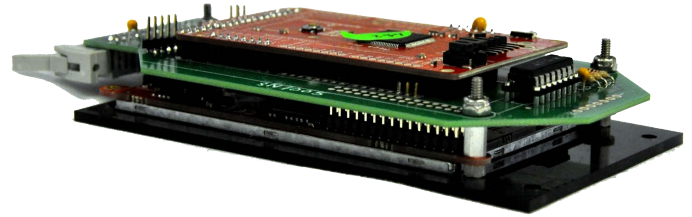
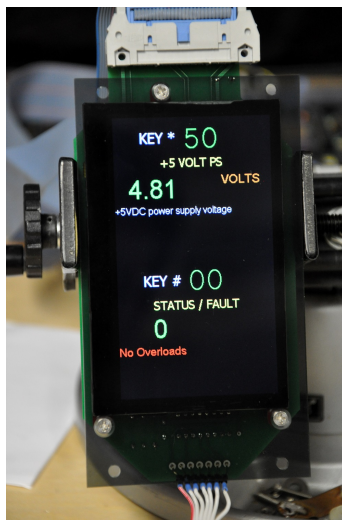


# New Life for the SX

by Michael Patton



## CLEAR NEED FOR A RETROFIT

The Harris SX transmitter series, built in 1 kW, 2.5 kW, and 5 kW versions from 1983-1990, was quite popular, and Harris sold hundreds of them, both here and abroad. SX transmitters continue to be found in backup and even primary service at many stations all over the world. However, there has been one issue in particular which has dogged every SX series transmitter ever made: the premature failure of the digital alphanumeric displays in the built-in diagnostic display.

Today, most displays in SX transmitters are missing many segments, even whole digits. These displays (TIL308, made by Texas Instruments) have proven to be terribly unreliable, not just in this application but anywhere they were used. Texas Instruments walked away from them, declaring them obsolete many years ago, and there never was a second-source supplier.

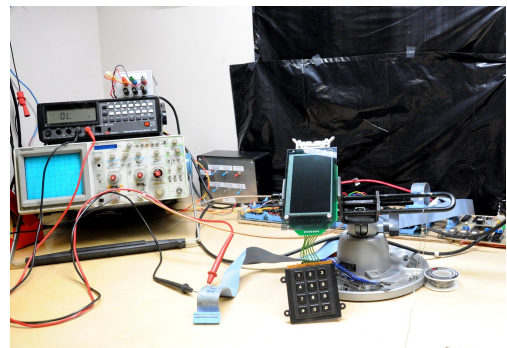


They have been essentially "unobtainium" for several years now. Occasionally, a few can be found on the surplus (read: quality unknown) market, but even then, their cost is truly frightening: just one digit (and there are 16 in the display) can cost from \$80 to \$250!

## NOT THE BEST DESIGN

Even when the original display worked well, using it was cumbersome at best; after all, it was '80s technology. The display only showed a 2-digit code for each channel/reading; this required a user to have a chart of channel numbers in order to have any idea which reading/code was for what parameter, or what the normal readings should be. Yet another chart was needed to decode the meaning of the bizarrely cryptic overload codes. And, of course, the charts were always the first thing to be lost out of the service manual.

Unlike most other transmitters, on the SX series there are no "idiot lights" to show failures; this display is the only window into the internal workings and health of the unit. Without a fully working display it is extremely difficult to troubleshoot these transmitters. The only alternative to a functional diagnostic display is for the engineer working on the transmitter to defeat the interlocks and attempt to make direct measurements of internal voltages and waveforms, while the transmitter is actually running. This is an extremely dangerous practice under any circumstances, but especially so since most engineers work alone these days. I believe that the failure of this display is the biggest impediment to keeping one of these transmitters running.



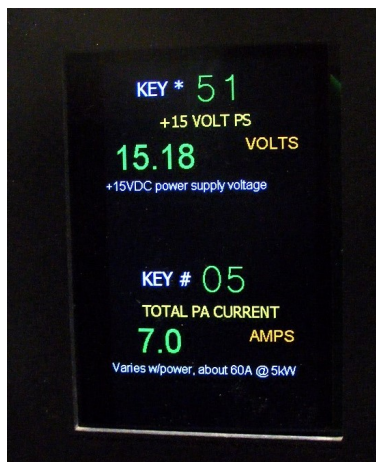
## DESIGNING & BUILDING A SOLUTION

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**The MP&A SX Display**

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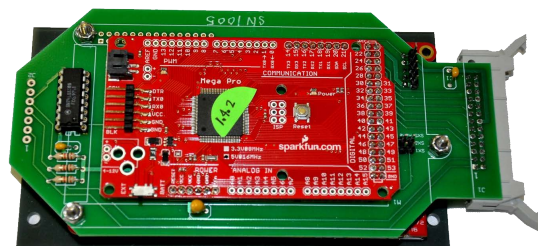
As the original SX displays began to fail, factory support was discontinued, and parts stocks disappeared, we at Michael Patton & Associates saw a clear need for a better solution.



We looked at several types of liquid-crystal and LED displays, and finally settled on a very nice color LCD graphics display that is both large and bright, driven by a micro-controller from the Arduino family.

## The MP&A SX Retrofit Display

Once we worked out how to interface the data bus which fed the old display into a modern micro-controller, we set about writing the code that would bring it all to life. Many long hours and empty pizza boxes later, we are very happy with the product we created – and I feel sure that you will be, too.



## BETTER THAN THE ORIGINAL

Our retrofit display has been designed to solve the problems with the original displays, as well as to provide greatly enhanced functionality and reliability. For example, to protect the LCD display unit from potential burn-in problems, the display is programmed to turn itself off after a few minutes with no keystrokes, but wakes back up with any new key press. Like the original, our display allows you to monitor two different parameters at the same time, and to easily change readings on either. Unlike the original, our new display lists the selected channel's name in plain text, along with the normal reading for that channel.

Unlike the original, our new display lists the selected channel's name in plain text, along with the normal reading for that channel. Troubleshooting calls and routine logging of parameters are both now much easier without display. You get a clear indication of what is happening inside the transmitter, while not compromising safety at all.

#### EASY INSTALL RETROFIT CARD

**Transmitter Type**  
**HARRIS SX-1**

Installing your new display is simple: The display mounts onto the old unit's mounting studs and plugs right into the ribbon cable, and the old keyboard can be re-used. (If your keyboard has also failed, we have new ones, too). A simple jumper setting will tell the display what type of transmitter it's in (1, 2.5, or 5 kW), so our unit will show what the normal readings should be for your transmitter.

**MP&A now has in stock our retrofit color LCD display units for immediate shipment. Call or email us to secure your order.**



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