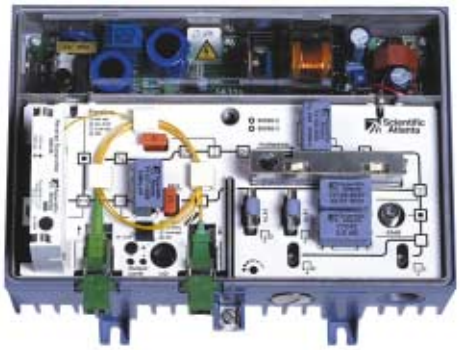
Optoelectronics

Compact Model 90090
Fiber Deep Node
862 MHz with 42/54 MHz Split

Description



The Scientific-Atlanta® Compact Model 90090 Fiber Deep Node is a small, low-cost, 110V AC powered node that addresses the divergent needs of today's broadband networks. This node is primarily intended for indoor use, but can be used outdoors in an appropriate enclosure. The node shares common plug-in accessories with other amplifiers in the Compact family, and utilizes KS 5/8" RF ports (using provided adapters). In the reverse path, both 1310 nm DFB and FP optical transmitters are available.

The forward amplifier portion of the node provides a single, high-level, forward RF output that can be split to provide two outputs by using an optional plug-in splitter or directional coupler. Forward RF setup is simple – using a push-button variable attenuator for RF level, and a plug-in interstage equalizer for RF tilt. A directional coupler RF test point is provided at the forward output and reverse transmitter input, allowing for accurate signal level measurement. Surge protection is provided for the RF ports, and all Compact products are equipped with a double gasket that includes an RF and a water-dust gasket.

The Compact Fiber Deep Node can also be configured with a Scientific-Atlanta status monitoring transponder. The transponder, in conjunction with Transmission Network Control System (TNCS), enables remote monitoring of critical node related parameters, and remote control of the built-in 3-state reverse switch for ingress isolation. Additionally, a Handheld Programmer Terminal is offered, which allows for local control of configurable node parameters and verification of node status.

Features

- Compact space-saving design
- High-level output
- GaAsFET technology for superior performance
- Plug-in DFB & FP reverse optical transmitters
- Optional status monitoring and control for enhanced reliability
- Built-in 3-state reverse switch (on/off/-6 dB)

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TNCS Software and Features

Scientific Atlanta's Transmission Network Control System (TNCS) is a comprehensive Windows-based element management system that provides centralized end-to-end monitoring and control of broadband transmission networks. TNCS is a mixture of software and hardware components used to monitor and control the status of headend, transmission and distribution segments of the network. Signal processing and transmission (located in the headends and hubs) as well as optical nodes, power supplies and amplifiers are all monitored and controlled with TNCS.

TNCS and the Compact Nodes: The Compact Transponder

The TNCS is described in the TNCS Basic Design Guide - please refer to the data sheet catalogue, part number A541394. The key product for monitoring and control of the Compact 90090 node is the Compact Transponder type 91051. The Compact transponder is a plug-in module designed to fit in the Compact node's available transponder space, and it can be snapped into place without interrupting service. No special mounting kits or cables are required and all test points will remain fully accessible at all times. The forward and reverse communications frequencies of the transponder are fully frequency agile.

Specifications

Compact Transponder Type 91051

Alarm levels for output levels, power supply DC voltage and AC input voltages are set in the TNCS software.

Frequency

transmit, frequency agile, 50 kHz step	5 - 65 MHz
receive, frequency agile, 50 kHz step	45 - 174 MHz
Monitor frequency	transponder receive frequency
Transmitter bandwidth, FSK mod.	400 kHz

Levels

transmit, adj. in 2 dB steps	+24 to +50 dBmV
receive	-25 to +20 dBmV
receive level, recommended	10 dB below video carrier levels

TNCS Monitorable Parameters

power supply DC voltage
optical input power
output level
reverse switch state
temperature
advanced reverse transmitter parameters

TNCS Controllable Parameters

output level, offset from initial level
reverse transmitter on/off
3-state reverse switch 0, -6 dB, off
gain settings of reverse transmitter type 9008x
quieting tone settings of reverse transmitter type 9008x

Note:

Handheld Programmer Terminal (optional) allows local monitoring and control of the above parameters. For more information see "Handheld Programmer Terminal" data sheet part number A541401.

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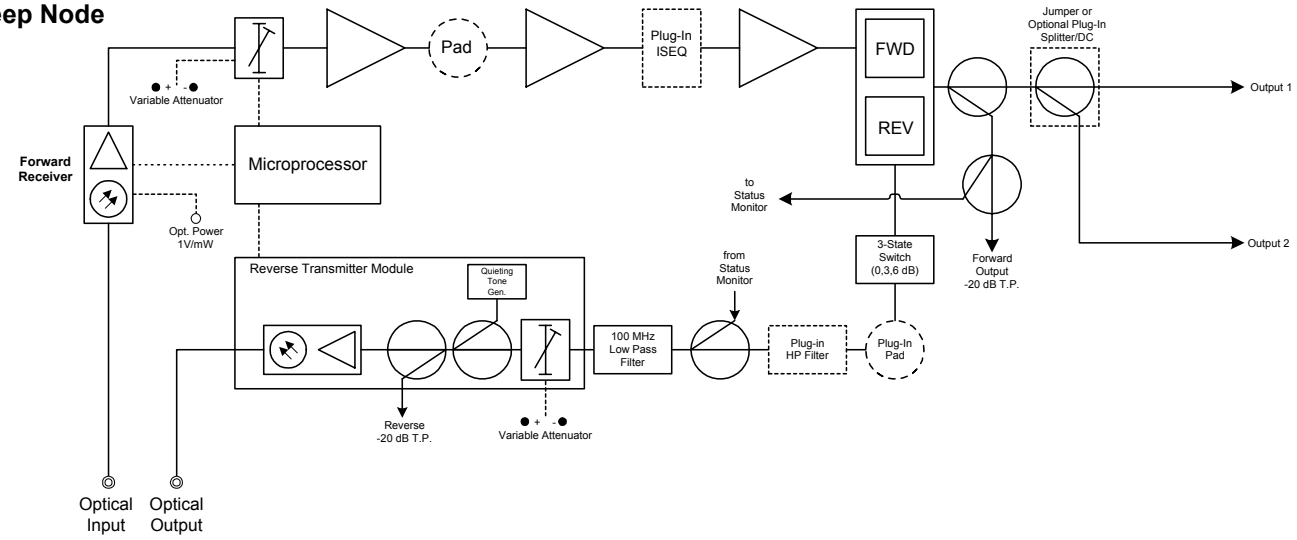
Block Diagram

90090 Node

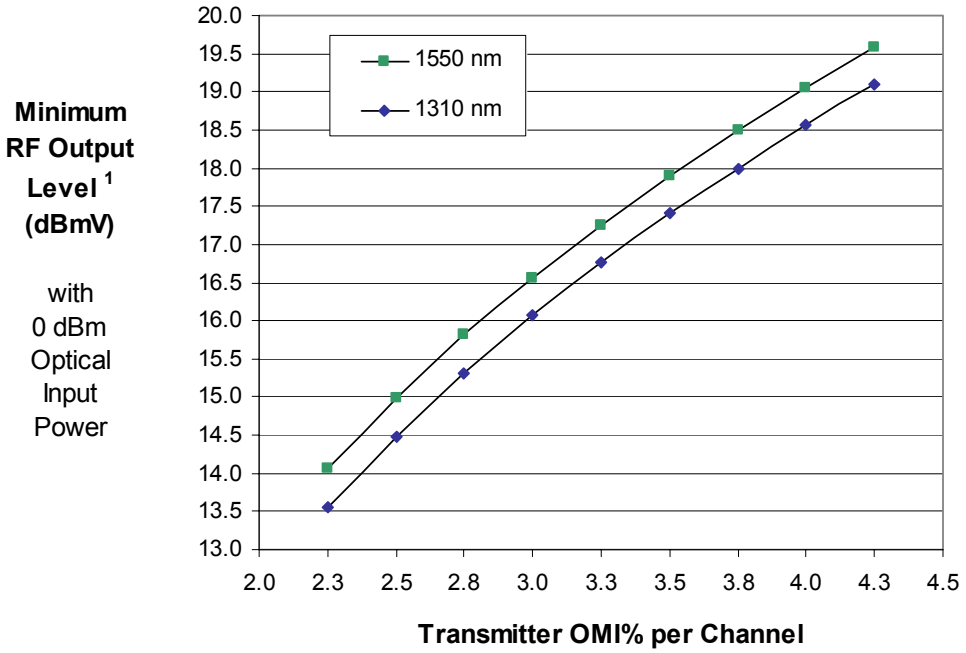
Compact Fiber Deep Node



Forward Optical Section Specifications

Optical Section - Forward Receiver Module	Units	Optical RX	Notes
Wavelength	nm	1310 and 1550	
Optical Input Range	dBm mW	-5 to +1 0.3 to 1.3	
Pass Band	MHz	45-862 MHz	
Optical Input Test Point (± 10%)	V DC	1V/mW	

Receiver RF Output Level Vs Transmitter OMI



Notes for Optical Section Specifications:

1. Minimum Optical Rx RF output level for the stated transmitter percent OMI/ch. (Optical Modulation Index per channel), with receiver optical input power of 0 dBm. To determine Rx RF output levels at other optical input power, add (or subtract) 2 dB in RF level for each 1 dB increase (or decrease) in receiver optical input power. The Rx RF output level shown is referenced to the output of the Rx's variable RF attenuator, with attenuator set to minimum attenuation (0 dB). While not directly measurable, the Rx RF output level predicted from the graph can be used to accurately predict achievable station RF output levels, as well as the C/N contribution for the launch amplifier section that follows the Rx.

For reverse optical transmitter and link performance, see the "Analog Reverse Optical Transmitters for Compact Nodes" data sheet.

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Specifications

General Station Performance	Units	Forward	Reverse	Notes
Pass Band	MHz	54-862	5-42	
Return Loss	dB	16	16	
RF Test Points (± 0.75 dB)	dB	20	20	

Forward Launch Amplifier Performance		Units	With 9 dB I/S EQ & 6 dB I/S Pad	Notes
Amplifier Type		---	GaAsFET	
Operational Gain (minimum)		dB	37.5	2
Variable Attenuator Range		dB	0 to 13	
Frequency Response		dB	± 1	3
Internal Tilt (± 1 dB)		dB	+9	3
Noise Figure @ 55 MHz		dB	8	10
Noise Figure @ 862 MHz		dB	8	10
Reference Output Level @:	862 MHz	dBmV	48	
	750 MHz		46.7	
	650 MHz		45.5	
	550 MHz		44.5	
	55 MHz		39	
Reference Output Tilt (55-862 MHz)		dB	9	1
78 NTSC Channels (CW) with digital				4
Composite Triple Beat		dB	73	8
Cross Modulation		dB	68	5,8
Composite Second Order (high side)		dB	66	8
94 NTSC Channels (CW) with digital				7
Composite Triple Beat		dB	70	8
Cross Modulation		dB	65	5,8
Composite Second Order (high side)		dB	63	8

Reverse Station Performance	Units		Notes
Frequency Response	dB	± 1	9
Internal Tilt (± 0.5 dB)	dB	0	9
Insertion Loss	dB	4	6

Notes:

1. Reference output tilt is specified as “Linear” tilt (as opposed to “cable” tilt).
2. Launch amplifier gain from RF output of forward optical receiver’s variable RF attenuator to station RF output port, with 9 dB ISEQ, 6 dB interstage pad, variable attenuator set to minimum attenuation (0 dB), and jumper in RF output jumper/splitter/coupler location.
3. Frequency response and internal tilt specified is “optical to electrical” from forward Rx input to station output, with 9 dB ISEQ, 6 dB interstage pad, variable attenuator set to minimum attenuation (0 dB), and jumper in RF output jumper/splitter/coupler location. ISEQ value equals tilt produced in dB.
4. 78 CW NTSC channels loaded from 55 to 550 MHz. Digital refers to 550-862 MHz loading with QAM carriers at -6 dB levels relative to analog video carrier levels.
5. X-mod (@ 15.75 kHz) specified using 100% synchronous modulation and frequency selective measurement device.
6. From station reverse input port to the RF input of the optical transmitter module, with 0 dB reverse input pad and jumper in RF output jumper/splitter/coupler location.
7. 94 CW NTSC channels loaded from 55 to 650 MHz. Digital refers to 650-862 MHz loading with QAM carriers at -6 dB levels relative to analog video carrier levels.
8. Station output performance can be determined by combining optic link performance and launch amplifier performance. Stated distortion performance is for launch amplifier section operated at reference output levels and tilt, configured as specified.
9. Frequency response and internal tilt specified is “electrical to optical” from reverse station input to reverse Tx output, with 0 dB reverse input pad, and jumper in RF output jumper/splitter/coupler location.
10. Launch amplifier noise figure at RF output of forward optical receiver’s variable RF attenuator, with 9 dB ISEQ and 6 dB interstage pad.

Unless otherwise noted, the above specifications reflect typical performance at stated reference levels in the recommended operating configuration(s). Unless otherwise noted, specifications are based on measurements made in accordance with NCTA Recommended Practices for Measurements on Cable Television Systems using standard frequency assignments and are referenced to 68°F (20°C).

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Specifications, continued

Station Delay Characteristics			
Forward (Chrominance to Luminance Delay)		**Reverse (Group Delay in 1.5 MHz bandwidth)**	
Frequency (MHz)	**Delay (ns)**	**Frequency (MHz)**	**Delay (ns)**
55.25 - 58.83	13	5.0 - 6.5	20
61.25 - 64.83	5	6.5 - 8.0	10
67.25 - 70.83	3	8.0 - 9.5	6
77.25 - 80.83	2	37.5 - 39.0	6
		39.0 - 40.5	7
		40.5 - 42.0	9

Electrical	**Units**	
AC input voltage range	V AC	90 - 146
Power Consumption Station with launch amplifier & Rx only 1310 nm Optical Transmitter - FP 1310 nm Optical Transmitter – DFB Status Monitoring Transponder	Watts	 20.5 2.5 3.0 1.3

Environmental	
Operating Temperature Range	+5 to +140°F -15 to +60°C
Mechanical	
Housing Dimensions	7.3 in. L x 5.7 in. H x 3.7 in. D 185 mm L x 145 mm H x 95 mm D
Weight	7.0 lbs.
Compliance	
Emissions Safety	FCC, EU FCC, EU, UL
Surge Protection	2 kV Combination Wave (ANSI/IEEE C62.41-1991)

Ordering Information

862 MHz Node	Part Number
Compact Node Model 90090 with 115 V AC Powering	A90090.101

*The following **Required Components** for Model 90090 must be ordered separately:*

Required Components	Part Number
Bulkhead Mating Adaptors (1 required for each optical connection, forward & reverse) – SC/APC to FC/APC – SC/APC to SC/APC	 A90540.1058 A90540.1088
42/54 Diplex Filter (2 required)	A75126.104254
Interstage Equalizer (1 required) chose from: – Plug-In Interstage EQ (3 dB) – Plug-In Interstage EQ (6 dB) – Plug-In Interstage EQ (9 dB)	 A74100.10803 A74100.10806 A74100.10809
Output Link (1 required) chose from: – Jumper (for 1 output) – 2-way Splitter# 77041 – DC-6 Directional Coupler # 77042 – DC-10 Directional Coupler # 77043 – DC-14 Directional Coupler # 77044	 A74069.10 A77041.10 A77042.10 A77043.10 A77044.10
Plug-in Pads (attenuators) - Available in 1 dB steps from 0 to 20 dB – 1 required for reverse activation – 1 required for forward interstage attenuator location (6 dB recommended)	A77140.0000 (0 dB) sequentially thru A77140.0020 (20 dB)

*The following **Optional Accessories** for Model 90090 may be ordered separately:*

Optional Accessories	Part Number
1310 nm FP Optical Transmitter with SC/APC connector (order bulkhead mating adaptor separately)	A90080.10
1310 nm DFB Optical Transmitter with SC/APC connector (order bulkhead mating adaptor separately)	A90083.101310
Passive Reverse Module	A74069.10
Test Point Adapter	A71004
KS Entry Port Adapter (PG-11 to 5/8" KS) *(1 entry port adaptor supplied with amplifier module)*	A70865
Compact Transponder	A91051.11
Handheld Programmer Terminal	A91200.10

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