

# TAC-329x Family

Low-SWaP, multiple bandwidth downconverter/tuners  
Includes single-channel and dual-channel versions

Offering flexibility and adaptability in the field

- RF Input: 0.5 to 26.5 GHz (optional 50 GHz extension)
- IF Output: Tunable up to 4.5 GHz
- Selectable BW: 500, 1000 and 2000 MHz
- Low-SWaP form factor
- Search, scan and set-on ready



The TAC-329x product family is a SWaP-focused tuner and downconverter with selectable instantaneous bandwidths (IBW) and IF positioning, enabling user operation closer to the source of the signal of interest, while offering flexibility and adaptability in the field. The rugged, small form factor is especially well suited to applications requiring portability, reduced footprint and unattended operation.

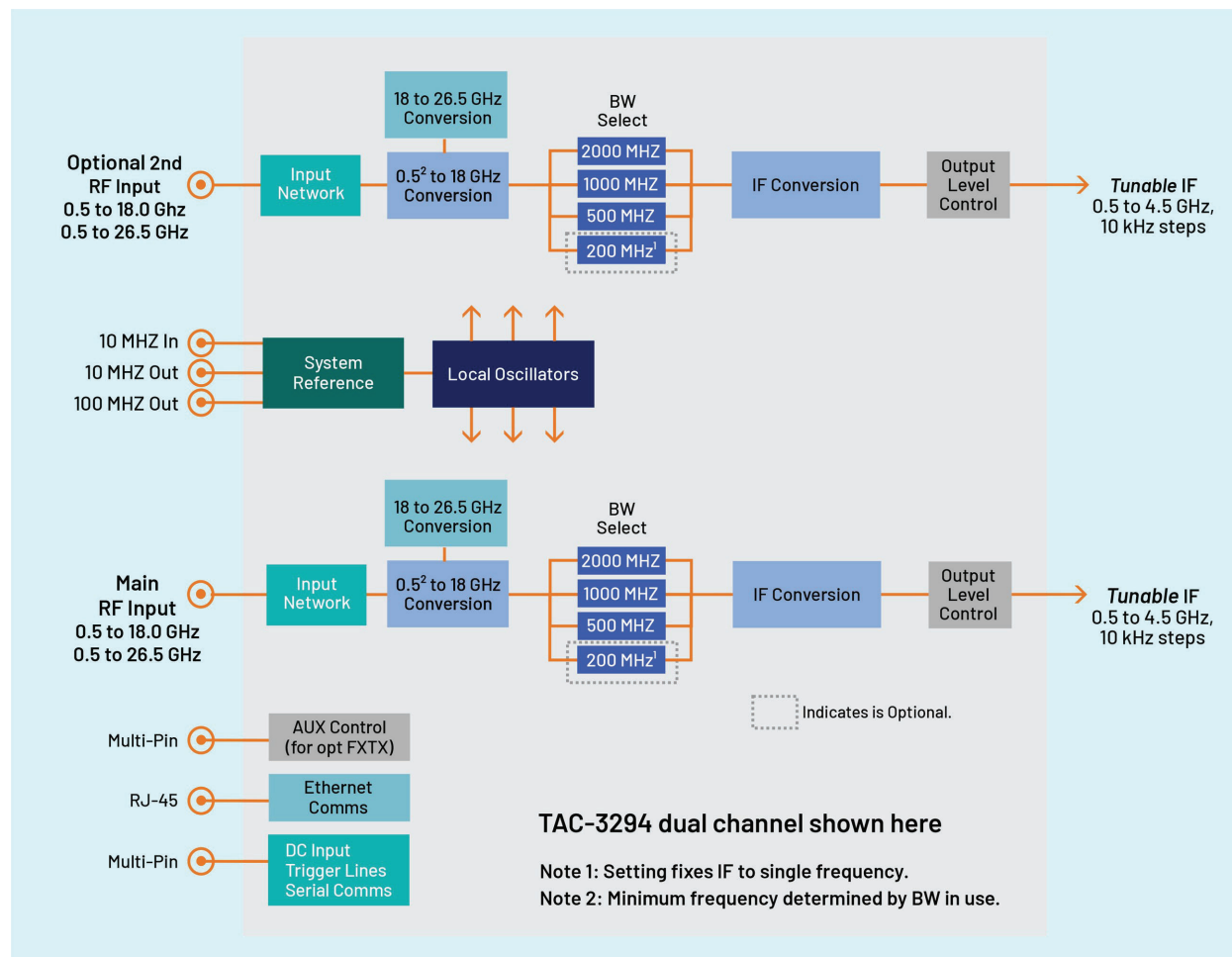
Significant advantages offered by selectable IBW and IF positioning include adaptability of the tuner, which empowers the user to address a broad spectrum of signals, and the ability to reconfigure the device as signals of interest change.

**BANDWIDTHS**

Unique to the TAC-329x, user-selectable bandwidths offer the variety of throughput ranges to support ever-changing requirements and setup configurations. The values in the table below represent the selections available.

WB bandwidths (3 dB): selectable with full IF tuning range.	500 MHz 1000 MHz 2000 MHz
NB bandwidth, with IF output fixed at 625 MHz. This selection is optional.	200 MHz

## BLOCK DIAGRAM



## GUI-INTERFACE

The TAC-329x includes a web browser-based GUI that provides complete control of the TAC tuner. Controls include selection of the RF input tuning frequency, the location of the IF output frequency, the acquisition bandwidth, gain control, and AGC selectivity. There is also an Alarm LED and "Alarm Details" page to provide detailed warnings on issues like signal compression, abnormal thermal conditions, and PLL lock problems. The firmware allows the user to store and recall settings easily and a unit power-down results in the tuner returning to its previous setup.

List, Scan and Sweep modes give the user the ability to tune around the RF spectrum programmably. The TAC GUI also provides integrated user documentation.

Frequency In: 18100.00 MHz	New Freq In	Alarm Status:
Frequency Out: 1000.00 MHz	New Freq Out	
Channel 1: ON	ON/OFF 1	
Bandwidth: 1000MHz	New IFBW1	
Mode: MGC	AGC/MGC 1	
Output Level: N/A	New Level 1	
Gain: 19 dB	New Gain 1	
Channel 2: ON	ON/OFF 2	
Bandwidth: 500MHz	New IFBW2	
Mode: AGC	AGC/MGC 2	
Output Level: -1 dBm	New Level 2	
Gain: N/A	New Gain 2	
Temperature: 31 C	ON/OFF CTRL	
Thermal Control: ON	ON/OFF	
Thermal Override: OFF	New Cut Off	
Cut Off Temp: 65 C	New Cut On	
Cut On Temp: 59 C		
Recall: Reg_0	Recall Reg#	
Save: Reg_1	Save Reg#	
	Sanitize Unit	

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## SCPI COMMAND CONTROL

In addition to the browser-based GUI, the TAC-329x can be controlled via SCPI commands. SCPI commands provide identical controls to the GUI, but in a simple text based format, allowing the user to integrate control of the TAC into their software application.

Whether controlling the TAC via the GUI or through SCPI commands, the unit provides both Ethernet and Serial ports as the physical connection to the host PC.

## RF INPUT CHARACTERISTICS

The TAC-329x family addresses different input ranges based on the bandwidth in use. The table below shows input ranges of center frequencies that can be tuned for each of the bandwidths available.

RF input frequency tuning range	0.5 – 26.5 GHz (for 500MHz BW) 1.0 – 26.5 GHz (for 1000MHz BW) 1.5 – 26.5 GHz (for 2000MHz BW)
Frequency tuning resolution	10 kHz
Conversion sense	Upright for tuned frequencies up to 18.0 GHz Inverted > 18 GHz
LO re-radiation (23–44 GHz)	- 70 dBm, max
Max input level, no damage	+20 dBm

## OPTIONAL RF INPUT EXTENSIONS

The RF input tuning range of the TAC-329x family can be extended with the use of an FXTX frequency extender. Designed with the same footprint of the TAC-329x, the FXTX will block downconvert signals that reside up to 50 GHz, depending on the selected option set. Signals downconverted by the FXTX are provided to the base TAC tuner for further tuning and filtering, providing a contiguous tuning solution from 0.5 to 50 GHz.

RF tuning range extension	FXTX-34 Single Channel: 18–40 GHz FXTX-34-C Dual Channel: 18–40 GHz FXTX-35 Single Channel: 26.5–50 GHz FXTX-35-C Dual Channel: 26.5–50 GHz
Frequency tuning resolution	10 kHz
Conversion sense	Upright
RF input Connector	40 GHz Models: 2.92mm 50 GHz Models: 2.4mm
Max input level, no damage	+20 dBm
IF output within the accompanying TAC tuning range	IF output within the accompanying TAC tuning range
Control	LEMO Connection, from TAC-329x
Reference	100 MHz, from TAC-329x

**RF OUTPUT CHARACTERISTICS**

The TAC-329x uniquely provides an IF output frequency that is fully tunable, providing the user greater control to tailor the settings in support of downstream components, such as digitizers.

Frequency tuning range	500–4500 MHz
Frequency tuning resolution	10 kHz
Output 1 dB compression point, at max gain	+10 dBm, min
Output IP3	+20 dBm, typ
Power adjustment range, at +25°C	-20 to 0 dBm, in .5 dB steps (AGC mode)
Gain adj range	10 to 50 dB, in 1 dB steps (MGC mode)
Spurious	<-60 dBc, typ at 0 dBm output
Harmonics, at +10 dBm pout	-20 dBc, typ
Image rejection	60 dB, min
Noise figure at max gain	12 dB, typ.

**REFERENCE AND LOCAL OSCILLATORS**

The TAC-329x has an internally-generated 100 MHz reference clock that can be phase-locked to an external, user-supplied 10 MHz reference. This 100 MHz reference clock is output via a front panel connector to allow a TAC-329x to drive a reference to external devices. A 10 MHz reference clock output connector is also provided, which is the output of the 100 MHz reference clock, divided by 10.

Phase noise, measured at 10 GHz RF input frequency, typ, in degrees RMS	<0.25 deg, 100 Hz to 10 MHz integrated
Internal reference frequency	100 MHz
Internal reference aging, per year	+/- 1 ppm
Internal reference stability over temp	0.2 ppm
Reference output, 100 MHz	100 MHz @ 6 dBm +/-3 dB, locked to the reference in use
Reference output, 10 MHz	10 MHz @ 6 dBm +/-3 dB, locked to the reference in use
External reference input (customer supplied)	10 MHz @ 0 dBm +/- 6 dB
Locking range of external reference	+/- 1 ppm
Reference select	Auto-select, lock to external, if present. Otherwise internal
Reference input/output connectors	SMA-female

## SEARCH SWEEP/SCAN

The TAC-329x supports search via two modes: list mode and step/scan. Triggered pulses are used to enable auto-scanning or single, user-actuated individual steps. Search settings can be configured using SCPI commands or the GUI.

Search Modes	Description	Programmable	Enable
Step/Scan Mode- Manual	HW or SW triggers used to manually step from RF start to RF stop based on preset step size. Dwell time is not used.	Start, stop, step size and direction	HW trigger or SW command
Step/Scan Mode - Auto	SW command initiates step\scan routine. Used to .automatically step from RF start to RF stop based on preset step sizes and dwell times.	Start, stop, step size, dwell time, scan direction, number of cycles	SW command
List Mode - Manual	Uses preloaded list of up to 1000 entries in RF entries in TAC HW or SW trigger used to take individual step to next entry in list. Dwell time is not used.	List entry, scan direction, repeat	HW trigger or SW command
List Mode - Auto	Used preloaded list of up to 1000 entries in RF entries in TAC SW command used to initiate list. Dwell time determined by list parameters.	Start, stop, step size, dwell time(s), scan direction, repeat	SW command

## PRODUCT COMPARISON

The table below compares the TAC-329x with the RFT-329x.

	TAC-329x	RFT-329x
Form factor	Low SWaP	Rackmount
Size	7 x 10 x 1.5 inches	1U, 2U
RF Tuning Range	Up to 26.5 GHz (50 GHz with FCTX)	Up to 50 GHz
IF Tuning Range	0.5 - 4.5 GHz	0.05 - 2.0 GHz
Instantaneous BW's	200, 500, 1000, 2000 MHz. 200 MHz is optional.	50, 100, 200, 500, 1000, 2000 MHz
Low-Band Extension	No	Yes
AGC capable	Standard	Optional
One Touch Sanitizing	Standard	Requires series of commands
High Speed Search	Standard	Optional
Remote "reset" available	Yes	No
Tuning Speed	50 usec for TAC, 600 usec for RFT	
Temperature Range	-30 to +55 C	0 to +50 C
Options for Phase Coherent Tuners	Optional coherent 2nd channel	Master/Slave All-in-One Dual Channel
Power	DC	AC

## SPECIFICATIONS

## Environmental

Operating temperature: -30 to +55°C, baseplate

Humidity: Up to 95% non-condensing

## Physical

Power requirement: DC: +10-15 VDC, 2A typ, for dual channel version, varies by configuration

Power connector: LEMO, two conductor

Size, inches: 7H x 10D x 1.5W

Hardware reset: Locally and remotely controllable, via software or hardware features

## Tuning and Control

Communication interfaces: Ethernet and Serial RS-232

Connector: LEMO

Remote control: SCPI-type command-set and browser-based GUI

External block converter support: User offset configurable for BDC in use

SWP connections, 3v TTL lines or RS422 Differential:

- Trigger IN (strobe)
- Trigger enable (pause)
- All settled indicator (ready)

Tuning speed (settling times): < 50 usec

Search types (see below):

- SCPI-based
- HW triggered step/scan
- SW triggered step/scan
- HW triggered list
- SW triggered list
- List size: Up to 1000 entries

IP parameters:

- Set IP Mode (DHCP/Static)
- Set IP address, gateway, subnet
- Read MAC address

## ORDERING INFORMATION

Model	Part Number	Description
TAC-3290-18	010-02407-0001	Compact RF tuner, single channel, 0.5-18 GHz input; tunable IF output; 3 selectable BWs
TAC-3290-26	010-02407-0002	Compact RF tuner, single channel, 0.5-26.5 GHz input; tunable IF output; 3 selectable BWs
TAC-3294-C-18	010-02407-0003	Compact RF tuner, dual channel, 0.5-18 GHz input; tunable IF output; 3 selectable BWs
TAC-3294-C-26	010-02407-0004	Compact RF tuner, dual channel, 0.5-26.5 GHz input; tunable IF output; 3 selectable BWs

Options	Part Number	Description
FXTX-34	010-02410-0012	Single Channel Downconverter Frequency extension unit. 18-40 GHz Input Range. For TAC-3290
FXTX-35	010-02410-0002	Single Channel Downconverter Frequency extension unit. 26.5-50 GHz Input Range. For TAC-3290
FXTX-34-C	010-02410-0011	Dual Channel Downconverter Frequency extension unit, in small form factor enclosure. 18-40 GHz Input Range. Dual Inputs, Dual Outputs, Shared LO. For TAC-3294-C
FXTX-35-C	010-02410-0002	Dual Channel Downconverter Frequency extension unit. 26.5-50 GHz Input Range. Dual Inputs, Dual Outputs, Shared LO. For TAC-3294-C

## ACCESSORIES

Accessory	Part Number	Description
Option -DCC	074718-LF	DC cable assembly with 2-pin LEMO connector for TAC Products, 24 inches in length.
Option -TFX	020-02407-0015	Test Adapter fixture for TAC product M&C Controls. Includes circuit card plus Opt -MXC cable harness (p/n: 140-02407-0001) with 16-pin LEMO and Molex connectors.
Option -MXC	140-02407-0001	Cable harness (p/n: 140-02407-0001) with 16 pin M&C Control LEMO and Molex connectors.

Need More Help? Need a Variant of This Product?  
Contact Mercury's RF & Microwave engineering team at [rf.microwave@mrcty.com](mailto:rf.microwave@mrcty.com)



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