3. PIONEER 10 ABSOLUTE CALIBRATION

The effective wavelength (λ eff) is defined as the average over wavelength weighted by the channel spectral transmission, T (λ). The equivalent bandpass ($\Delta\lambda$) is defined by $\Delta\lambda T_{max} = \int T(\lambda)d\lambda$. The brightnesses listed in the BST (BPc, RPc, BSc, RSc) are in EDR or relative units. To convert them to $S_{10}(V)$'s - the equivalent number of 10th visual magnitude stars of solar color per square degree - they must be multiplied by the calibration constants (C) given below:

Channel	λ eff	$\Delta\lambda$	C
BP	4392A	829A	0.619
RP	6390A	936A	0.648
BS	4363A	818A	0.697
RS	6508A	1038A	0.761

The total blue (red) brightness in $S_{10}(V)$ units is the sum of the two blue (red) channels:

TOTAL BLUE BRIGHTNESS IN $S_{10}(V)$ UNITS = 0.619 BPc + 0.697 BSc,

TOTAL RED BRIGHTNESS IN $S_{10}(V)$ UNITS = 0.648 RPc + 0.761 RSc.

The $S_{10}(V)$ unit contains the solar spectral distribution; i.e., a source of solar color has the same $S_{10}(V)$ value at all wavelengths. The conversion to absolute units therefore depends on the effective wavelength of each Pioneer channel. The conversion of $S_{10}(V)$ units to absolute units for each channel of Pioneer 11 is listed below:

Channel	Conversion
Bp	1 $S_{10}(V)$ = 1.17 x 10^{-9} ergs $cm^{-2}s^{-1}sr^{-1}A^{-1}$
Rp	1 $S_{10}(V)$ = 1.08 x 10^{-9} ergs $cm^{-2}s^{-1}sr^{-1}A^{-1}$
Bs	1 $S_{10}(V)$ = 1.15 x 10^{-9} ergs $cm^{-2}s^{-1}sr^{-1}A^{-1}$
Rs	1 $S_{10}(V)$ = 1.06 x 10^{-9} ergs $cm^{-2}s^{-1}sr^{-1}A^{-1}$