Radar Speed Displays:
Options for Display Format and Power

by Joseph Wise

In early 1997, the personnel at Precision Solar Controls introduced me to their radar speed display unit. They had taken one of their LED numeric displays and the radar from a police radar trailer and converted it into a stand-alone unit for fixed installations. At that time, they were producing few radar speed display units.

Times change and so do the markets. Presently, there is a host of units to choose from for fixed applications. Do a Web search for “radar speed displays” and you'll get many hits. Today, radar speed displays come in many sizes and formats. Most feature an LED display, K-band radar and a processor board to interpret the radar information and display the speed of the vehicle in the field of view.

Some units feature an advanced form of flip-disc technology coupled with LEDs for a hybrid display. Many include options such as offender/violator alerts which cause the displays to flash the digits, background or both, to inform drivers they are speeding. Some will even scroll or display the message “Slow” or “Slow Now” for the offender/violator warning. Units can be purchased either as a nominal 115/230VAC or 12VDC and in some cases, 24VDC.

Since these products are DC compatible, they are well suited for solar power to create a stand-alone traffic safety device.

Recently I had four of the units, currently available on the market, in my shop for evaluation. They include the RU2 FAST 250, Precision Solar Speed Monitor, IDC VSC-1520, and the 3M Driver Feedback sign. The units are not all the same size as this review was unplanned. Please keep this in mind when looking at the photos accompanying this article.

There are other radar display units available but I have not had the opportunity to obtain the units for evaluation. Information for contacting the manufacturers of the four units discussed is available at the end of this article.

Figure 1 - from left to right: RU2 FAST 250, IDC VSC-1520 and 3M 1VL Driver Feedback display. Test conditions: moderately overcast, 4-6 p.m. in August; viewed approx 35 ft away; 10 ft off center of IDC unit. All units face west.

RU2 FAST 250/350

RU2 manufactures radar speed trailers, fixed display and custom traffic trailers. The smaller of the two units manufactured by RU2, a FAST 250, was provided for the text. Its physical features are in Table 1, and is pictured on the left in Figure 1.

The unit uses an approach only K-band radar head to sense speed. The display board is comprised of a flat black background with discrete LEDs mounted to the board. It features a gray tinted GE sign-quality non-glare Lexan window over the display board so you are viewing the LED display directly. This allows a wider viewing angle for this display over some of the others

tested.

It is also a fairly lightweight unit with room for up to one group 31 battery and a charge controller within the display case for light duty cycle applications which don't have power available. A violator alert feature is an option on this unit and the settings are done in the field using a key switch and a push button at the bottom of the unit.

The alert speed is set during boot-up of the unit in 5mph increments. Its appearance is the alternate flashing of the character fields for a few seconds after which it returns to displaying the actual speed of the vehicle. Units are also available in KPH format for use outside the United States. The unit can be solar powered and has a midrange power draw for the unit tested.

RU2 indicated at the time of writing that it was developing a method to reduce the power draw significantly. The FAST 250 comes with either saddle mounts for a 3.5 - 4.5-inch O.D. pole or .25-inch aluminum plate band mounts for poles more than 5 inches in diameter. A 6 inch x 24 inch “Your Speed” sign is included with each unit and can be affixed using the tool and security hardware included. RU2 does offer a larger unit with an 18 inch character board for greater visibility.

Information Display Company VSC-1520
IDC in Portland, Oregon got its start in radar speed displays by building portable displays for police use.

The physical features of the unit are listed in Table 1 and it's in the center of Figure 1. This unit also uses an LED display for its digits.

The unit is comprised of a small electronic/ display module mounted within a rectangular aluminum sign with the words “Your Speed” above the LED display to boost viewing contrast. The unit features an angled, black masked Lexan cover over the LED display.

The black mask is designed to channel or limit the view so visibility is limited to the driver's field of view. The face is angled to eliminate glare from approaching vehicles.

The standard unit also includes a violator alert mode which causes the display to flash when the preset threshold is reached. The unit also includes a blanking feature (the unit goes blank) if an upper speed threshold is exceeded.

Figure 2 - left to right: PSC Traffic Monitor Speed Display; IDC VSC-1520; 3M 1VL Driver Feedback and RU2 FAST 250 (blank) display. Test conditions: clear and sunny 7-9 a.m. in August; viewed approx. 40 ft away ; centered to the group. All units are facing east.

Another option, Active Speed Limit configuration, allows the unit to display and flash the posted speed limit instead of the vehicle's speed. All settings are made inside the face using jumpers on headers. Increments of 1 mph can be set and a contact closure output is available which is

energized during a violator alert. Access to the jumpers requires the unit be opened in the field.

The VSC incorporates a unique method for dealing with projectiles from vandals: a character board which flexes up to 2.5 inches as the Lexan face pushes in on it from a projectile impact. The unit also features a universal mount for banding onto a variety of pole sizes. The unit is lightweight at around 40 pounds and easy to handle.

The IDC VSC-1520 had a power draw between that of the RU2 and PSC units. While we had an AC unit for the test, the DC version of the unit shown had an average power daytime display draw of 1.1A: 0.34A in standby and 0.42A at night which makes this unit about average for power draw for an LED radar display. IDC also offers a larger unit for greater visibility as listed in Table 1.

Precision Solar Controls Traffic Monitor
PSC manufactures a variety of LED powered highway equipment including variable message boards; arrow boards; radar trailers and LED traffic signals. The physical features of the unit are in Table 1 and it is pictured on the left in Figure 2.

As with all PSC products, this unit features an LED display in which the number of LED elements is minimized by lenses in front of the pixel. The unit comes equipped with two character boards which display an 18-inch high digit.

The unit has an optional violator alert feature which causes the background of the digits to flash if a vehicle is driven over the speed limit. The violator alert speed threshold is set using a pair of digits with up/down buttons. The user sets the speed threshold by dialing in the alert speed value in 1mph increments. This feature is fairly easy to retrofit into an existing unit with an upgrade kit.

This is a rugged unit encased in a highly vandal-resistant enclosure. Both the radar and the display are located behind a heavy clear polycarbonate window and frame assembly. The window is angled back from the front of the display to minimize glare to oncoming drivers.

The PSC Traffic Monitor was the heaviest of the units tested, weighing in at 120 pounds so plan on installation being a two-man job. PSC has also included mounting framework and U-Bolts for attaching the display to a 4.5-inch O.D. pole. It is easily modified to fit other sized poles with minor field modifications. This display has the lowest power draw of all the units tested. With a full display, the typical daytime draw is approximately 9W. The night draw is about 4W.

3M Driver Feedback Model 1VL DFBDCSL
3M manufactures everything from Post-it notes to adhesives for raised pavement markers to the very popular fluorescent yellow-green sheeting now available for caution signs.

A 3M division located in eastern Washington has designed and manufactured shuttered type signs which have been adapted into the display shown on the right in Figure 1. For those not familiar with this technology, a pixel is turned over to exhibit either a black face or, in this case, a yellow face. Using this technology with the 3M high visibility fluorescent yellow sheeting material results in a high contrast alphanumeric display.

The display uses a current pulse to generate a magnetic field at each pixel to turn it to the necessary display. In addition, when a pixel is in its yellow display mode, there is an amber LED which pokes out of it to enhance the display for the approaching driver. There are two sizes to choose from. The one shown is the smallest unit which features a 12-inch character.

The electronics for the unit are housed in a shallow enclosure at the rear of the sign which also takes up most of the rear of the unit. 3M has thoughtfully included four threaded inserts at the rear of the sign which make it easy to attach to perforated square tubing.

It should be noted that the smaller unit was designed to be powered by a 24VDC source from its inception due to performance issues. It can be ordered as either a 12 or 24 VDC unit but 24VDC operation is suggested. This unit can also be used in school flasher systems yet because it can maintain a display without power, requires a shut-down sequence to blank the display prior to removing power from the unit.

The larger unit was designed for operation at 12VDC from its inception making it more power efficient and easier to use in solar powered applications. 3M engineering has indicated the unit tested is one of their older models. Newer models will feature a clear Lexan window with a protective overlay which provides improved contrast in the lighting situations given in Figures 1 and 2.

As previously stated, all units are available in DC versions facilitating the use of solar power in most situations. Many people call us to find out what it would take to run them on solar power and my answer is three important points of information are necessary for a properly designed solar-powered system:
1. Where is the system going to be located?
2. How many hours per day will it run in each mode of operation?
3. What is the electrical load (power it consumes) in each mode of operation?

All of the above information must be gathered and verified or the solar-powered system will either be undersized or grossly oversized, resulting in wasted money. (For more details “Wireless Traffic Control Solutions” *IMSA Journal* July/August 2002).

Your solar provider should also furnish a sizing report to substantiate any offering or you will be unable to obtain warranty service on an undersized system.

For a fair estimate of what it would take to run these units on a solar-powered system, we prepared sizing reports for each display using the following assumptions:

Location: Boulder, CO
Load: Radar speed display
Duty Cycle: Display mode 80% of daytime hours, 20% rest. Night display mode 40% of night hours, 60% rest.

Working under these assumptions we have the following results:

RU2 FAST 250
This unit requires an 85W solar array and two 95Ah batteries to provide adequate back up. Estimated retail pricing for this package would be approximately $2,100 in addition to the cost of the display unit.

IDC VSC-1520
This unit requires a 75W solar array and two 95Ah batteries to provide adequate back up. Estimated retail pricing for this package would be approximately $1,900 in addition to the cost of the display unit.

PSC Traffic Monitor
This unit requires a 55W solar array and a 115Ah battery to provide adequate back up. Estimated retail pricing for this package would be approximately $1,700 in addition to the cost of the display unit.

3M Driver Feedback
This unit requires a 150W solar array and three 115Ah batteries to provide adequate back up. Estimated retail pricing for this package would be approximately $2,800 in addition to the cost of the display unit.

Please note: the prices listed are average values which could be expected through

distribution channels around the country. These prices may or may not reflect actual costs for a particular project and are presented for relative cost comparisons to power these displays.

Some of the displays presented include timed activation options and all can be configured to work with an external contact closure from a time switch. Figure 3 shows a typical installation using dual 8-inch amber DC LED lamps from Precision Solar and an RU2 FAST 250 unit in the City of Goodyear, Arizona.

Figure 3 - Speed display with LED school beacon system, Goodyear, AZ

In summary, there are a variety of radar speed displays to choose from. All have the common goal of informing motorists of their speed with the intent of getting them to police themselves; all do so in a similar manner. If a vehicle is traveling over the speed limit, each speed display provides feedback to the driver by flashing the display in various ways or providing an actual text message.

As LED and display technology moves forward, manufacturing costs, features and pricing should improve. The addition of solar power to the units will allow for an overall reduction in system deployment costs and minimize the time to get systems up and running as opposed to connection to the AC power grid.

My thanks to RU2, 3M, PSC and IDC staff members for their input on this article. For further information on the equipment discussed, please go to the following Web sites:

Information Display Company
www.informationdisplay.com
Contact: Gary Odell

Precision Solar Corporation
www.precisionsolar.com
Contact: David Wilfong

RU2 Systems
www.ru2systems.com
Contact: Steve Sigler

3M
http://3m.com/safety
Contact: Dan Skites

IMSA member Joe Wise, B.S.E.E. is CEO and founder of Solar Traffic Controls, LLC, (www.solar-traffic-controls.com), an engineering firm which designs and manufactures solar-powered traffic control products. You can reach him by e-mail at jawise@earthlink.net or by phone at 480-449-0222 in Tempe, AZ (MST)

Model Number	Mfr	Dimensions/inches	Wt/Lbs	Display Type	Digit Size	Voltage
FAST 250	RU2	26" X20.5" X 9"	25	LED	12"	12VDC,90-250VAC
FAST 350	RU2	28.5" X 40" X 3"	45	LED	18"	12VDC,120VAC
VSC-1520	IDC	30" X 42" X 6"	31	LED	15"	12VDC, 120/240VAC
VSC-1820F	IDC	36" X 48"X 6"	38	LED	18"	12VDC, 120/240VAC
TRAFFIC MONITOR	PSC	33" X 34" 12"	120	LED	18"	12VDC,120VAC
1VL DRIVER FEEDBACK	3M	24" X 30" X 5"	30	SHUTTER/LED	12"	24VDC, 120/240VAC
2VL DRIVER FEEDBACK	3M	36" X 48"X6"	80	SHUTTER/LED	18"	12VDC, 120/240VAC