Using the LSA1000 Software Tools

The application program examples contained in this appendix demonstrate the practical use by remote control of the LSA1000 software tools in real-life applications. *Refer to the accompanying Remote Control Manual for the commands.*

Note: Memory allocation and error handling are not shown.

Example 1

Digitized Data Transfer from LSA1000 to PC: In many cases, the LSA1000 may be used solely as a high speed digitizer, for transferring large amount of digitized data to the host PC as fast as possible. The following is an example program for transferring 2 MB of digitized data from LSA1000 to PC with emphasis on speed of transfer.

Requirement

Sample Rate = 1.5GS/s
Capture Time = 50us
Number of Points = 75,000

LSA1000 Settings

Sample Rate = 2GS/s
Time per Div. = 5us
Memory Size = 100K

Program Code

```
IM_MakeConnection("IP:172.25.1.2");

//Initialize the unit
    IM_WriteDevice("CHDR OFF");
    IM_WriteDevice("TDIV 5us");
    IM_WriteDevice("MSIZ 100K");
```

```
IM_WriteDevice("COMB 2");
IM_WriteDevice("COMS C1");
IM_WriteDevice("WFSU NP, 75000, FP, 0");//transfer only
75k points
IM_WriteDevice("CFMT OFF, BYTE, BIN");
IM_WriteDevice("TRLV 0");
IM_WriteDevice("TRSL POS");
IM_WriteDevice("TRSE EDGE, SR, C1");


IM_QueryDevice("C1:INSP? 'PNTS_PER_SCREEN'",
strBuf, sizeof(strBuf));
idxPtr = strchr(rspStr, ':');
sscanf(idxPtr+1, "%d", &BufferSize);


Loop
{
        IM_WriteDevice("ARM; WAIT; C1:WF? DAT1");
        IM_ReadDevice(Buffer, BufferSize);
}

        IM_Disconnect();
```

Example 2

Using Processing Power on LSA1000 Pulse Parameters: While Example 1 shows the LSA1000 as a "pure" high speed digitizer, the on-board processing capability of the LSA1000 can also be used. In fact, the LSA1000 has the same math functions and processing capability as a high-end LeCroy digital oscilloscope. This Example measures pulse widths of the waveforms that were captured by the LSA1000.

Requirement

Sample Rate = 1.5GS/s
Capture Time = 50us
Number of Points = 75,000

LSA1000 Settings

Sample Rate = 2GS/s
Time per Div. = 5us
Memory Size = 100K

Program Code

```
IM_MakeConnection("IP:172.25.1.2");

// Initialize the unit
IM_WriteDevice("CHDR OFF");
IM_WriteDevice("TDIV 5us");
IM_WriteDevice("MSIZ 100K");
IM_WriteDevice("COMB 2");
IM_WriteDevice("COMS C1");
IM_WriteDevice("WFSU NP, 75000, FP, 0");
IM_WriteDevice("CFMT OFF, BYTE, BIN");
IM_WriteDevice("TRLV 0");
IM_WriteDevice("TRSL POS");
IM_WriteDevice("TRSE EDGE, SR, C1");

Loop
{
IM_QueryDevice("ARM; WAIT; C1:PAVA? WID", strBuf,
sizeof(strBuf));
}
IM_Disconnect();
```

Example 3

Using Processing Power for FFT: This commands the LSA1000 to perform FFT (Fast Fourier Transfer) on the captured waveform and transfer FFT result to the host PC.

Requirement

Sample Rate = 1.5GS/s
Capture Time = 50us
Number of Points = 75,000

LSA1000 Settings

Sample Rate = 2GS/s

Time per Div. = 5us
Memory Size = 100K

Program Code

```
        IM_MakeConnection("IP:172.25.1.2");

// Initialize the unit
        IM_WriteDevice("CHDR OFF");
        IM_WriteDevice("TDIV 5us");
        IM_WriteDevice("MSIZ 100K");
        IM_WriteDevice("COMB 2");
        IM_WriteDevice("COMS C1");
        IM_WriteDevice("WFSU NP, 75000, FP, 0");
        IM_WriteDevice("CFMT OFF, BYTE, BIN");
        IM_WriteDevice("TRLV 0");
        IM_WriteDevice("TRSL POS");
        IM_WriteDevice("TRSE EDGE, SR, C1");


// define the math function
        IM_WriteDevice("TA:TRA ON");
        IM_WriteDevice("TA:DEF EQN, 'PS(FFT(C1))', MAXPTS,
        2500, WINDOW, RECT, DCSUP, OFF");

Loop
{
        IM_WriteDevice("ARM; WAIT");

        // loop until math processing completes
        Loop
        {
                IM_QueryDevice("INR?", strBuf, sizeof(strBuf));
                If (strBuf indicates a flag is set)
                        Break;
        }
        IM_QueryDevice("TA:WF? DAT1", Buffer, BufferSize);
```

```
}
        IM_Disconnect();
```

Example 4

Using Processing Power for Averaging: This commands the LSA1000 to perform Averaging on the captured waveform and transfer averaging result to the host PC.

Requirement

Sample Rate = 1.5GS/s
Capture Time = 50us
Number of Points = 75,000

LSA1000 Settings

Sample Rate = 2GS/s
Time per Div. = 5us
Memory Size = 100K

Program Code

```
        IM_MakeConnection("IP:172.25.1.2");

// Initialize the unit
        IM_WriteDevice("CHDR OFF");
        IM_WriteDevice("TDIV 5us");
        IM_WriteDevice("MSIZ 100K");
        IM_WriteDevice("COMB 2");
        IM_WriteDevice("COMS C1");
        IM_WriteDevice("WFSU NP, 75000, FP, 0");
        IM_WriteDevice("CFMT OFF, BYTE, BIN");
        IM_WriteDevice("TRLV 0");
        IM_WriteDevice("TRSL POS");
        IM_WriteDevice("TRSE EDGE, SR, C1");


// define the math function
        IM_WriteDevice("TA:TRA ON; TB:TRA ON");
        IM_WriteDevice("TA:DEF EQN, 'AVGS(C1)',  SWEEPS,
25
```

```
        IM_WriteDevice("TB:DEF EQN, 'PS(FFT(TA))', MAXPTS,
        2500, WINDOW, RECT, DCSUP, OFF");

Loop
{
        // loop until math processing completes on trace A
        Loop
        {
                IM_WriteDevice("ARM; WAIT");
                IM_QueryDevice("INR?", strBuf, sizeof(strBuf));
                If (strBuf indicates a flag is set)
                        Break;
        }
        // loop until math processing completes on trace B
        Loop
        {
                IM_QueryDevice("INR?", strBuf, sizeof(strBuf));
                If (strBuf indicates a flag is set)
                        Break;
        }
        IM_QueryDevice("TB:WF? DAT1", Buffer, BufferSize);
}
        IM_Disconnect();
```

D Appendix D: Program Examples