

Data Acquisition Rates of the New GSSI Model SIR-30 GPR Controller

Ground penetrating radar (GPR) has been used in high-speed applications for several decades. Technological advances in each generation of GPR units have led to increasingly faster data collection speeds. This translates to higher density data (i.e. scans per meter or scans per foot) and greater data collection speed. Consequently, GPR data can be obtained more safely and efficiently for transportation infrastructure related applications such as roads, bridges, and railroads. GSSI's newest generation control unit, the SIR-30, offers unsurpassed scanning rates and most importantly, these scanning rates are independent of the number of antennas used to obtain data.

This is an important distinction. Many GPR manufacturers specify the maximum transmit rate of a GPR control unit as the sum of the transmit rates of all the channels. This implies a scan density that cannot actually be obtained with more than 1 channel at a time.

The SIR-30 has a maximum, channel-independent, transmit rate of up to 730 KHz†. At this transmit rate, one 2GHz horn antenna* can obtain data at a scan spacing of 4 cm (1.5 in) while traveling at 134 km/hr (83 miles/hr). And, because the transmit rate is independent of the number of channels, the same 4 cm (1.5 in) scan density can be obtained on each antenna whether collecting with 1, 2, 3, or 4 antennas at the same time.

Consequently, with the SIR-30, four 2 GHz antennas* can be mounted side-by-side and each antenna can obtain 256 sample/scan data at a 2 cm (0.8 inch) spacing at 99 Km/hour (61 miles/hr) or 198Km/Hr (102 miles/hr) at a spacing of 4cm. This amounts to a total of about 5500 scans per second.

Scan Spacing per Channel cm (in)	Maximum Speed Km/Hr (MPH)	Samples/Scan	Channel Transmit Rate (KHz)	Typical Applications	Number of Antennas
12 (4.8)	598 (371)	256	730†	Railroad	1-4
12 (4.8)	402 (250)	512	730†	Railroad	1-4
6 (2.4)	201 (125)	512	730†	Railroad	1-4
6 (2.4)	153 (95)	512	500†	Railroad	1-4
12 (4.8)	307 (190)	512	500†	Railroad	1-4
4 (1.5)	134 (83)	512	730†	Highway	1-4
4 (1.5)	102 (63)	512	500†	Highway	1-4
2.5 (1.0)	100 (62)	256	500†	Bridge	1-4
2.5 (1.0)	100 (62)	256	500†	Bridge	1-4

*Newer antenna models, †Requires 2 connected SIR-30s, ‡In North America transmit rates cannot exceed 100 KHz per channel.

