



ACT AT5000 1310 nm F3CT Optical Transmitter

Quick Reference Guide

Revision C

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ACT Document Number: ACT AT51 F3CT Transmitter

Quick Reference Guide Revision C

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This document is produced to assist professional and properly trained personnel with installation and maintenance issues for the product. The capabilities, system requirements and/or compatibility with third-party products described herein are subject to change without notice.

For more information, contact ACT: support@ascentcomtec.com



Revision History

Revision	Date	Reason for Change
Α	03/18/2019	Draft
В	03/18/2019	Initial release
С	11/05/2024	Update F3CT related content



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Precautions



Exposure to class 1M laser radiation is possible. Access should be restricted to trained personnel only. Do not view exposed fiber or connector ends when handling optical equipment.

- Ensure adequate cooling and ventilation as specified.
- The installation and operation manual should be read and understood before units are put into use.
- Always replace protective caps on optical connectors when not in use.
- The typical connectors fitted are SC/APC 8°. Note: 8° angle polished connectors must be used.

Cleaning

Use only a damp cloth for cleaning the front panel. Use a soft dry cloth to clean the top of the unit.

Do not use spray cleaner of any kind.

Grounding

The Optical Transmitter should have good grounding with grounding resistance < 4 Ω .

According to the international standard, 220V plug in adopts tri-wire rule and the middle wire is the grounding wire.

Before connecting circuit, please use proper electric wire (#20AWG and more) to connect the grounding screw and the grounding frame. When use DC input power supply, the equipment chassis must be grounded.

Overloading

Overloading wall outlets and extension cords can result in a risk of fire or electric shock.

Use approved electrical cords.

Damage requiring service

Unplug unit and refer servicing only to Ascent Communication Technology qualified service personnel.

Servicing

Do not attempt to service this unit yourself. Refer all servicing only to Ascent Communication Technology qualified service personnel.



1 Introduction

1.1 Overview

AT5000 1RU 1310 Forward Transmitter offers a flexible, 1RU, high performance platform for high quality forward path CATV video and data services distribution, especially for the sub headend and hubs in CATV networks. Together with ACT 1RU AT5000 ARQR return receiver provides an ideal standalone MDU solution in traditional HFC network and also high density FTTX networks to bring back the data signal from business and subscriber home premises.

AT5000 1RU 1310 Direct Mod forward transmitter is designed with a high performance 1310nm DFB laser transmitter module and ideal for both broadcast and narrowcast application in one pizza box platform. AT5000 F3CT can provide a wide range of optical output power to deliver both analog and digital signals. Advanced pre-distortion circuitry achieves superior CSO and CTB performance. Good link performance enables DOCSIS 3.0 downstream bonding on HFC architectures.

AT5000 F3CT forward transmitter is equipped with intuitive front panel LCD display to make operator's life easier. The optical transmitter is packaged in a self-contained 19" sub-rack of 1 RU with universal mains power supply and SNMP management.

1.2 Features

- High performance distributed feedback (DFB) laser with pre-distortion circuit
- Suitable for CTAV sub headend or hub standalone application
- Bandwidth 47 MHz to 1218 MHz
- Automatic/manual gain control (AGC/MGC)
- Single input for both broadband and narrowband signal
- RF input test point
- Short circuit protection
- Dual redundant hot-swappable AC or DC power supplies
- Front-panel LCD for local monitoring of transmitter status
- Local or remote monitoring and configuration
- SNMP/HTTP monitoring, management and control.

1.3 Specifications

AT5000 Direct Mod 1310 nm Single Forward Transmitter, F3CT

Items	Unit	Index Min.	Тур.	Max.	Remarks
Operating Wavelength Range	nm	1300	1310	1320	
No. of Output Ports			1		
Output Power per Port Optical Return Loss	dBm dB	2 50		36	2mW interval
Fiber Connector		SC/APC			FC/APC、LC/APC
Operating Bandwidth Input Level Flatness	MHz dBμV dB	47 75 -0.75 -1 0	80	1218 85 +0.75 +1 0	AGC 47 to 1002MHz 1002 to 1218MHz
Return Loss Input Impedance	dB Ω	16	75	11.0	47 to 1218MHz
RF connector No. of Test Channels		F Metric/Imperial PAL-D/59CH(NTSC/80CH)		CH)	Specified by user
CNR	dB	51.0			Tx to Rx
CIB CSO	dB dB	60.0			Rx -1dBm
Network Management Interface		SNMP,WEB	supported	ł	
Power Supply	V	90 -72		265 -36	AC DC
Power Consumption	W			20	Dual Power Supply, 1+1 standby
Operating Temp	°C	-5		+65	Auto case temp control
Storage Temp	°C	-40		+85	
Operating Relative Humidity	%	5		95	
Dimension	mm	370×483×4	4		D、W、H
Weight	Kg	4.1			



1.4 Models and Options

AT5000 F3CT Series	Description
AT-51-F3CT-DM-08-SC-AC2	AT5000 1310nm F3CT Direct Mod TX 1RU, 8dBm output, 1218MHz, SC/APC, Dual AC Power
AT-51-F3CT-DM-10-SC-AC2	AT5000 1310nm F3CT Direct Mod TX 1RU, 10dBm output, 1218MHZ, SC/APC, Dual AC Power
AT-51-F3CT-DM-12-SC-AC2	AT5000 1310nm F3CT Direct Mod TX 1RU, 12dBm output, 1218MHz, SC/APC, Dual AC Power
AT-51-F3CT-DM-13-SC-AC2	AT5000 1310nm F3CT Direct Mod TX 1RU, 13dBm output, 1218MHz, SC/APC, Dual AC Power
AT-51-F3CT-DM-14-SC-AC2	AT5000 1310nm F3CT Direct Mod TX 1RU, 14dBm output, 1218MHz, SC/APC, Dual AC Power
AT-51-F3CT-DM-15-SC-AC2	AT5000 1310nm F3CT Direct Mod TX 1RU, 15dBm output, 1218MHz, SC/APC, Dual AC Power



2 Introduction

2.1 Preparation before installation

- 1. Please examine the machine to see if there is distinct
- 2. Please examine if the accessories is complete and the quality cards is here. If not, pls contact sales or dealer.

2.2 Installation

Solution

- 1. Please keep a space about 4.5cm between machines for ventilation.
- 2. Please make sure: the socket works very well and well grounded.

The impedance $\leq 4\Omega$; 220V power with three cables, the middle one should connected to the ground. Incorrect grounding may hurt the device or influence the quality of signal.

- 3. Please make sure the key is turned to OFF before the power supply connected.
- 4. Please keep the interface of the fiber clean before connecting the fiber. The connector could choose FC/APC or SC/APC.

1 		3, 4, 5, 6, 7	8 9, 10, 11	2 12 1
•		O STATUS O LASER O RF O POWER	AT5000 DMOD OPTICAL TRANSMITTER	OFF RF TEST
T	Port	Item	Description	1
	1	Mounting Points	Holes for securing unit to rack3	
	2	LASER ON/OFF	Key switch for laser activation	
	3	Status	Status indicator GREEN – Status is normal	
	4	LASER	RED – Status temperature is too low or to Laser indicator GREEN – Output power is normal	oo high
	5	RF	RF indicator GREEN – Normal operation	
	6, 7	PWR1/PWR2 (Optional)	RED – RF input is too low or too high Power 1 / Power 2 indicators GREEN – Two-way switch power supply is YELLOW – One-way power supply is work RED – Abnormal status	s working ing
	8	VFD/LED	VFD/LED display for satellite optical trans	mitter parameters such
	9, 10	KEYPAD	Keypad used to scroll through menu item	s on transmitter display
	11	ENT	Enter button	
	12	RF TEST	Input level test (-20 dBm)	
s Provider j	for FTTx, RFoG,	and HFC	www.ascentcomtec.com	Page 9 of 27

2.3 Front Panel Instructions

2.4 Rear Panel Instructions



Port	Item	Description
1	FAN	Intelligent fan, begins to run when the chassis temperature reaches 32 °C to 35 °C (set by
2	RF INPUT	RF signal input
3	CONSOLE	Console for computer network management
4	ETHERNET	Ethernet port, compliant with CNMP standard interface
5,6	PS1/PS2	Power supply 2 outlet
7	OPT OUT	Optical Output
8	Grounding port	For Grounding



Product appearance may vary with model options.

Note



3 Technical Description

3.1 Overview



3.2 Physical Description

The unit is housed in a 19" rack, 1 RU height. Status indicators and control keys are located on the front panel along with an RF monitor port. The front panel provides an LCD display for comprehensive status information and user interface. The rear panel contains the optical interconnects, power, and data interface connectors.

The RF test port on the front panel is -20 dB from the modulating signal level. This is just after the internal AGC functional block. This signal is constant when the AGC circuit is functioning normally. Refer to the specification for typical levels. The output impedance of this port is 75 Ω , with an F-type connector.

The rear panel also contains the two optical ports, which are typically SC/APC bulkhead connectors.

The power interface, is a standard 3-prong line cord, with hot, neutral, and chassis ground. The metal chassis of the transmitter is tied to ground.

3.3 AGC Operation

The AT51-F3CT will be in AGC mode (Automatic Gain Control) when first powered on. To change it to MGC mode (Manual Gain Control), refer to **Section 5.3**.



4 Software Description - Operation

4.1 Web Management

Web server is built in SNMP module. Users can directly view the basic operating parameters and network parameters of the device through the web browser. Popular web browsers include IE of Microsoft, Chrome of Google, Firefox of Mozilla, Opera of software ASA's, etc. The built-in web server of SNMP supports these popular browsers very well. The following diagrams are illustrated by opera browser.

1. Please find the IP address of the device in the LCD panel menu. The default IP address is

192.168.0.22. Set the IP address of the computer to the same network segment as the device, find the "network" icon on the desktop of windows system, select the icon, right-click the mouse, and select "properties" in the pop-up menu.

Network	Open
	Map network drive Disconnect network drive
	Create shortcut Delete
	Properties

Step 1: Open local Area Connection setting:

🕞 - 😫 🕨 Control Panel 🛛	Network and Internet Network and Sharing Center + 47 Search Control Pane	il .	
Control Panel Home	View your basic network information and set up connections		
Change adapter settings	see full map		
Change advanced sharing	ADMIN-PC Unidentified network Internet		
settings	(This computer)		
	View your active networks Connect or disconnect		
	Public network Connections: I Local Area Connection		
	Change your networking settings		
	Set up a new connection or network		
	Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.		
	Connect to a network		
	Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.		
	Choose homegroup and sharing options		
	Access files and printers located on other network computers, or change sharing settings.		
Casalas	Troubleshoot problems		
HomeGroup	Diagnose and repair network problems, or get troubleshooting information.		
Internet Ontions			
incense options			

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Step 2: Set Properties

General				
Connection				
IPv4 Connectivity:			Internet	
IPv6 Connectivity:		No I	nternet access	
Media State:			Enabled	
Duration:			00:20:39	
Speed:			100.0 Mbps	
Details				
Activity				
	Sent —	-	 Received 	
Bytes:	4,344,304	Ì	100,897,055	
Properties	🕃 Disable	Diagnose	2	
			Close	



Step 3: Set the PC IP address in the same range with device IP address. For example the device IP address is 192.168.0.22, pls set PC IP address to 192.168.0.X (X different from 22).

Local Area Connection Properties	×		
Networking			
Connect using:			
Atheros AR8151 PCI-E Gigabit Ethemet Controller (NDI	S E		
This connection uses the following items:			
Client for Microsoft Networks			
Image: State St			
✓ ▲ Internet Protocol Version 6 (TCP/IPv6)			
Internet Protocol Version 4 (TCP/IPv4)			
 ✓ Link-Layer Topology Discovery Responder 			
Description			
Iransmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks			
ОК Са	ncel		

Internet Protocol Version 4 (TCP/IPv4) Properties					
General					
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.					
Obtain an IP address automaticall	y				
O Use the following IP address:]				
IP address:	192.168.0.10				
Subnet mask:	255.255.255.0				
Default gateway:	192.168.0.1				
Obtain DNS server address autom	natically				
Use the following DNS server addresses:					
Preferred DNS server:					
Alternate DNS server:	· · ·				
Validate settings upon exit	Advanced				
	OK Cancel				



2. Open web browser, input the IP add and login in. The IP factory setting is 192.168.0.22.

User Name: admin Password: ascent

O Menu	peed Dial +	<u>~</u>
< > C 8	B ⊕ 192.168.0.22 ©	ŧ
		_
Authentication	Required	
?	http://192.168.0.22 is requesting your username and password. The site says: "Embedded WEB Manager"	
User Name:		
Password:		
	OK Cancel	

3. The web management consist of five submenus. Items guide on the left, click to enter.

Device Status
Device Settings
Alarm Status
Alarm Properties
Network Settings
Change Password
Reset Settings



4.2 Device Status Menu

nmunication Technology	WEB Man	ager	0 00	arer ar	
ice Status	e Status	Device Model AT-51-F:	ST-DM-08-SC		
ice Settings		Serial Number 2212061	25796		
m Status		Device Version: 2.0.0			
m Properties		Unit Temprature: 24.0	°C		
vork Settings		Power Supply 1 Normal			
nge Password		Power Supply 2 Normal			
et Settings					
ate Firmware					
ice Logs	Laser Out	put 6.3 mW	Laser Wavel	en: 1310.00 nm	
	Input RF Le	vel: 81 dBuV	Laser Driver Le	vel: 102 dBuV	
	Index 1	BIAS 44.0 mA	TEMP 23.9 °C	0.00 A	
	Index	Power Name		Power Voltage	
	1	DC +3.3V		3.2 V	



4.3 Device Settings Submenu

OMI mode: switch AGC/MGC statuses.

OMI Value: -5 dB to +5 dB adjustable, factory setting is 0 dB.

○ 192.168.0.22					80% 公
	AT5000 TRANS WEB Manager		12 M		
Device Status	vice Settings Laser Status OMI Mode OMI Value MOC ATT Channel Number	Laser ON V AGC V 0.0 11.0 84	g (-5.0~5.0) d B (-5.0)	Set Set Set Set	
		Copyright ©	2011-2022 Asce	nt Communication Techn	ology Limited

4.4 Alarm Status

evice Status	Alarm Status			
evice Settings	Index	Parameter Name	Alarm Status	
larm Status	1	Unit Temprature	Nominal	
Inter Dropasties	2	Drive Level	Nominal	
ann Propenies	3	Input RF Level	Nominal	
etwork Settings	4	Laser TEMP	Nominal	
hange Password	5	Laser BIAS	Nominal	
eset Settings	6	Laser Opt-output	Nominal	
	7	Laser TEC	Nominal	
pdate Firmware	8	DC +3.3V	Nominal	



4.5 Alarm Properties

and beinings	and the second se			I HI	LO	LOLO	Deadband	Action	
irm Status	1	Unit Temprature ('C)	85	70	5	0	2	Set	
arm Properties	2	Drive Level (dBuV)	120	110	90	60	1	Set	
twork Settings	3	Input RF Level (dBuV)	100	90	70	☑ 60	1	Set	
ange Password	4	Laser TEMP ('C)	40.0	35.0	15.0	10.0	1.0	Set	
set Settings	5	Laser BIAS (mA)	☑ 150.0	2 120.0	20.0	10.0	1.0	Set	
date Firmware	6	Laser Opt-output (mW)	40.0	38.0	1.0	0.5	0.1	Set	
vice Logs	7	Laser TEC (A)	3.00	2.00	-2.00	-3.00	0.10	Set	
	8	DC +3.3V (V)	4.1	3.8	2.8	2.5	0.1	Set	
	Index		Parameter Na	ne			Control	Action	

4.6 Network Settings

Set IP Address, etc.

ASCENT-X-	WEB Mana	ger	SIVII	IIE	.K ()	14 10 00 00 CP	
evice Status	etwork Settings						^
evice Settings	Device MAC:	D8: 29:	16: 57: 0 BEG01	05: BB			
arm Status	Agent Version:	v1.0.0				Refresh	
arm Properties -			(-		
twork Settings	Static IP Address:	192	. 168	. 0	. 22	Set	
ange Password	Subnet Mask:	255	. 255	. 0		Set	
set Settings	Default Gateway:	192	. 168	. 1		Set	
date Firmware	Trap Address 1:	255	. 255	255	255	Set	
vice Logs	Trap Address 2:	0	. 0			Set	
	Trap Address 3.	0	. 0			Set	
	Trap Address 5:	0				Set	
	Trap Address 6	0	. 0			Set	
	Trap Address 7:	0	. 0	. 0	1 0	Set	
	Trap Address 8:	0	. 0	. 0	. 0	Set	
-	IPv6 Global Unicast.						
	IPv6 Local Link:	fe80::d	a29:16#	:te57:5	db		

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	AT5000 TR WEB Mana	ANSMITTER ger	8° (P 11	
evice Status	IPv6 Local Link:	fe80::da29:16ff:fe57:5bb		^
evice Caltinge	Trap IPv6 Host1:	:	Set	
evice Settings	Trap IPv6 Host2:		Set	
arm Status	Trap IPv6 Host3:		Set	
arm Properties	Trap IPv6 Host4:		Set	
etwork Settings	Trap IPv6 Host5:	1	Set	
hange Password	Trap IPv6 Host6:		Set	
eset Settings	Trap IPv6 Host7:		Set	
odate Firmware	Trap IPv6 Host8:		Set	
evice Logs —	2			
	NTP:	Enable v	Set	
	NTP Host	pool.ntp.org	Set	
	DNS1:	223.5.5.5	Set	
	DNS2:	0.0.0.0	Set	
	Read Community:	public	Set	
	Write Community:	public	Set	
	Trap Community:	public	Set	
	SNMP Version:	V1 ~	Set	

4.7 Change Password

ommunication Technology	WEB Manager	
Device Status Device Status Varm Status Narm Properties Relevent Settings Indiate Firmware Device Logs	Inge Password	



4.8 Reset Settings

evice Status	Restore settings and Reboot device Reboot device	
arm Status	Reboot dev	rice
arm Properties etwork Settings nange Password	Restore factory settings Warning!! Click the restore button, all parameters will be restored to factory default.	
eset Settings Idate Firmware	Restore Fac	tory
wice Logs	Restore Net parameters: IP Address: 192.168.0.22 Subnet Mask: 255.255.0.0 Gateway Address: 192.168.1.1 All Trap Address: 0.0.0.0 	
	User parameters: User name: admin Password: 123456 	
	Restore n	et

4.9 Update Firmware





4.10 Device Logs

ascent ommunication Tech	nology WEB Ma	anager		
evice Status	- Device Logs			^
evice Settings	Poslx TimeSync		Clear Logs	
arm Status	Posix Time	System UpTime	Record Content	
	1970/1/1 08:09:13	00:09:13	Input RF LevelLOLO S0dBuV	
arm Properties	1970/1/1 08:09:13	00:09:13	Drive Level LO 78dBuV	
stwork Settings	1970/1/1 08:02:53	00:02:53	Input RF Level NOMINAL 86dBuV	
cinora ociungo	1970/1/1 08:02:53	00:02:53	Drive Level NOMINAL 102dBuV	
hange Password	1970/1/1 08:00:06	00:00:06	DC +3.3V NOMINAL 3.2V	
	1970/1/1 08:00:06	00:00:06	Laser Opt-output NOMINAL 6.3mW	
eset Settings	1970/1/1 08:00:06	00:00:06	Laser BIAS NOMINAL 44.0mA	
	1970/1/1 08:00:06	00:00:06	Laser TEMP NOMINAL 23.9°C	
odate Firmware	1970/1/1 08:00:06	00:00:06	Drive Level LO 78dBuV	
evice Logs	1970/1/1 08:00:06	00:00:06	Unit Temprature NOMINAL 21'C	
	1970/1/1 08:00:01	00:00:01	DC +5 3V LOLO OV	
	1970/1/1 08:00:01	00:00:01	Laser Opt-output LOLO 0mW	
	1970/1/1 08:00:01	00:00:01	Laser BIAS LOLD OmA	
	1970/1/1 08:00:01	00:00:01	Laser TEMP LOLD O'C	
	1970/1/1 08:00:01	00:00:01	Input RF Level LOLO DOBLY	
	1970/1/1 08:00:01	00:00:01	Drive Level LOLO 0dBuV	
	1970/1/1 08:00:01	00:00:01	Unit Temprature LOLO 0 C	
	1970/1/1 08:00:10	00:00:10	Laser Opt-output NOMINAL 6.3mW	-
	1970/1/1 08:00:10	00:00:10	Laser BIAS NOMINAL 44.0mA	
	1970/1/1 08:00:06	00:00:06	DC +3.3V NOMINAL 3.2V	
	1970/1/1 08:00:06	00:00:06	Laser TEMP NOMINAL 23.6°C	
	1970/1/1 08:00:06	00:00:06	Drive Level LO 78dBuV	
	1970/1/1 08:00:06	00:00:06	Unit Temprature NOMINAL 19'C	
	1970/1/1 08:00:01	00:00:01	DC +3.3V LOLO OV	
	1970/1/1 08:00:01	00:00:01	Laser Opt-output LOLO 0mW	



5 Setup Menu

Press the ▼ to display the following menus in turn, and press the ▲ to reverse the cycle.



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AT5000 1310 nm F3CT Optical Transmitter

6 Input Signal Level

The total RF analog input level depends on the number of analog channels in your system and is identical for the type of system (NTSC, PAL, CENELEC) used. Use the following equation to determine the optimum RF input level per channel when the rated channel loading is not being used:

Analog Input Level (dBmV) = A+10log(N/M)+10log(W1/W2)

A: Manufacturer's recommended nominal drive level for optical transmitter/module;

N: The number of channels corresponding to A;

M: Actual number of loaded channels

W1: The bandwidth corresponding to A;

W2: The actual bandwidth

For example, if the product datasheet give the following parameters:

75 dBµv @ 59 PAL channels

If the customer actually has: 40 NTSC channels, the drive level will be:

Actual drive level=75+10log(59/40)+10log(8/7)=75+10*1.69+10*0.06=75+1.7+0.6=77.3(dBµV)

For digital channels, if the digital signal level is 6 dB lower than the analog signal level, then 4 digital channels are equal to 1 analog channel; If the digital signal level is 10 dB lower than the analog signal level, then 10 digital channels are equal to 1 analog channel. In the actual calculation, first calculate the number of digital channels as the number of analog channels, and then use the above formula. For example, with 20 analog channels, 20 digital channels, and with the digital channel being 6 dB lower than the analog channel level, then the total number of channels is:

20 + 20/4 = 25 (channels)

7 Troubleshooting 7.1 Fiber Optic Maintenance

Any time the fiber leads to the amplifier are disconnected, there is the potential for contamination of the ends of the fiber connectors. Dirt or other contaminants on these components can reduce the amplifier's performance and can result in permanent damage to the device. It is recommended that the fiber connectors be cleaned prior to connection, or reconnection, to the system.

Error Status	Possible Reason	Solution	Notes
POWER Yellow	Single power supply working	Connect another power supply	
STATUS Red	No RF input	Connect RF Input	
LASER Red			
RF Red			
POWER Yellow			
STATUS Red	The key turned to OFF	Turn the key to ON	
LASER Red			
RF Red			
LCD Display "KEY OFF"			
Output power LCD displays normal value, but low value by power meter	Output interface or patch cord is dirty.	Clean the output interface with industrial anhydrous alcohol or dust-free paper	
	Power meter error	Change power meter	Top brand power meter is advised

Appendix 1: Conversion of Optical Power

mW	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
dBm	0.0	3.0	4.8	6.0	7.0	7.8	8.5	9.0	9.5	10.0	10.4	10.8	11.1	11.5	11.8	12.0
mW	17	18	19	20	21	22	25	32	40	50	63	80	100	125	160	200
dBm	12.3	12.5	12.8	13.0	13.2	13.4	14	15	16	17	18	19	20	21	22	23

7.2 Troubleshooting Conditions

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