

OPV Series II Radio Unit Connection to RFL GARD 8000 (X-21)

Description

This application note covers the connectivity between the OPV Series II Radio Unit and the RFL GARD8000 through X-21 enabled interfaces.

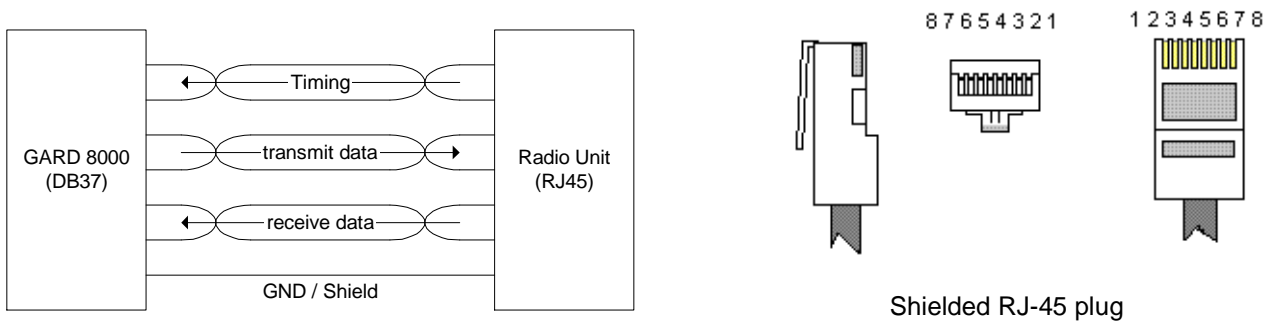
Both transmit and receive data are timed to a single clock generated by the Radio System. The timing end to end is synchronised by having one Radio Unit act as a slave synchronising to the other Radio Unit acting as a master.

When configured for X-21 the OPV Series II Radio Units provide a 64 kbps data path with both Radio Units operating as DCE, hence the GARD 8000 is required to operate as a DTE.

The provided 64 kHz system timing is typically ± 5 ppm or better while Jitter at the slave is $\pm 0.1\%$. Latency is better than 6 ms (typically 5.1 ms) while asymmetry is better than 125 us.

Serial Cable Wiring

The recommended cable type is shielded twisted pair similar to Belden 1868E fitted with a shielded RJ-45 plug.



The following table outlines the required connections for X-21.

GARD 8000 (DTE)			OPV (DCE)		
Termination required	Signal	Pin – DB37 (female)	Pin – RJ45 (male)	Signal	In / Out
N	RT (A)	8	6	Timing A	O
	RT (B)	26	3	Timing B	
N	RD (A)	6	5	Rx Data A	O
	RD (B)	24	4	Rx Data B	
		N/C	8	Not Used	I
		N/C	7	Not Used	
N	SD (A)	4	2	Tx Data A	I
	SD (B)	22	1	Tx Data B	
N/A	Shield / GND	Body	Body	Shield / GND	N/A
N/A	Signal GND	19	N/C		
N/A	Chassis GND	1	N/C		

Cable Termination: Although operation will not normally be prevented if the connecting cable is incorrectly terminated at the user equipment end, proper termination is strongly advised. As well as ensuring maximum signal integrity over longer cables, correct termination is necessary to ensure that compliance with CISPR22/EN55022 EMC standards is maintained. The GARD8000 provides internal termination for the X21 signals and therefore additional termination is not required. The Radio Unit provides internal termination for Tx Data.

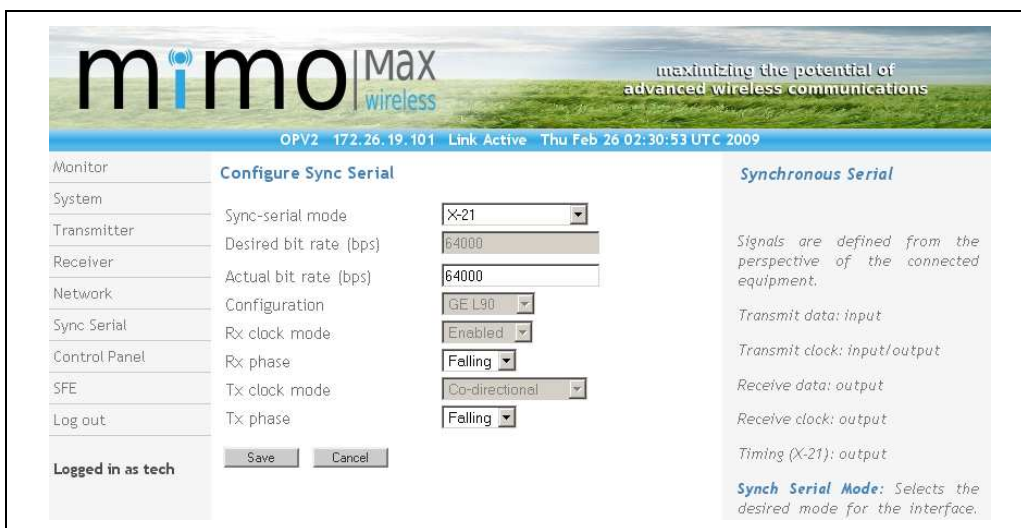
Grounding: The Synchronous Serial drive of the OPV SII circuitry is optically isolated from the chassis ground (1500 VRMS). This is intended to prevent the possibility of ground loops. Therefore grounding of the shield at the GARD 8000 is required to prevent the shield and Synchronous Serial ground from floating.

Radio Unit Configuration

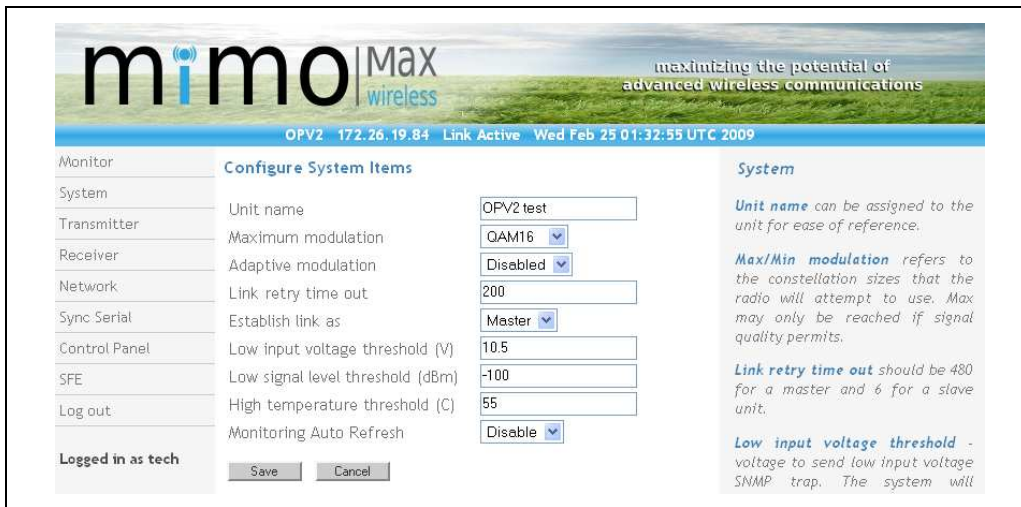
Following are the OPV SII CCMS settings required for X-21 operation.

End A	
CCMS – Mode Select	X-21
CCMS – Clock Phase	Falling
CCMS – Establish link as	Master (a preset system control parameter)

End B	
CCMS – Mode Select	X-21
CCMS – Clock Phase	Falling
CCMS – Establish link as	Slave (a preset system control parameter)



Radio Unit CCMS ‘Synchronous Serial’ page.
Access is through the ‘Sync Serial’ tab.



Radio Unit CCMS 'Configure System Items' page showing selection as a Master.
Access is through the 'System / Configuration' tab.

In the context of X.21 the Master/Slave settings are only used to indicate which end will generate the timing and which end will regenerate it. The parameters themselves are used by the Radio Unit's for Air Interface link control.

GARD 8000 Configuration

The following is an image of the GARD 8000 web page for configuration of the applicable communications interface. Access is through the units Ethernet port.

