 to respond to a request.

3.4 CurrentState

CurrentState is a public Property that returns the current State structure. CurrentState is read only.

3.5 State

The **State** itself is a structure that contains these read only fields:

- **Stopped** – a Boolean that indicates the 3110 player is Stopped.
- **SystemStatus** – a string that is displayed on the center-right of the 3110. It can be IDLE, PAUSED, RUN,
- **Sequence** – a string that indicates the sequence number currently playing.
- **PlayingSegment** – the segment number from the 3110 display
- **SystemOffset** – the value from the 3110 Settings > System Calibration page.
- **SystemGain** – the value from the 3110 Settings > System Calibration page.
- **AmpStatus** – status of an attached amplifier. It returns "Run" if no amplifier is attached.
- **SerialNumber** – the serial number of the 3110.

3.6 LastRequestedDir

The **LastRequestedDir** is a public single-level Directory structure with the data from the last directory requested. Even though this is a public structure, the utility does not access it directly; it is only referenced internally in the RemoteControlClient.

3.7 Directory

The **Directory** structure contains these fields:

- **name** – a string that contains the name of the directory or folder entry.
- **path** – a string that contains the path to the current node.
- **folderType** – a Boolean that indicates whether the current entry is a folder or a file.
- **mounted** – an Android designation that the folder is available. The Network folder is available but shows as unmounted.
- **folders** – the count of folders among the children of the current node.
- **files** – the count of the files among the children of the current node.
- **parent** –
- **parentId** –

NOTE: All of these fields are camel case in the event that autocorrect tries to change them to Pascal case.

3.8 RequestDirList

RequestDirList is a public method that returns the tree contents for the requested pathname. The utility calls it only from the RootNode.

- public List<Directory> RequestDirList(string pathName)

3.9 RequestCurrentState

RequestCurrentState is a public method that requests that information from the 3110 and populates the CurrentState returns the populated structure. Following up the request with the processing of the CurrentState structure is how it is handled.

3.10 Disconnect

Disconnect stops the client communication with the 3110.

4 Overview of Features

4.1 Operation of Display/Information

Ability to report (through communication nodes in the class) the following states or data:

- The connected 3110A serial number
- System status: Idle (paused, stopped, or no test loaded)
- Test playing
- Present segment active
- System gain
- System DC offset
- Name of the loaded test
- Test completed

4.2 Ability to Execute the Following Operations

- Enter IP address of 3110 and connect.
- Stop 3110 test in progress.
- Pause 3110 test in progress. When paused, the 3110 output is to drop to a user selected default voltage and when pause is released test is to resume.
- Start 3110 test (both from paused state and initial start).
- Disconnect from 3110.

4.3 Ability to Read File Structure of 3110

- Load available test file structure.
- As demonstrated in the example program, a test can be selected from within the FilesForm TreeView and then run on the 3110.
- If new file or folder is created on the 3110 the file structure will need to be updated by the application.

4.4 Pause Feature

- When clicked, the function is the same as on the 3110.
- When Play is clicked while Paused, the signal will resume at the beginning of the current segment (the segment that was current when Pause initiated).
- Provide a user selectable default voltage level. When pause is initiated, the system will provide this voltage until pause is ended.

NOTE: To maintain a desired DC voltage on DUT at the termination of a test, we recommend adding the required DC voltage as a last segment, with a trigger set to “True”. This will maintain the DC voltage indefinitely, until triggered off.

5 Function of the Utility

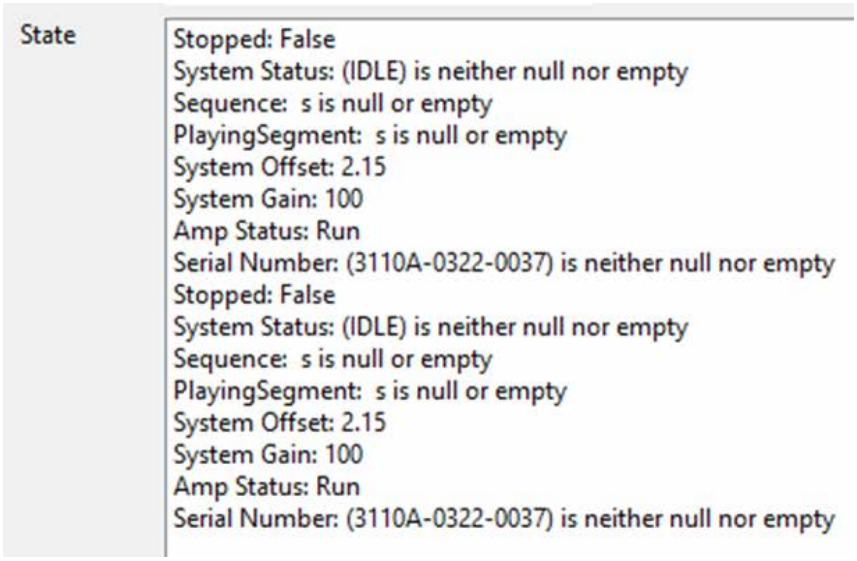
The utility is simply a vehicle to demonstrate the function of the RemoteControlClient and is not intended for daily use. The source code is provided so the user can see how the class is consumed by the utility.

5.1 UI Main Page

As mentioned earlier, the initialization takes about 50 seconds to load the file structure, so please be patient.

5.2 Status Box

The status box in the middle keeps a running list of the System Status returns from the 3110. It is updated when the Update button is pressed.



A closer view of the Status box after initialization and the Update button has been pressed once.

5.3 Play, Pause and Stop Buttons

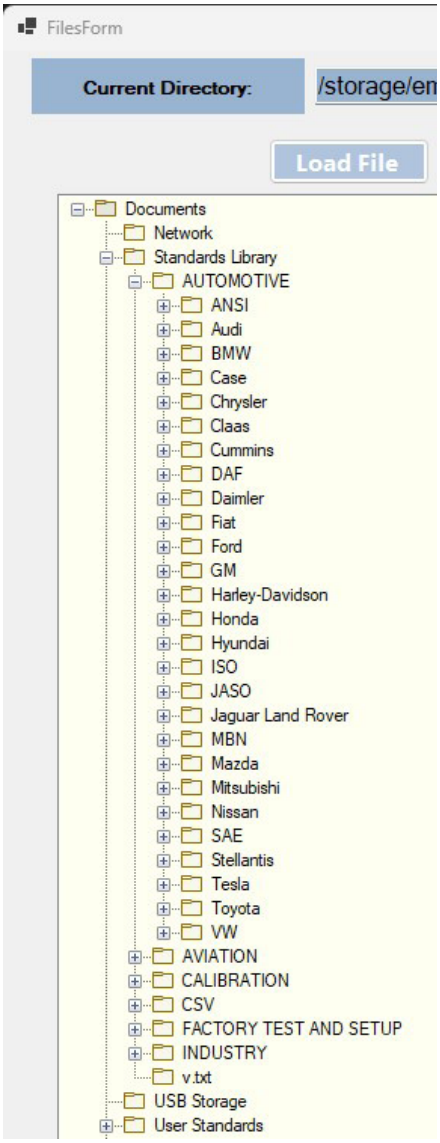
The Play, Pause, and Stop buttons control the function on the 3110. A file must be loaded for them to have any effect.

The “Update file list from the 3110” button reloads the file structure from the 3110 (another 50-second wait) and the button stays highlighted until the process completes.

5.4 FileForm

The FilesForm is activated from the menu strip at the top left corner. The selected file or directory appears at the top of the FilesForm page.

Files > List Files displays the file structure in a TreeView, starting with the root at “Documents.”



Navigation is like any similar application – click the “+” beside a folder to expand it and continue to navigate down to the file that is needed. Select the file with the cursor and then click the “Load File” button to load the file in the 3110. The FilesForm is not a non-modal, so it can remain open and moved out of the way, tiled, or minimized. The display on the 3110 will confirm the file load. Now the Play, Pause, and Stop buttons on the MainForm will function as expected. The buttons function the same as the buttons on the 3110 itself.

To load a different file, simply Stop the player, select the new file, click the “Load File” button, and (back on the MainForm) click Play.