

Developer and manufacturer:  
BHE, Bonn Hungary Ltd.  
H-1044 Budapest Ipari Park Str. 10.



# FREQUENCY CONVERTER CATALOGUE

Revision A

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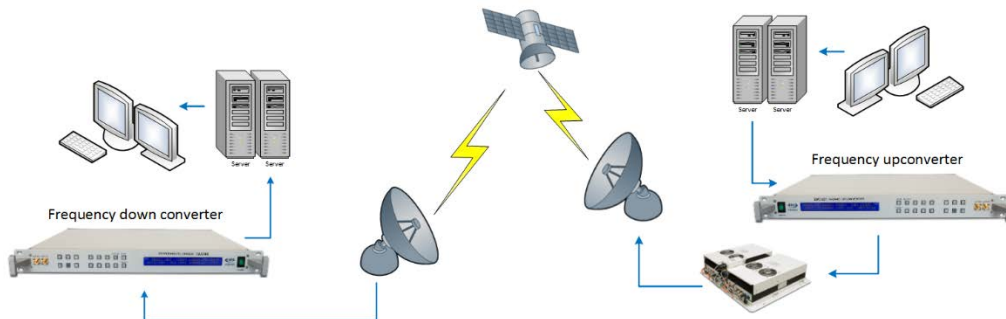


## BHE Bonn Hungary Electronics Ltd.

Microwave & RF Development & Manufacturing

🏠 H-1044 Budapest, Ipari Park u. 10. Hungary ✉ H-1325 Budapest, P.O.Box 164. Hungary

☎ +36 1 233 2138 📠 +36 1 233 2506 🌐 www.bhe-mw.eu ✉ info@bhe-mw.eu



Frequency converters are key part of satellite ground stations or test facilities to secure reliable communication link between ground and space segments. Standard up- and downconverters are typically used at telecommunication, broadcast or telemetry / telecommand ground stations to transform the baseband signal into the upper region of the frequency spectrum and vice versa. Test Loop Translators (TLT) are intended to check system performance of uplink / downlink ground station without using live satellite link. Excellent RF to RF signal conversion and precisely adjustable attenuation can simulate signal transmission path for testing purposes.

BHE converter portfolio gives comprehensive selection for ground station operators to pick tuneable or block converter, stand-alone or redundant systems for indoor or outdoor environmental application. More standard stand-alone up and downconverters supplementing with switch and control unit can be organized into 1:1 or 2:1 redundant converter system in order to increase reliability.

Multi-channel downconverters driven by common local and reference signal are perfect solutions for satellite tracking purposes where signals get combined coming from different dishes to calculate azimuth and elevation angle data.

In order to ensure proper synchronization at satellite stations the majority of the converters can automatically sense the presents of external reference signal and switch to it from its internal reference source. The typical frequency of such external reference signal could be 5 MHz / 10 MHz.

## References

We at BHE are very proud of supplying such professional customers like ISRO (Indian Space Research Organisation) and its organisations such as NRSC, SAC, MCF, ISTRAC, SHAR, Indonesia's space agency LAPAN, the KARI in South Korea and SatRec. BHE supplied the 3 channel downconverters for the ground station for India's Mars Mission. Among of many other system integrator BHE has the honour to supply such valued customers like ESA and DLR.



1. Figure BMCD35 S-band 3 channel downconverter



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### Downconverters

MODEL	RF BAND	No OF CHANNELS	RF START FREQUENCY [MHz]	RF STOP FREQUENCY [MHz]	RF STEP RESOLUTION	IF FREQUENCY [MHz]	IF BW [MHz]	REMOTE INTERFACE	STANDARD ENCLOSURE
<b><u>BMCD24</u></b>	L S	1 1	1430 2200	1545 2300	100 kHz	70	20	RS-232	module
<b><u>BMCD48</u></b>	S	1	2000	2400	1 kHz	70	40	TCP/IP	19", 1 U rack mountable
<b><u>BMCD25</u></b>	S X	1 1	2200 8020	2400 8420	500 kHz	137,5 720	40	RS-422	module
<b><u>BMCD33</u></b>	S	1	2200	2300	1 kHz	70	2	RS-232	19", 1 U rack mountable
<b><u>BMCD35</u></b>	S	3	2200	2300	1 kHz	70	40	TCP/IP	19", 2 U rack mountable
<b><u>BMCD63</u></b>	S	1	2200	2300	1 kHz	70	40	TCP/IP	19", 2 U rack mountable
<b><u>BMCD80</u></b>	S	6	2200	2300	1 kHz	70	40	TCP/IP	19", 3 U rack mountable
<b><u>BMCD17</u></b>	C	2	3400	4200	block	1350	800	RF tone	IP67 outdoor
<b><u>BMCD54</u></b>	C	3	3625	4200	1 kHz	70	15	RS-422	19", 2 U rack mountable
<b><u>BMCD55</u></b>	C	1	3625	4200	1 kHz	70	36	TCP/IP and RS-485	19", 1 U rack mountable
<b><u>BMCD60</u></b>	C	3	3625	4200	1 kHz	70	60	TCP/IP	19", 2 U rack mountable
<b><u>BMCD29</u></b>	C	2	3625	4200	1 kHz	70	15	RS-422 / RS-485	19", 1 U rack mountable
<b><u>BMCD36</u></b>	C	1	5850	6450	1 kHz	3912,5	575	RS-422	IP67 outdoor
<b><u>BMCD41</u></b>	C	1	5850	6425	1 kHz	3912,5	575	RS-422	19"/3, 1 U rack mountable
<b><u>BMCD57</u></b>	C	1	5850	6425	1 kHz	3912,5	575	RS-422	IP67 outdoor
<b><u>BMCD40</u></b>	C	1	5850	6725	block	1387,5	875	DC voltage	IP67 outdoor
<b><u>BMCD43</u></b>	C	1	6712,5	6712,5	block	3412,5	0,5	TCP/IP	IP67 outdoor
<b><u>BMCD64</u></b>	X	1	7900	8400	1 kHz	720	400	TCP/IP	19", 1 U rack mountable
<b><u>BMCD49</u></b>	X	1	8000	8500	1 kHz	720	400	TCP/IP	19", 1 U rack mountable
<b><u>BMCD66</u></b>	X	1	8000	9000	1 kHz	720	400	TCP/IP	19", 1 U rack mountable
<b><u>BMCD32</u></b>	X	2	8025	8400	100 kHz	720	600	TCP/IP	19", 1 U rack mountable



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MODEL	RF BAND	NO OF CHANNELS	RF START FREQUENCY [MHz]	RF STOP FREQUENCY [MHz]	RF STEP RESOLUTION	IF FREQUENCY [MHz]	IF BW [MHz]	REMOTE INTERFACE	STANDARD ENCLOSURE
<b><u>BMCD76</u></b>	X	3	8025	8500	1 kHz	70	50	TCP/IP	19", 2 U rack mountable
<b><u>BMCD52</u></b>	X	1	8400	8500	1 kHz	70	50	TCP/IP	19", 1 U rack mountable
<b><u>BMCD27</u></b>	Ku	1	10700	12750	block	1325	750	TCP/IP	19", 1 U rack mountable
<b><u>BMCD34</u></b>	Ku	1	10700	12750	block	1475	1050	DC voltage	IP67 outdoor
<b><u>BMCD45</u></b>	Ku	1	10800	12800	1 kHz	720 / 70	220 / 40	TCP/IP	19", 1 U rack mountable
<b><u>BMCD19</u></b>	X	2	10900	11700	block	1350	800	RF tone	IP67 outdoor
<b><u>BMCD31</u></b>	Ku	3	10950	12750	1 kHz	70	40	RS-422	19", 1 U rack mountable
<b><u>BMCD59</u></b>	X	1	10950	11700	1 kHz	70	40	RS-422 / RS-485	19", 1 U rack mountable
<b><u>BMCD37</u></b>	Ku	1	10950	12750	100 kHz	70	36	TCP/IP and RS-485	19", 1 U rack mountable
<b><u>BMCD21</u></b>	Ku	2	11700	12250	block	1225	550	RF tone	IP67 outdoor
<b><u>BMCD22</u></b>	Ku	2	12250	12750	block	1200	500	RF tone	IP67 outdoor
<b><u>BMCD68</u></b>	Ku	1	13750	14500	block	11750	2050	TCP/IP	19", 1 U rack mountable
<b><u>BMCD39</u></b>	Ku	3	34500	35500	external local	2940	20	RS-422	module

Order of RF start frequency



2. Figure BMCD40 C-band block converter



3. Figure BMCD37 Ku-band downconverter



2. Figure BMCU21 S-band upconverter



3. Figure BMCU15 5 W Ka-band upconverter



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**Upconverters**

MODEL	RF BAND	No OF CHANNELS	RF START FREQUENCY [MHz]	RF STOP FREQUENCY [MHz]	RF STEP RESOLUTION	IF FREQUENCY [MHz]	IF BW [MHz]	REMOTE INTERFAC E	STANDARD ENCLOSURE
<b><u>BMCU17</u></b>	S	1	2025	2120	1kHz	70	8	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU20</u></b>	S	1	2025	2120	1kHz	70	8	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU21</u></b>	S	1	2200	2300	1kHz	70	10	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU32</u></b>	S	1	2000	2400	1 kHz	70	20	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU23</u></b>	S	1	2200	2300	1kHz	2072,5	95	TCP/IP	IP67 OUTDOOR
<b><u>BMCU29</u></b>	S	1	2200	2300	1kHz	2072,5	95	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU44</u></b>	S	1	2020	2120	1kHz	230	40	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU34</u></b>	C	1	7145	7235	1 kHz	70	8	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU33</u></b>	C	1	7145	7235	1 kHz	230	8	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU38</u></b>	C	1	5850	6450	1 kHz	70	8	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU12</u></b>	X	1	7950	8550	500 kHz	720	600	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU31</u></b>	X	1	8000	8500	100 kHz	820	240	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU14</u></b>	X	1	8025	8400	500 kHz	720	600	TCP/IP	19", 1 U RACK MOUNTABLE
<b><u>BMCU13</u></b>	KU	1	12750	13250	BLOCK	1200	500	NA	IP67 OUTDOOR
<b><u>BMCU25</u></b>	KU	1	13750	14500	100 kHz	70	36	RS-485	19", 1 U RACK MOUNTABLE
<b><u>BMCU26</u></b>	KU	1	13750	14500	BLOCK	1325	750	RS-232	IP67 OUTDOOR
<b><u>BMCU15</u></b>	KA	1	25750	26250	BLOCK	1200	500	TCP/IP	MODULE
<b><u>BMCU22</u></b>	KA	1	25750	26250	BLOCK	1200	500	TCP/IP	MODULE

Order of RF start frequency

## Test Loop Translators

MODEL	RF BAND	CHANNEL NO	RF START FREQUENCY [MHz]	RF STOP FREQUENCY [MHz]	RF STEP RESOLUTION	OUTPUT RF RANGE	SEE ALSO
<b><u>BMCU23</u></b>	S	1	2025	2120	1 kHz	2200-2300 MHz	UPCONVERTERS
<b><u>BMCU29</u></b>	S	1	2025	2120	1 kHz	2200-2300 MHz	UPCONVERTERS
<b><u>BMCD28</u></b>	C	1	5850	6450	1 kHz	3625-4200 MHz	DOWNCONVERTERS
<b><u>BMCD36</u></b>	C	1	5850	6450	1 kHz	3625-4200 MHz	DOWNCONVERTERS
<b><u>BMCD41</u></b>	C	1	5850	6425	1 kHz	3625-4200 MHz	DOWNCONVERTERS
<b><u>BMCD43</u></b>	C	1	6700	6730	block	3397-3427 MHz	DOWNCONVERTERS

Order of RF start frequency



4. Figure BMCU29 S-band TLT



5. Figure BMCD43 C-band TLT



8. Figure BMCD41 C-band TLT

## Redundant systems

MODEL	RF BAND	RF RANGE	IF BAND	TUNABLE	ORDER OF REDUNDANCY	CONTROL UNIT	SEE ALSO
<b><u>BMCR10-D2</u></b>	S	2000-2400 MHz	70 MHz	1 kHz	2:1	BUSR10	DOWNCONVERTERS, BMCD48
<b><u>BMCR11-D2</u></b>	X	8000-8500 MHz	720 MHz	1 kHz	2:1	BUSR11	DOWNCONVERTERS, BMCD49
<b><u>BMCR12-U2</u></b>	S	2000-2400 MHz	70 MHz	1 kHz	2:1	BUSR10	UPCONVERTERS, BMCU32

Order of RF start frequency



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### **About us**

BHE has been supporting the RF and Microwave industry since 1991. Its products are operating on ground, aerial and space level. As key part of such communication systems BHE developed and manufactured a number of frequency converters which have led to a comprehensive portfolio in this area. The selection includes both standard and custom-tailored solutions. Flexibility, reliability and more than twenty years of experience make BHE a professional manufacturer.



BHE has the honour to supply major companies worldwide who are leaders in the RF satellite communication and supporting segment. Existing models cover the generally used frequency ranges from L to Ku band. BHE puts great efforts to select all key components carefully not compromising when it comes to state-of-the-art semiconductors.



The assembling and testing are done in professionally equipped assembling and microwave test laboratories. Beyond RF testing BHE established special EMC and environmental testing facility in order to keep in one hand all the essential testing processes. Unwanted signal emissions, immunity measurement, checking proper operation during vibration or in extreme temperature ranges are just some of the test processes we can perform.



As a result of the compounded experience in the field of microwave development and manufacturing BHE has a comprehensive portfolio of RF frequency converter equipment by now. The products have excellent RF parameters, and high reliability. The modular construction makes BHE's products flexible and custom tailored. All components are selected carefully in order to achieve the highest level of reliability and working perfectly for long time on a 24/7 basis.

Further information can be found in our web site on

**[www.bhe-mw.eu](http://www.bhe-mw.eu)**

or ask a quotation via

**[sales@bhe-mw.eu](mailto:sales@bhe-mw.eu)**