DAS SOLUTIONS GUIDE

Microlab
A Division of RF Industries

microlabtech.com

The Microlab Portfolio of UWB Products:

- Meets the increased bandwidth and capacity demands for 5G
- Covers the entire FR1 frequency range (617-5925 MHz)
- Provides a future-proof path for all applications
- Guarantees Low PIM Performance
- Ensures high quality and high MTBF
- Offers peace of mind with guaranteed specifications

Model	Description
Dx-83FE Series	2,3,4-way Splitters, 617-5925 MHz
DN-x4FE Series	Tapper, 350-5930 MHz
CC-600E Series	Directional Couplers, 617-5925 MHz
CA-141E Series	Hybrid Coupler, 617-5925 MHz
CM-680E Series	3X3 Hybrid Matrix, 617-5925 MHz
CM-141E Series	4x4 Hybrid Matrix, 617-5925 MHz
TK-600 Series	Low PIM Termination Loads, 350-5925 MHz

Splitters – Ultra-Wideband (6GHz)

Model	Frequency (MHz)	Ways	Split Loss (dB)	Power (W)	Conn. Type	Ingress	PIM (dBc)
D2-83FE	617-5925	2	3	300	4.3-10	IP67	-161
D3-83FE	617-5925	3	4.8	300	4.3-10	IP67	-161
D4-83FE	617-5925	4	6	300	4.3-10	IP67	-161
D2-76FE	617-5925	2	3	50	4.3-10	IP67	-153

D2-83FE

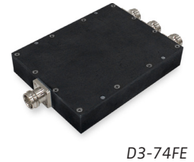
D2-76FE

Splitters – Standard Bandwidth (2700MHz)

Model	Frequency (MHz)	Ways	Split Loss (dB)	Power (W)	Conn. Type	Ingress	PIM (dBc)
D2-84KFE	575-2700	2	3	300	4.3-10	IP68	-161
D3-84KFE	575-2700	3	4.8	300	4.3-10	IP68	-161
D4-84KFE	575-2700	4	6	300	4.3-10	IP68	-161
D2-95FE	580-2700	2	3	500	4.3-10	IP67	-161
D3-95FE	580-2700	3	4.8	500	4.3-10	IP67	-161
D2-74FE	575-2700	2	3	50	4.3-10	IP65	-154
D3-74FE	575-2700	3	4.8	50	4.3-10	IP65	-154
D4-74FE	575-2700	4	6	50	4.3-10	IP65	-154

D4-84KFE

D2-95FE



D3-74FE

See individual data sheet for complete specifications.

Directional Couplers – Ultra-Wideband (6GHz)

Model	Frequency (MHz)	Coupling Value (dB)	Power Rating (W)	Conn. Type	Ingress	PIM (dBc)
CC-605E	617-5925	5	300	4.3-10	IP67	-161
CC-606E	617-5925	6	300	4.3-10	IP67	-161
CC-607E	617-5925	7	300	4.3-10	IP67	-161
CC-608E	617-5925	8	300	4.3-10	IP67	-161
CC-610E	617-5925	10	300	4.3-10	IP67	-161
CC-613E	617-5925	13	300	4.3-10	IP67	-161
CC-615E	617-5925	15	300	4.3-10	IP67	-161
CC-620E	617-5925	20	300	4.3-10	IP67	-161

Directional Couplers – Standard Bandwidth (2700MHz)

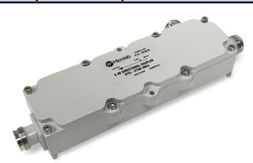
Model	Frequency (MHz)	Coupling Value (dB)	Power Rating (W)	Conn. Type	Ingress	PIM (dBc)
CC-05E	575-2700	5	300	4.3-10	IP67	-161
CC-06E	575-2700	6	300	4.3-10	IP67	-161
CC-07E	575-2700	7	300	4.3-10	IP67	-161
CC-08E	575-2700	8	300	4.3-10	IP67	-161
CC-10E	575-2700	10	300	4.3-10	IP67	-161
CC-13E	575-2700	13	300	4.3-10	IP67	-161
CC-15E	575-2700	15	300	4.3-10	IP67	-161
CC-20E	575-2700	20	300	4.3-10	IP67	-161
CC-30E	575-2700	30	300	4.3-10	IP67	-161

Tappers – Ultra-Wideband (6GHz)

Model	Frequency (MHz)	Tapper Ratio	Coupling Value (dB)	Power Rating (W)	Conn. Type	Ingress	PIM (dBc)
DN-34FE	350-5930	2:1 (3 dB)	4.8	500	4.3-10	IP67	-161
DN-44FE	350-5930	3:1 (4.8 dB)	6.1	500	4.3-10	IP67	-161
DN-54FE	350-5930	4:1 (6 dB)	7	500	4.3-10	IP67	-161
DN-64FE	350-5930	6:1 (8 dB)	8.5	500	4.3-10	IP67	-161
DN-74FE	350-5930	10:1 (10 dB)	10.5	500	4.3-10	IP67	-161
DN-84FE	350-5930	20:1 (13 dB)	13	500	4.3-10	IP67	-161
DN-94FE	350-5930	30:1 (15 dB)	15.3	500	4.3-10	IP67	-161
DN-04FE	350-5930	100:1 (20 dB)	20.1	500	4.3-10	IP67	-161
DN-14FE	350-5930	1000:1 (30 dB)	30.1	500	4.3-10	IP67	-161

DN-34FE

CC-606E



CC-06E

See individual data sheet for complete specifications.

Hybrid Combiners – Ultra-Wideband (6GHz) and Standard Bandwidth (2700MHz)

Model	Frequency (MHz)	Coupling Value	Ports	Power/Input (W)	Conn. Type	Ingress	PIM (dBc)
CA-141E	617-5925	3	2x2	100	4.3-10	IP67	-161
CM-680E	617-5925	4.8	3x3	150	4.3-10	IP67	-161
CM-141E	617-5925	6	4x4	100	4.3-10	IP67	-160
CA-14E	350-5925	3	2x2	200	4.3-10	IP67	-161
CM-14E	350-5925	6	4x4	200	4.3-10	IP67	-160
CA-84KE	617-2700	3	2x2	80	4.3-10	IP68	-161
CM-80KE	617-2700	4.8	3x3	150	4.3-10	IP68	-161
CM-88KE	617-2700	6	4x4	150	4.3-10	IP68	-161
CT-84KE	617-2700	3	2x1	160	4.3-10	IP68	161

Multi-Band Combiners – 600MHz - 6GHz

Model*	Type	Frequency (MHz) / Bands	C-Band n77 ?	Input-Power/ (W)	Conn. Type	Ingress	PIM (dBc)
BK-263E†	Diplexer	617-2690 | 3300-5925	Y	200/100	4.3-10	IP67	-161
BK-201E	Diplexer	617-2690 | 1695-2700		250	4.3-10	IP67	-161
BK-745E†	Diplexer	PCS | AWS - Twin		100	4.3-10	IP67	-161
BK-694E†	Diplexer	617-2300 | 2496-2690		250/100	4.3-10	IP67	-161
BK-693E†	Diplexer	617-2200 | 2300-2700		200	4.3-10	IP67	-161
BK-75E	Diplexer	700 | 850		100	4.3-10	IP67	-153
BK-3008E†	Triplexer	617-960 | 1695-2700 | 3300-4200	Y	250	4.3-10	IP67	-161
BK-3001E†	Triplexer	PCS | AWS | 2.5 BRS		100	4.3-10	IP67	-161
BK-421E†	Triplexer	700+850 | PCS+AWS | WCS+2.5 BRS		250	4.3-10	IP67	-161
BK-363E	Triplexer	600+700 | PCS | AWS		50	4.3-10	IP67	-161
BK-962E	Quad	700 | 850 | PCS | AWS		250	4.3-10	IP67	-161
BK-5001E	Penta	700 | 850 | PCS | AWS | WCS		100	4.3-10	IP67	-161

†For Twin/Quad model configurations please contact your Microlab Sales Representative.

CA-141E

BK-263E

BK-745E

See individual data sheet for complete specifications.

Low PIM Attenuators – Standard Bandwidth (2700MHz)

Model	Frequency (MHz)	Power Rating (W)	Value (dB)	Conn. Type	PIM (dBc)
FY-03E	617-2700	40	3	4.3-10 (m-f)	-161
FY-06E	617-2700	25	6	4.3-10 (m-f)	-161
FY-10E	617-2700	20	10	4.3-10 (m-f)	-161
FY-15E	617-2700	20	15	4.3-10 (m-f)	-161
FY-20E	617-2700	20	20	4.3-10 (m-f)	-161
FZ-03FE	617-2700	80	3	4.3-10 (f-f)	-161
FZ-06E	617-2700	133	6	4.3-10 (m-f)	-161
FZ-10E	617-2700	110	10	4.3-10 (m-f)	-161
FZ-15E	617-2700	100	15	4.3-10 (m-f)	-161
FZ-20E	617-2700	100	20	4.3-10 (m-f)	-161
FZ-30E	617-2700	100	30	4.3-10 (m-f)	-161

Resistive Attenuators – Ultra Wideband (6GHz)

Model	Frequency (MHz)	Power Rating (W)	Value (dB)	Conn. Type	PIM
AT-01E	DC-6000	2	1	4.3-10 (m-f)	--
AT-02E	DC-6000	2	2	4.3-10 (m-f)	--
AT-03E	DC-6000	2	3	4.3-10 (m-f)	--
AT-04E	DC-6000	2	4	4.3-10 (m-f)	--
AT-05E	DC-6000	2	5	4.3-10 (m-f)	--
AT-06E	DC-6000	2	6	4.3-10 (m-f)	--
AT-07E	DC-6000	2	7	4.3-10 (m-f)	--
AT-08E	DC-6000	2	8	4.3-10 (m-f)	--
AT-09E	DC-6000	2	9	4.3-10 (m-f)	--
AT-10E	DC-6000	2	10	4.3-10 (m-f)	--
AT-15E	DC-6000	2	15	4.3-10 (m-f)	--

FY-10E

FZ-06E

AT-03E

See individual data sheet for complete specifications.

Low PIM Terminations – Ultra-Wideband (6GHz) and Standard Bandwidth (2700MHz)

Model	Frequency (MHz)	Power Rating (W)	Conn. Type	Ingress	PIM (dBc)
TK-605ME	350-5925	5	4.3-10 (m)	IP67	-161
TK-605MG	350-5925	5	2.2-5 (m)	IP67	-161
TK-605BMT	350-5925	5	NEX10 (m)	IP67	-161
TK-610ME	350-5925	10	4.3-10 (m)	IP67	-161
TK-610MG	350-5925	10	2.2-5 (m)	IP67	161
TK-610BMT	350-5925	10	NEX10 (m)	IP67	-161
TK-625ME	350-5925	25	4.3-10 (m)	IP67	-161
TK-625MG	350-5925	25	2.2-5 (m)	IP67	-161
TK-205ME	350-2700	5	4.3-10 (m)	IP67	-161
TK-205MG	350-2700	5	2.2-5 (m)	IP67	-161
TK-205BMT	350-2700	5	NEX10 (m)	IP67	-161
TK-210ME	350-2700	10	4.3-10 (m)	IP67	-161
TK-210MG	350-2700	10	2.2-5 (m)	IP67	-161
TK-210BMT	350-2700	10	NEX10 (m)	IP67	-161
TK-225ME	350-2700	25	4.3-10 (m)	IP67	-161
TK-225MG	350-2700	25	2.2-5 (m)	IP67	-161
TK-25FE	400-2700	60	4.3-10 (f)	IP67	-161
TK-27ME	400-2700	100	4.3-10 (m)	IP67	-161

Resistive Terminations – Ultra-Wideband (6GHz)

Model	Frequency (MHz)	Power Rating (W)	Conn. Type	Ingress	PIM
TA-2MG	DC-6000	2	2.2-5 (m)	IP67	--
TA-2MHE	DC-6000	2	4.3-10 (m)	IP65	--
TA-2MT	DC-6000	2	NEX10 (m)	IP67	--
TB-640ME	DC-6000	40	4.3-10 (m)	IP67	--

TK-610ME

TK-25FE

TK-205BMT

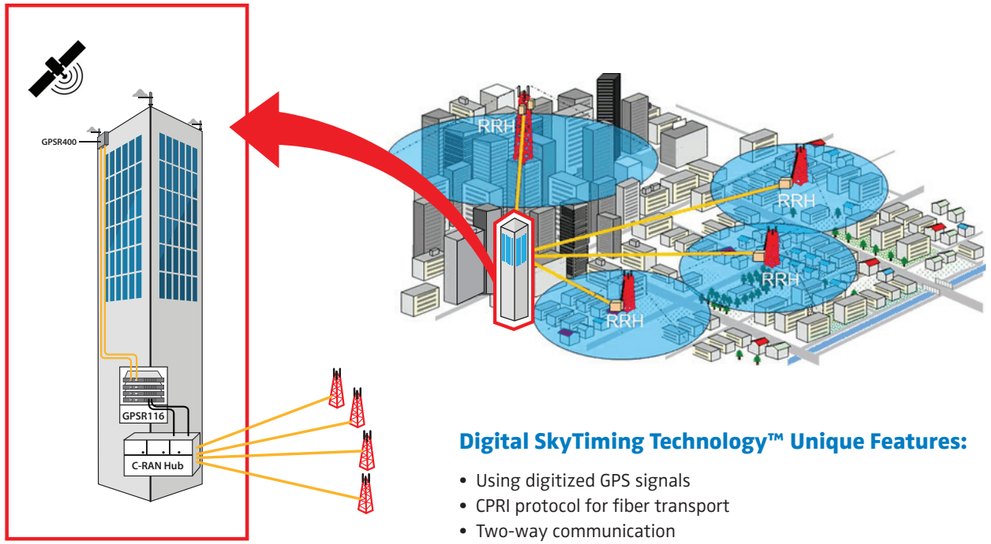
TK-625ME

See individual data sheet for complete specifications.

Digital Skytiming Technology™

Digital SkyTiming Technology™ is a patent-pending technique to transport GPS signals digitally over fiber for wireless network timing applications in C-RAN hubs and Distributed Antenna Systems (DAS). It is used in wireless systems where GPS signals are not readily available (where no skyview exists) close to the basestation or where remote monitoring and advanced alarms are required in the NOC by the carrier.

GPS signals are converted from RF to digital and transported over a fiber optic cable using CPRI protocols. The digital GPS signals are analyzed for number of satellites and their signal quality and monitored for robust network operation. The fiber link is also analyzed for round trip delay times and link quality to support advanced wireless features. The digital signals are then converted back to RF and distributed to the wireless network.



Digital SkyTiming Technology™ Unique Features:

- Using digitized GPS signals
- CPRI protocol for fiber transport
- Two-way communication

Impact of Digital GPS Signal Repeaters

- Solves network timing distance limitation in C-RAN and DAS systems
- Remote control and monitoring allows system management and reduces network troubleshooting
- Provides accurate timing required for advanced wireless services

Microlab A Division of RF Industries

GPS Solutions
Signal monitoring and distribution for cellular communication
UTC synchronization/timing and location

Digital Skytiming™ Benefits

- Allows GPS signals to be transmitted up to 10km from antenna to BTS/BBU
- New web-based interface provides remote system control and monitoring over Ethernet
- Monitors antenna status with automatic switch-over
- Redundant fiber optic links monitored with auto switch-over
- Provides communication delay within a 100 nanosecond alignment for LTE and LTE-A
- Eliminates signal degradation
- Advanced intelligent SNMP alarms

GPSR400 - Outdoor Remote Unit

- Up to 4 GPS antenna inputs
- Wall-mounted NEMA-4 enclosure
- Redundant fiber optic links
- Loss of signal alarms, LED system health monitors
- Connects to GPSR116 Indoor Head-End Unit

GPSR116 - Indoor Head-End Unit

- Up to 16 GPS RF outputs
- Redundant fiber optic links
- LED system health monitors
- Connects to GPSR400 Outdoor Remote Unit

GPSS216 - GPS RF Signal Splitter

- Up to 16 GPS RF outputs
- 2 GPS antenna inputs
- GPS signal quality monitoring
- Compatible with GPSR116 Indoor Head-End Unit

GPSS232 - GPS RF Signal Splitter

- Up to 32 GPS RF outputs
- 2 GPS antenna inputs
- GPS signal quality monitoring
- Compatible with GPSR116 Indoor Head-End Unit

GPS Solutions

Model	Description
GPSR116	GPS Repeater Head End, 16 RF Outputs, SMA Connectors
GPSR400	GPS Repeater Remote Unit, up to 4 GPS Antenna Inputs, 4.3-10 connector
GPSS216	Lossless GPS signal splitter, 2 RF inputs, 16 RF outputs
GPSS232	Lossless GPS signal splitter, 2 RF inputs, 32 RF outputs
GPSA001	GPSR AC/DC Adapter 100-240VAC/24VDC Indoor
GPSA003	GPSR AC/DC Adapter 100-240VAC/24VDC Outdoor
GPSA007	Optical Fiber Splice Box
GPS-30-N-S	GPS Active Antenna L1 Band 30dB Gain N-type
GPSJ-10-EMSM	1.0m, DC-6 GHz, .141, 4.3-10(m) to SMA(m)
GPSJ-20-NFSM	2.0m, DC-6 GHz, .141, N(f) to SMA(m)
GPSJ-30-SMSM	3.0m, DC-6 GHz, .141, SMA(m) to SMA(m)

Jumper Cables, Low PIM, Ultra-Wideband (6GHz)

Model	Frequency (MHz)	Cable Dia. (in.)	Power Rating (W)	Conn. #1	Conn. #2	Length (m)	PIM (dBc)
JA-10MX	DC-6000	0.141	100	4.3-10(m)	4.3-10(m)	1	-158
JA-10TX	DC-6000	0.141	100	4.3-10(m)	4.3-10(f)	1	-158
JA-10-MG-ME	DC-6000	0.141	100	2.2-5(m)	4.3-10(m)	1	-160
JA-10-MT-ME	DC-6000	0.141	200	NEX10(m)	4.3-10(m)	1	-160
JA-10MY	DC-6000	0.141	100	4.3-10(m)	7-16(m)	1	-158
JA-10MZ	DC-6000	0.141	100	4.3-10(m)	N(m)	1	-158
JA-20MX	DC-6000	0.141	100	4.3-10(m)	4.3-10(m)	2	-158
JA-20TX	DC-6000	0.141	100	4.3-10(m)	4.3-10(f)	2	-158
JA-20-MG-ME	DC-6000	0.141	100	2.2-5(m)	4.3-10(m)	2	-160
JA-20-MT-ME	DC-6000	0.141	200	NEX10(m)	4.3-10(m)	2	-160
JA-20MZ	DC-6000	0.141	100	4.3-10(m)	N(m)	2	-158
P2RFC-4870-39	DC-6000	0.138	100	2.2-5(m)	N(m)	1	-155
P2RFC-2402-39	DC-6000	0.138	100	4.3-10(m)	QMA(m)	1	-155
P2RFC-2962-39	DC-6000	0.138	100	NEX10(m)	NEX10(m)	1	-160
P2RFC-4870-79	DC-6000	0.138	100	2.2-5(m)	N(m)	2	-155
P2RFC-2402-79	DC-6000	0.138	100	4.3-10(m)	QMA(m)	2	-155
P2RFC-2962-79	DC-6000	0.138	100	NEX10(m)	NEX10(m)	2	-160
P2RFC-4676-39	DC-6000	1/4	600	4.3-10(m)	4.3-10 (m)	1	-160
P2RFC-2453-39	DC-6000	1/4	600	4.3-10(m)	4.3-10 (f)	1	-160
P2RFC-2898-39	DC-6000	1/4	600	4.3-10(m)	NEX10 (m)	1	-160
P2RFC-4798-39	DC-6000	1/4	600	4.3-10(m)	2.2-5 (m)	1	-160
P2RFC-4676-79	DC-6000	1/4	600	4.3-10(m)	4.3-10 (m)	2	-160
P2RFC-2453-79	DC-6000	1/4	600	4.3-10(m)	4.3-10 (f)	2	-160
P2RFC-2898-79	DC-6000	1/4	600	4.3-10(m)	NEX10 (m)	2	-160
P2RFC-4798-79	DC-6000	1/4	600	4.3-10(m)	2.2-5 (m)	2	-160

* Additional connector, cable type, and lengths available. Ask your Microlab Sales Representative about our quick-turn Custom Jumper Program.

Radio/DAS Point of Interface

Model	Description	Frequency (MHz)	Power Rating (W)	Conn. Type	Ingress	PIM (dBc)
DCC602-C39	4-ch 2:1 Combiner, 2RU	617-2700	5	4.3-10 (f)	IP67	-155
DCC602-C40	4-ch 2:1 Combiner, 2RU	617-2700	25	4.3-10 (f)	IP67	-155

Custom Passive Trays

Model	Description	Frequency (MHz)	Power Rating (W)	Conn. Type	Ingress	PIM (dBc)
SPT4RU2	(8) 1x2 Splitter Panel	617-2700	50	4.3-10 (f)	IP65	-154
PP-220FE	2RU Demarcation Panel	DC-6000	100	(20x) 4.3-10 (f-f)	--	-165

* Microlab offers additional custom and integrated solutions. Ask your Microlab Sales Representative about custom solutions.

DCC602-C40

JA-10MX

PP-220FE

See individual data sheet for complete specifications.

MCC Series™

Microlab's MCC Series™ is a Passive Modular Carrier Combiner for Neutral Host DAS/D-RAN Architectures. MCC is suitable for combining multi-band multi-operator radio signals for in-building and Outdoor DAS Applications. The modular configuration allows flexibility with individual scenarios and provides capabilities to easily add/upgrade over time. Featuring low-loss & low-PIM peformance up to 6GHz, the MCC ensures maximum throughput and coverage for 5G/4G networks

Features

- Modular Design
- Ultra-Wideband Operation (6GHz)
- C-Band / CBRS /Auction 110 (3.45GHz) Ready
- Low Loss and Low PIM performance for maximum network coverage and throughput
- Modular filter cards for popular Carrier configurations
- Up to 40W per Input
- IP67 rating for outdoor and indoor applications
- Rack and Wall-mount options available

MCC200-SRC-01

MCC200 with CM-141E-2R

MCC Ordering Guide

Modular Filter Cards	Description
MCC200-503	Modular Pentaplexer 600-700/850/PCS/AWS/5GNR n77 40W 160dBc 4.3-10 IP67
MCC200-502	Modular Pentaplexer 600-850/PCS/AWS/WCS-BRS/5GNR n77 40W 160dBc 4.3-10 IP67
MCC200-403	Quadraplexer 600-700/PCS/AWS/2.5 BRS, -160dBc 4.3-10 IP67
MCC200-100	Ultra-Wideband "Thru" Card 617-5925MHz, 4.3-10 IP67

Hybrid Matrix Options	Description
CM-141E-2R	Ultra-Wideband Dual-Channel 4x4 Hybrid Combiner, 617-5925MHz, 4.3-10, IP67, 2RU
CM-141E-4R	Ultra-Wideband Quad Hybrid Combiner 4X4 617-5925MHz 100W -161dBc 4.3-10 2RU
MCC200-SRC-01	Ultra-Wideband 4x4 Hybrid Combiner, 617-5925MHz, 4.3-10, IP67 with integrated wallmount 4-slot subrack
MCC200-SRC-02	Ultra-Wideband Twin 4x4 Hybrid Combiner, 617-5925MHz, 4.3-10, IP67 with integrated wall mount 4-slot subrack (2x2 MIMO application)

Rack and Peripherals	Description
MCC200-SRC-00	Modular Filter Card Subrack, 4-slot wall mount
MCC200-SRC-01	Ultra-Wideband 4x4 Hybrid Combiner, 617-5925MHz, 4.3-10, IP67 with integrated wall-mount 4-slot subrack
MCC200-SRC-02	Ultra-Wideband Twin 4x4 Hybrid Combiner, 617-5925MHz, 4.3-10, IP67 with integrated wall mount 4-slot subrack (2x2 MIMO application)
MCC200	Modular Filter Card Sub-Rack 8-slots 6RU
MCC200-A03	"Blanking" Faceplate for MCC200 Filter Card Slot .

Learn more at: microlabtech.com

For more information about Microlab contact your local representative.
Find a complete list here: microlabtech.com/sales/

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