

the printed substrate and then rinse the substrate so as to remove the soluble ink. This also removes the sputtered layer above the soluble ink. If the fiducial marks are not soluble in the solvent, the location of the pattern in the sputtered layer can be known, even if that pattern is invisible, or has such low contrast with the substrate that it is effectively invisible.

5 In one aspect, the disclosure resides a method of providing a substrate having a predetermined pattern thereon comprising: providing a printing roll, a first ink dispenser, and a second ink dispenser; the first ink dispenser and the second ink dispenser positioned to dispense a first ink and a second ink onto the printing roll in separate first and second zones respectively; dispensing the first ink soluble in a selected solvent into the first zone with the
10 first ink dispenser and dispensing the second ink that is non-soluble in the selected solvent into the second zone with the second ink dispenser; advancing the substrate against the printing roll printing fiducial marks onto the substrate with the second ink, while simultaneously printing the predetermined pattern onto the substrate with the first ink; sputtering a layer of conductive material onto the substrate over the predetermined pattern;
15 and rinsing the substrate with the selected solvent removing the first ink and the predetermined pattern while leaving the fiducial marks on the substrate.

 In another aspect, the disclosure resides in a method of providing a substrate having a predetermined pattern thereon comprising: providing a printing roll, a first ink dispenser, and a second ink dispenser, the first ink dispenser and the second ink dispenser positioned to
20 dispense a first and a second ink onto the printing roll in separate first and second zones respectively; dispensing a low contrast ink into the first zone and a visible ink into the second zone; advancing the substrate against the printing roll to print fiducial marks onto the substrate with the visible ink, while simultaneously printing a first predetermined pattern onto the substrate with the low-contrast ink; subsequently placing a secondary pattern in
25 registration with the first predetermined pattern on the substrate using the fiducial marks as a guide. In some convenient embodiments, the secondary predetermined pattern is placed in registration with the first predetermined pattern by a second printing operation. In another embodiment, the secondary predetermined pattern is placed in registration with the first predetermined pattern by laminating an additional layer to the substrate.

30 In this application, “contrast” means the degree of dissimilarity of a measured quantity such as luminance of two areas, expressed as a number computed by a specified formula. This definition comes from ASTM Standard E284, “Standard Terminology of Appearance”. In the broadest sense a “low contrast ink” is any ink that is insufficiently optically distinguishable from the substrate to allow a secondary operation on the substrate to