BU-1000/155 OPERATIONAL DESCRIPTION, PARTS LIST & INSTALLATION

David Smith of Burghardt Inc produced the following operational description and parts listing. This text is repeated in the technical description of the report.

THEORY OF OPERATION
The BU-1000/155 is a low power data transceiver.

RECEIVER SECTION
The receiver is a double conversion superheterodyne design. When in the receive mode, signal is allowed to pass to the Q1 RF AMP, where it is amplified and sent to U1 for the first mix. X2 is a 3rd overtone crystal which is tripled by Q2 to produce the first mix frequency. The first mixer is located in U1 and produces a 10.7MHZ first IF. X1 produces the 2nd mix frequency of 10.245MHZ. It is mixed in U1 to produce a 455KHZ 2nd IF frequency. Receiver audio is then detected in U1 to produce RXA out.

TRANSMIT SECTION
Modulation is applied to D3 varactor and is used to shift the frequency of X201 to produce FM modulation. X201 is a 3rd overtone crystal. Its frequency is tripled by Q241 to give the appropriate output frequency. It is then amplified by Q242 pre-driver and Q243 final. It is passed through D440/441 switching when in transmit mode and from there applied to the antenna.

BU-1000/155 SPECIFICATIONS:

GENERAL:
FREQUENCY COVERAGE:1 CHANNEL(150 to 160 MHz)
TX CURRENT DRAW: 250MA
RX CURRENT DRAW: 120MA

RECEIVER:
SENSITIVITY: 10DB SINAD AT .8UV
AUDIO OUTPUT LEVEL: 2VPP AT 3KHZ DEVIATION
1ST IF FREQUENCY: 10.7 MHz
2ND IF FREQUENCY: 455 kHz

TRANSMITTER
POWER: 250MW

BU-1000/155 OPERATIONAL DESCRIPTION, PARTS LIST & INSTALLATION

BU-1000/155 DATA TRANSCEIVER BOARD PARTS LIST
(155 MHz)

RECEIVER SECTION

C2,8,10,11,13,16,17,18,19,20,23,24	.1UF NEWARK 07WX6808
C6	33PF DIGIKEY PCC330CCT-ND
C7	18PF DIGIKEY PCC180CCT-ND
C14	120PF DIGIKEY PCC121CCT-ND
C4	4.7PF DIGIKEY PCC4R7CCT-ND
C15,1	47PF DIGIKEY PCC470CCT-ND
C5	22PF DIGIKEY PCC220CCT-ND
C12	1UF TANTILUM NEWARK 93F2694
C9	3.9PF DIGIKEY PCC3R9CCT-ND
C3	100PF DIGIKEY PCC101CCT-ND
C25	1000PF DIGIKEY PCC102BCT-ND
C21	2200PF DIGIKEY PCC222BCT-ND
R6,2	470 NEWARK 07WX0214
R10,12	39K NEWARK 08WX8266
R3,7,8	1K NEWARK 07WX0211
R4	5.6K NEWARK 08WX8274
R5	15K NEWARK 08WX7826
R1	100K NEWARK 96F6995R100.0K
R9	10K NEWARK 08WX8237
R11,13	22K NEWARK 08WX8252
R14	330 OHM 1/2 WATT DIGIKEY 330H-ND
FL1	MURATA SFE10.7MJA10-A
FL2	MURATA CFU455B2
L1	43NH DIGIKEY DN4010-ND
L2	1.5UH DIGIKEY TK1412-ND
L3	.108UH DIGIKEY TK2713-ND
L4	.64MH DIGIKEY TK1302-ND
U1	MC13135DW NEWARK 07F2896
U2	78L05ACP NEWARK 07F7397
X1	10.245 MHz BOMAR
X2	SELECTED BOMAR
Q1	MRF901 NEWARK 08F1298
Q2	2N3904 NEWARK 09F5663
ZD1	6.8 V 1/2 WATT ZENER NEWARK 09F4090

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TRANSMITTER SECTION	
C265,252,259,260,261,263,272	.1UF NEWARK 07WX6808
C253,254,269	47PF DIGIKEY PCC470CCT-ND
C255	18PF DIGIKEY PCC180CCT-ND
C224	3.9PF DIGIKEY PCC3R9CCT-ND
C262,250	220PF DIGIKEY PCC221BCT-ND
C258	6.8PF DIGIKEY PCC6R8CCT-ND
C251,221,222	8.2PF DIGIKEY PCC8R2CCT-ND
C257	27PF DIGIKEY PCC270CT-ND
C264	15PF DIGIKEY PCC150CCT-ND
C267	2.2PF DIGIKEY PCC2R2CCT-ND
C271,273	1000PF DIGIKEY PCC102BCT-ND
C256	33PF DIGIKEY PCC330CCT-ND
C268	.01UF DIGIKEY PCC103BCT-ND
R210	470 OHM NEWARK 07WX0214
R212	15K NEWARK 08WX7826
R221,216,211,217	1K NEWARK 07WX0211
R214	5.6K NEWARK 08WX8274
R215,220	18K DIGIKEY P18KECT-ND
R219,223	100K NEWARK 96F6995R100.0K
R222,218	10 OHM DIGIKEY P10ECT-ND
R224	4.7K DIGIKEY P4.7KECT-ND
R225	330 OHM 1/2 WATT DIGIKEY 330H-ND
R226	150 OHM DIGIKEY P150ECT-ND
L290	1.5UH DIGIKEY TK1412-ND
L291	.137UH DIGIKEY TK2714-ND
L292,296,297,299	43 NH DIGIKEY DN4010-ND
L294,300	1UH DIGIKEY PCD1131CT-ND
L295	.241UH DIGIKEY TK2707-ND
L293	.375UH DIGIKEY TK2729-ND
L298	.211UH DIGIKEY TK2706-ND
Q242,241	MRF901 NEWARK 08F1298
Q243	2N4427 NEWARK 10WX2083
X201	SELECTED
ZD2	6.8V ZENER NEWARK 09F4090
D3	MV2105 VARACTOR NEWARK 08F2197

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COMMON SECTION

R401,402,403,400	1K NEWARK 07WX0211
C460,461	.1UF NEWARK 07WX6808
L475	56UH DIGIKEY PCD1106CT-ND
D440,441	MPN3404 NEWARK 07F9506
Q450	2N3906 DIGIKEY 2N3906DICT-ND
LED1	GREEN LED DIGIKEY 67-1059-ND
LED2	RED LED DIGIKEY 67-1065-ND
CN1	5 PIN JACK DIGIKEY H2097-ND
CN2	BNC JACK DIGIKEY ARF1178-ND
2 PIN JACK(OPTIONAL)	DIGIKEY H2094-ND
5 PIN PLUG(ACCESSORY)	DIGIKEY H2086-ND
2 PIN PLUG(OPTIONAL)	DIGIKEY H2083-ND
PINS(ACCESSORY)	DIGIKEY H2138-ND

BU-1000 INSTALLATION

The BU-1000/155 has a 5 pin connector for hookup to the MRU (meter reading unit) modem and a BNC connector for connection to a half wave dipole. The pinout of the 5 pin connector is as follows.

1) PTT (push to talk)
2) 12V (regulated 12 volt input)
3) Mod in (modulation input)
4) RXA (receiver audio output)
5) GND (ground)

The BU-1000/155 is to be installed and maintained by authorized personnel only.