NATIONAL RADIO ASTRONOMY OBSERVATORY
CHARLOTTESVILLE, VIRGINIA

ELECTRONICS DIVISION TECHNICAL NOTE NO. 180

Title: HOW TO OBTAIN PLOTTED OUTPUT NOW THAT PEN PLOTTERS
ARE OBSOLETE

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Date: NOVEMBER 10, 1997

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HOW TO OBTAIN PLOTTED OUTPUT NOW THAT PEN PLOTTERS ARE OBSOLETE

N. Bailey

November 10, 1997

Many new, modern instruments provide printed output over an IEEE-488 bus using HPGL language. The instruments expect to dump their output to pen plotters. This is a problem as pen plotters are no longer made.[1] In fact, HP no longer sells supplies for them.[2] Apparently, the HP printing and imaging division found that providing printers or plotters comparable with measuring instruments was not profitable. They appear to concentrate on the PC market. HP does not make any printer with an IEEE-488 interface. Most have Centronics parallel port interfaces, though some are available with RS232 serial port interfaces. Furthermore, printers have very short product cycles. New models are added frequently, and current models become obsolete just as fast. This makes it difficult to determine which printers (if any) are compatible with a given test instrument.

There are two issues to consider when trying to add a "plotter" to a test instrument: (1) Is there a black box which can convert from IEEE-488 to Centronics parallel? (2) Will the printer understand the graphics language used by the instrument? In this note, I will list two IEEE-488 interfaces that work well with instrumentation, provide information on choosing printers and describe a solution used to provide hard-copy output from a HP 85106.

I.   IEEE-488 to Centronics Conversion

Intelligent Interfaces, Inc.[3] has several lines of IEEE-488 to Centronics converters. These units not only provide an interface, but also preface data with a command that will switch PCL5 printers into their HPGL mode. I have experience with two of these. The Intelligent Interfaces MicroPrint 45H will convert the parallel interface of the printer to the IEEE-488 interface of the instrument and will pipe commands given by the instrument to the printer. It does not provide a response to any queries sent by the instrument. If your instrument does not expect responses from a plotter, this is the smallest, least expensive choice.

If your instrument does send queries to the plotter, the MicroPlot 50 is required. It also provides one-way IEEE-488-to-parallel conversion, but it will respond to queries, too. The instrument will act as if it were connected to a pen plotter.

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[1] Of course, you can always buy used plotters, but you may have difficulty buying pens.

[2] Supplies for HP plotters may be obtained from Imaging Products, 12696 Rockhaven Road, Chesterland, OH 44026, (440) 285-2813. Koh-I-Noor also makes pens for HP plotters. There may be other vendors.

[3] P. O. Box 1486, Stone Mountain, GA 30086-1486 (1-800-842-0888).

II.   Printers

Some instruments will provide output to only a plotter, while other instruments (including HP 8510C and 85106C network analyzers) will output data to a printer or a plotter. If given a choice, it is quicker to use a plotter. Plotters use HPGL, a vector graphics language that essentially describes movements of a pen. Printer languages are raster languages that need to send more data per page. The microprocessor in the instrument has to provide that data. The instrument will spend less time providing hard copies if it can dump HPGL to a modern printer. Either a laser printer or an inkjet printer can be used, so long as it understands HPGL.

Printers that use HP's PCL5 or PCL6 will understand HPGL, as HPGL/2 is a subset of PCL5.[4] PCL5 printers need to receive a control character before they can process HPGL/2 commands. The instrument will not provide that control character, but the interface converters mentioned in the previous section will.

According to the HP Printer and Imaging call-in center, these are the only HP printers currently available that use PCL5: LaserJet 4V, LaserJet 5Si, LaserJet 6L and DeskJet 1600. According to the HP website, the LaserJet 5, the Color LaserJet 5 and the LaserJet 6Lse use PCL5 or PCL6. The DeskJet 1600 is the only color inkjet printer made by HP that uses PCL5. I have not investigated other vendors.

III.   Timing of Various Converter/Printer Combinations

A DeskJet 1600C was attached to a HP 85106C network analyzer using MicroPrint 45H and MicroPlot 50. The DeskJet 1600C was connected as a 300 DPI printer when the MicroPrint 45H was used. When the MicroPlot 50 was used, it was possible to connect the DeskJet 1600C as a plotter. It took 6 minutes and 45 seconds for the network analyzer to resume measurement once a color landscape print was requested. It took only 20 seconds for the analyzer to resume measurement if a full-page plot was requested. For comparison, it takes 4 minutes for a HP 8510C network analyzer to resume measurement if a full-page plot is requested from a HP 7475A plotter connected directly to the analyzer.

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[4]PCL6 is an "enhancement" of PCL5.