HIGHLAND TECHNOLOGY

Model J744

Optical-Electrical Converter

Technical Manual

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1 Introduction

This is the technical manual for the Highland Model J744 compact analog optical-to-electrical converter.

Features of the J744 include:

- ST or FC fiberoptic input
- DC coupled, 1 GHz analog bandwidth
- Nominal 1 V / mW gain
- Two available wavelength ranges
- Compact 2.5" x 3.3" enclosure

2 Specifications

FUNCTION	DC-coupled analog optical-electrical converter
INPUT	850 nm versions accept 62.5/125 µm multimode fiber 1310/1550nm versions accept 9/125 µm singlemode fiber Optional ST or FC connectors Linear from 0 to 2 mW optical input
OPTICAL WAVELENGTH	GaAs version: 700- 875 nm InGaAs version: 1100 - 1650 nm
PROPAGATION DELAY	Light in to electrical out < 850 ps
OUTPUT	DC coupled, SMA connector 50 ohm source impedance 1 V/mW nominal sensitivity at peak wavelength, Hi-Z load 0.5 V/mW nom into 50 ohms
BANDWIDTH	DC to > 1GHz
RISETIME	< 350 ps
JITTER	< 12 ps RMS, J720 + J744
OPERATING TEMPERATURE	0 to 60°C
CALIBRATION INTERVAL	1 year
POWER IN	+12 VDC, 135mA nominal. J12 wall-plug universal-input power supply included
CONNECTORS	ST or FC optical input receptacles Gold plated SMA analog output jack 2.1mm X 5.5mm barrel power connector
INDICATOR	LED: Green power
PACKAGING	Aluminum enclosure, 3.3" (L) x 2.5" (W) x 1.0" (H) J732 mounting flange included

3 Overview

The J744 includes a fast fiber-coupled photodiode, a transimpedance amplifier, an output amplifier, and power supplies.

Output is nominally 1 volt per milliwatt of optical input when driving a high impedance load, such as a hi-Z oscilloscope. Output is 0.5 V/mW into a 50 ohm load.

Bandwidth will be limited when driving a hi-impedance oscilloscope by the scope's typical input capacitance. Full bandwidth requires that the J744 drive a very fast 50 ohm scope through a short, low-loss 50 ohm coaxial cable.

Two versions are available with peak wavelength response at 850 or 1500 nm.

The J744-1 and -11 versions use a GaAs photodiode and are typically used with 850 nm sources. Please refer to

Figure 1 below for the GaAs photodiode's nominal wavelength curve:

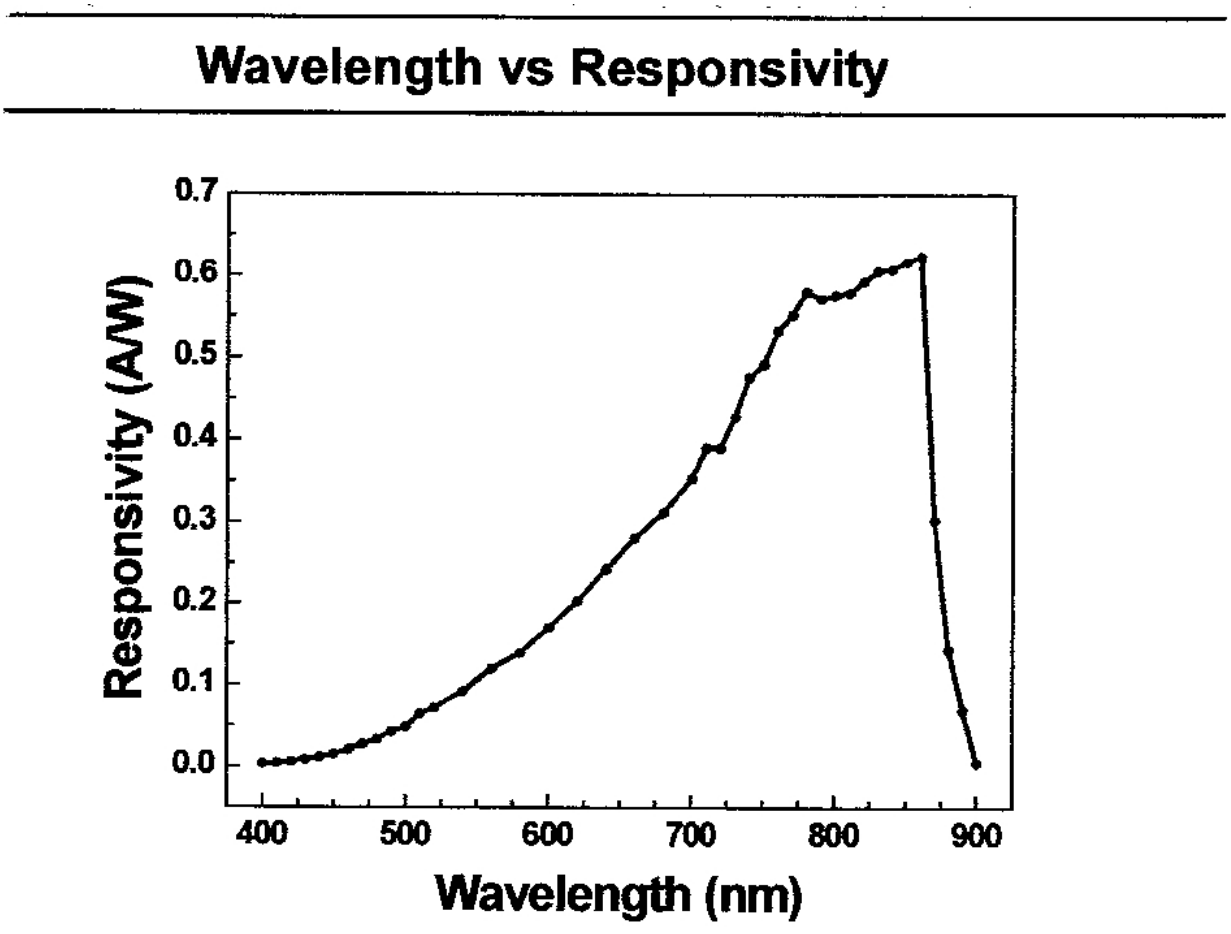

Figure 1: 850 nm GaAs detector typical response

The J744-3 and -13 versions use an InGaAs photodiode and are typically used with 1310 and 1550 nm sources. Please refer to Figure 2 below for the InGaAs photodiode's nominal wavelength curve:

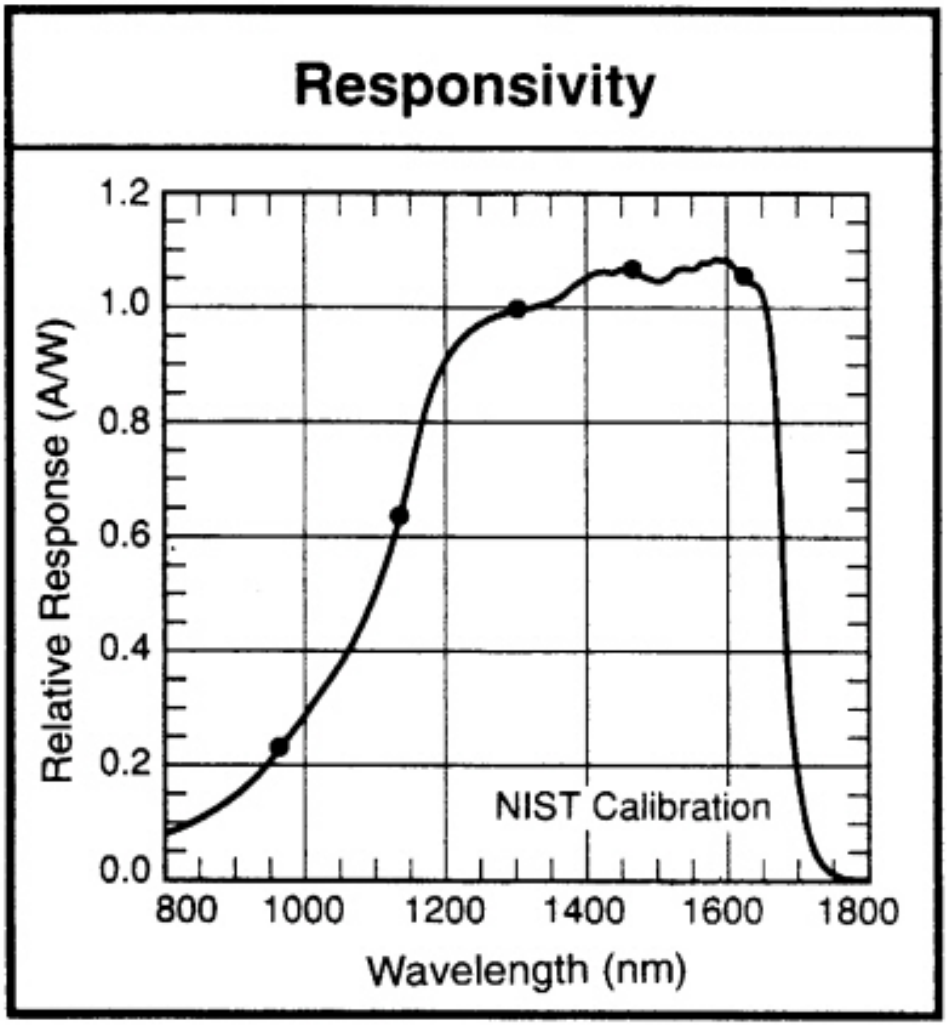

Figure 2: 1310/1550 nm InGaAs detector typical response

4 Waveforms

Figure 3 and Figure 4 below show typical O/E performance, showing both optical and electrical signals. Optical signals were produced using an 850nm multimode10Gb/s SFP module for GaAs versions. A 1310nm singlemode 10Gb/s SFP was used for InGaAs versions. The reference photodetector was a Tektronix SD-43 8GHz O/E. All electrical signals were resolved using a Tektronix SD-24 20GHz sampling head and 11801B scope.

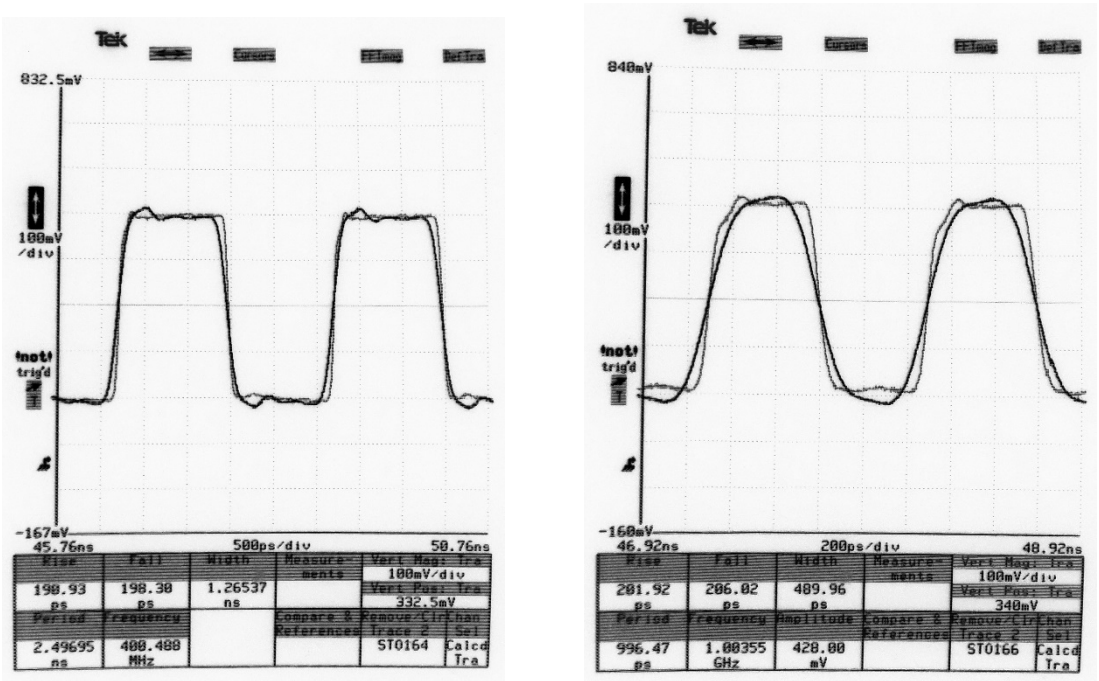

Figure 3: J744-1 and -11 GaAs versions with 850nm optical source at 400MHz and 1GHz

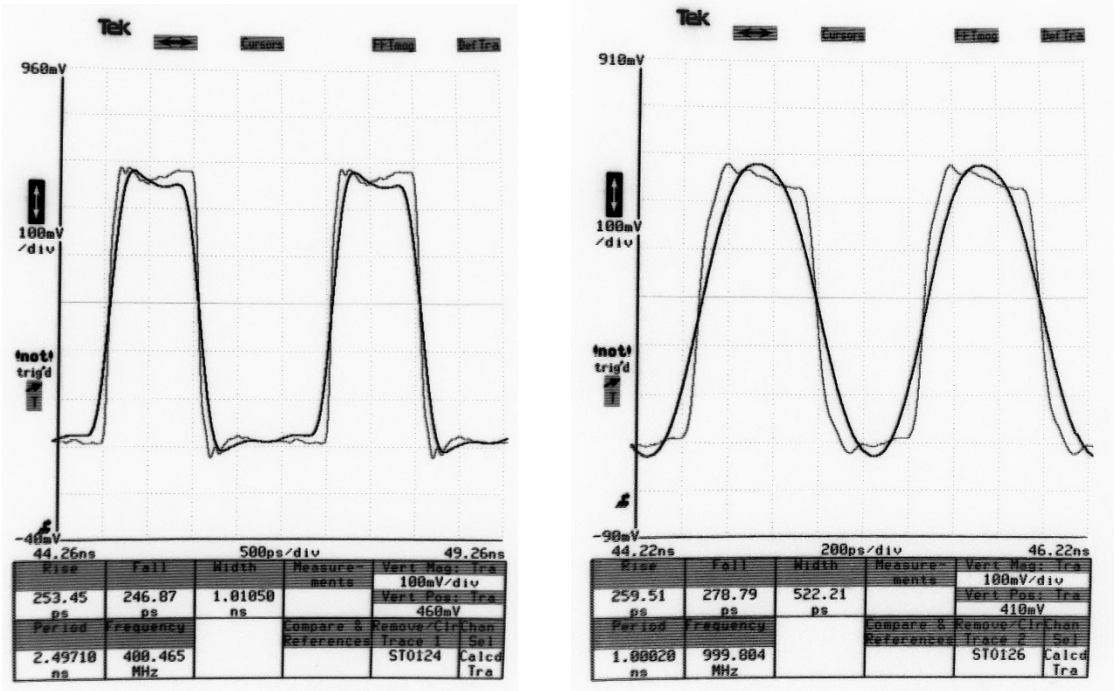

Figure 4: J744-3 and -13 InGaAs versions with 1310nm optical source at 400MHz and 1GHz

5 Versions

Standard versions of the J744 include:

Model	Part Number	Nom Wavelength	Fiber Connector	Photodiode
J744-1	21A744-1	850nm	ST	GaAs
J744-11	21A744-11		FC	
J744-3	21A744-3	1310nm/1550nm	ST	InGaAs
J744-13	21A744-13		FC	

6 Customization

Consult factory for information about additional custom versions.

7 Hardware Revision History

Revision A January 2020

Initial PCB release

8 Accessories

J12-1: 12 volt power supply (included with purchase)

J44-1: 3′ SMA to SMA cable

J59-1: 3′ ST to ST fiberoptic cable (multi mode simplex)

J60-1: 3' FC to FC fiberoptic cable (single mode simplex)

J61-1: 3′ ST to ST fiberoptic cable (single mode simplex)

J732-1: mounting flange (included with purchase)