

GM3014-HYB DATA SHEET
FEATURES

- **programmable parameters**
 - gain
 - low pass filter
 - high pass filter
 - AGC threshold
 - release time
 - MPO
- **fixed attack time**
- **typical gain 41 dB**
- **class D receiver compatible**
- **EEPROM non-volatile memory**
- **RAM memory for temporary storage**

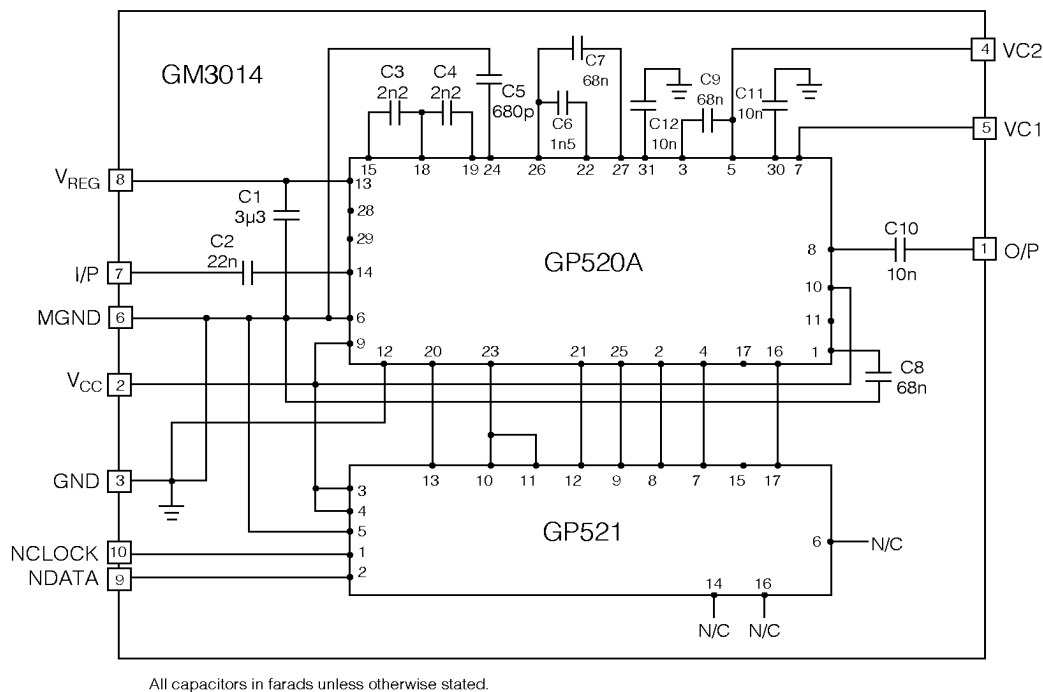
STANDARD PACKAGING

- Hybrid Typical Dimensions
0.348 in x 0.192 in x 0.110 in
(8.84 mm x 4.88 mm x 2.80 mm)

DESCRIPTION

The programmable hybrid is composed of the GP520A analog signal processor, the GP521 controller memory chip and twelve coupling and filtering capacitors. The hybrid utilizes optimal technology for each block of the system. The bipolar analog signal path results in high fidelity acoustic performance of the hearing instrument. The CMOS memory / controller allows for unlimited reprogramming of the RAM memory. Once the final fitting is determined it can be stored in the EEPROM permanent memory. The information is retained even when the battery is removed. The advantage of the hybrid is that it offers a complete system. Only three external components (microphone, class D integrated receiver and volume control) are necessary to make a final hearing instrument.

For hybrid communication protocol refer to the GP521 Data Sheet Document No. 510 - 79.


FUNCTIONAL BLOCK DIAGRAM

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE/UNITS
Supply Voltage	3 V DC
Pad 9,10	$V_{CC} + 200\text{mV}$ to GND -200mV
Pad 8, 7, 1	-0.1V to $V_{CC} + 0.1\text{V}$
Pad 5,4	-0.1V to 0.7V
Operating Temperature Range	0°C to 50°C

CAUTION
CLASS 1 ESD SENSITIVITY



PAD CONNECTION

O/P	1
V_{CC}	2
GND	3
VC2	4
VC1	5
MGND	6
I/P	7
V_{REG}	8
NDATA	9
NCLOCK	10

ELECTRICAL CHARACTERISTICS

Conditions: Frequency = 3 kHz, Temperature = 25°C , Supply Voltage $V_B = 1.3\text{VDC}$, The programmable parameters are adjusted to the following set values unless otherwise specified :

G1 - 15 (Gain 1) G2 - 15 (Gain 2) R_B - 15 (Receiver Bias Voltage) LP - 0 (Low Pass Filter)
HP - 15 (High Pass Filter) CL - 15 (Clipper) TR - 15 (AGC Threshold Level) RT - 15 (Release Time)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Minimum Battery Voltage	V_{CCMIN}		1.1	-	-	V
Quiescent Supply Current	I_{TOT}		425	600	900	μA
Voltage Regulator	V_{REG}		880	910	1000	V
Input Referred Noise	IRN	NFB 100 to 10 kHz at 12dB/oct	-	3.5	-	μVRMS
Attack Time	t_A		-	-	-	ms
Low Level (Pad 9, 10)	V_L		-	-	200	mV
High Level (Pad 9, 10)	V_H		$V_{CC} - 0.2$	-	-	V
Programmable Data Rate		$R_{PULLUP} = 10\text{ k}\Omega$	-	10.0	-	kHz
PROGRAMMABLE FUNCTIONS						
Electrical Gain	A_{3k}	$V_{IN} = -79\text{ dBV}$	36	40.0	44	dB
Electrical Gain Range	ΔA_{3k}	Note 1	28	32.5	36	dB
High Pass Filter Normalized Gain	$A_{N(850)}$	$V_{IN} = -59\text{ dBV}; f = 850\text{Hz}$ Note 2; HP - 0	11	18.8	23	dB
High Pass Filter Normalized Gain	$A_{R(120)}$	$V_{IN} = -59\text{ dBV}; f = 120\text{Hz}$ Note 3; HP -12	-6	-0.7	6	dB
Low Pass Filter Normalized Gain	$A_{N(20k)}$	$V_{IN} = -59\text{ dBV}; f = 20.0\text{kHz}$ Note 2	8.5	16.0	22.5	dB
Low Pass Filter Normalized Gain	$A_{R(3k)}$	$V_{IN} = -59\text{ dBV}; f = 3.1\text{kHz}$ Note 3; LP - 15	-4	1.0	4	dB

ELECTRICAL CHARACTERISTICS continued

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
MPO Level	V_{MPO}	$V_{IN} = -40\text{ dBV}$, $CL = 0$	-41	-39	-37	dBV
MPO Range	ΔMPO	Note 4	16.5	21	24.5	dB
MPO Range 2	$\Delta MPO2$	Note 5	9.0	12.0	14.0	dB
AGC Low Gain	A_{AGC}	Note 6	-5	0	+5	dB
AGC Range	ΔA_{AGC}	Note 7	11.5	14.9	17.5	dB
Minimum Release Time	t_{REL}		-	30	-	ms
Release Time Factor	$Fact_{REL}$		-	15	-	factor

All switches are as shown in Test Circuit unless otherwise specified.

- Notes:**
1. $\Delta A_{3k} = A_{3k} - (|V_{OUT}| - |V_{IN}|) = [V_{IN} = -59\text{ dBV}; G1 - 0; G2 - 0]$
 2. $A_N = A_{3k} - (|V_{OUT}| - |V_{IN}|)$
 3. $A_R = A_N - (|V_{OUT}| - |V_{IN}|)$
 4. $\Delta MPO = V_{MPO} - V_{OUT} [V_{IN} = -40\text{ dBV}; CL - 15]$
 5. $\Delta MPO2 = V_{MPO} - V_{OUT} [V_{IN} = -40\text{ dBV}; CL - 8]$
 6. $A_{AGC} = V_{OUT} - V_{IN} [V_{IN} = -40\text{ dBV}; G1 - 7; G2 - 0]$
 7. $\Delta A_{AGC} = A_{AGC} - (V_{OUT} - V_{IN}) [V_{IN} = -40\text{ dBV}; G1 - 7; G2 - 0; TR - 0]$

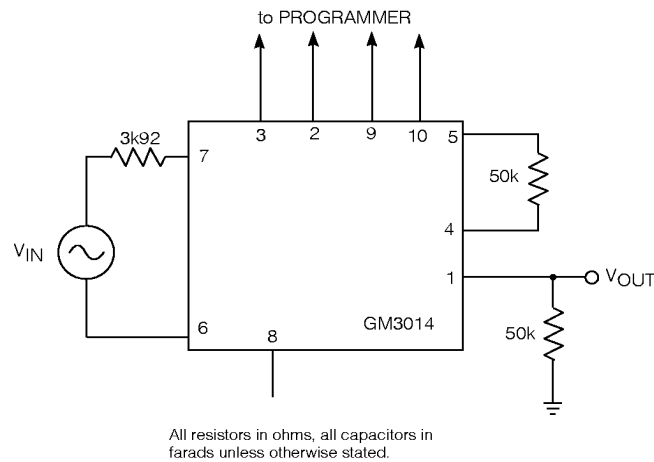


Fig. 1 Production Test and Characterization Circuit

TYPICAL ELECTRICAL RESPONSES

Input Level - 68 dBV unless otherwise stated

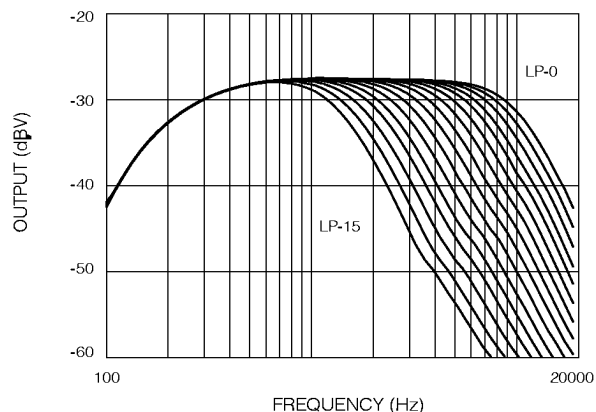


Fig. 5 Frequency Response for Low Pass Filter Settings (LP = 0 to 15)

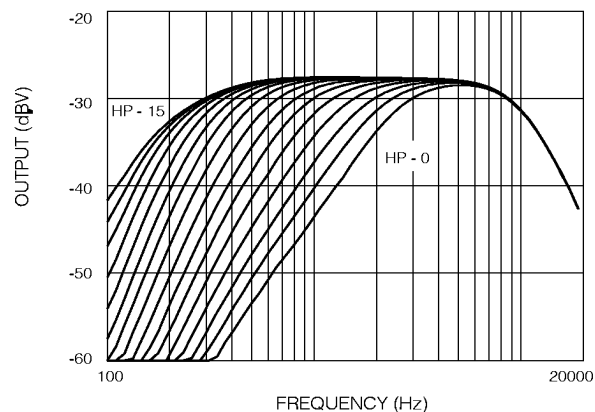


Fig. 6 Frequency Response for Different High Pass Filter Settings (HP = 0 to 15)

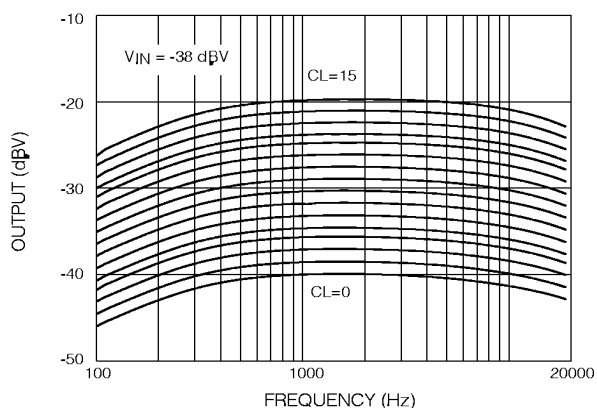


Fig. 7 Frequency Response for Different MPO Settings (CL = 0 to 15)

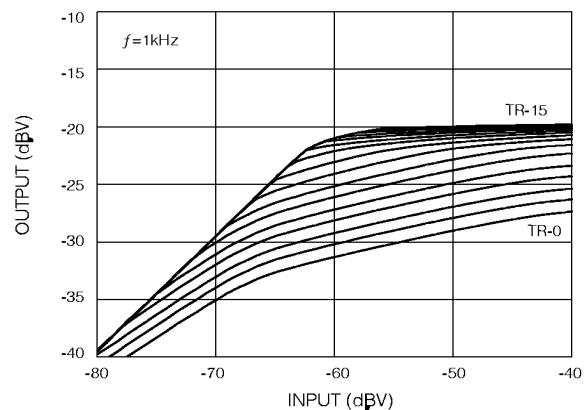


Fig. 8 I/O Response for Different Threshold Settings (TR = 0 to 15)

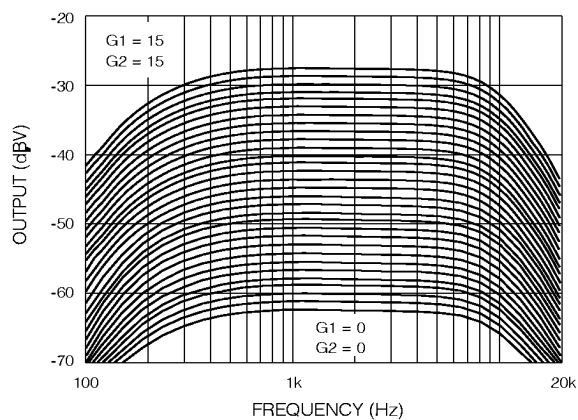


Fig. 9 Frequency Response for Different Gain Settings (G1, G2 = 0 to 15)

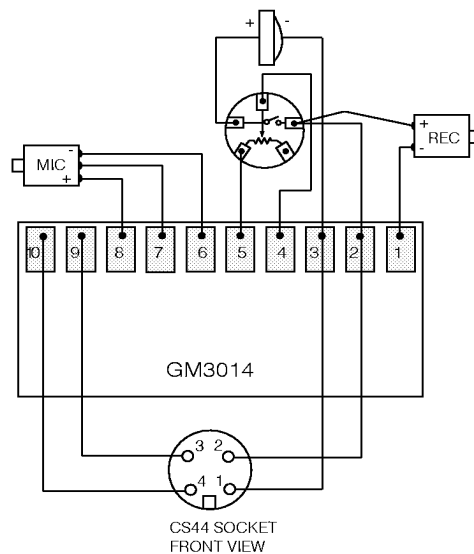
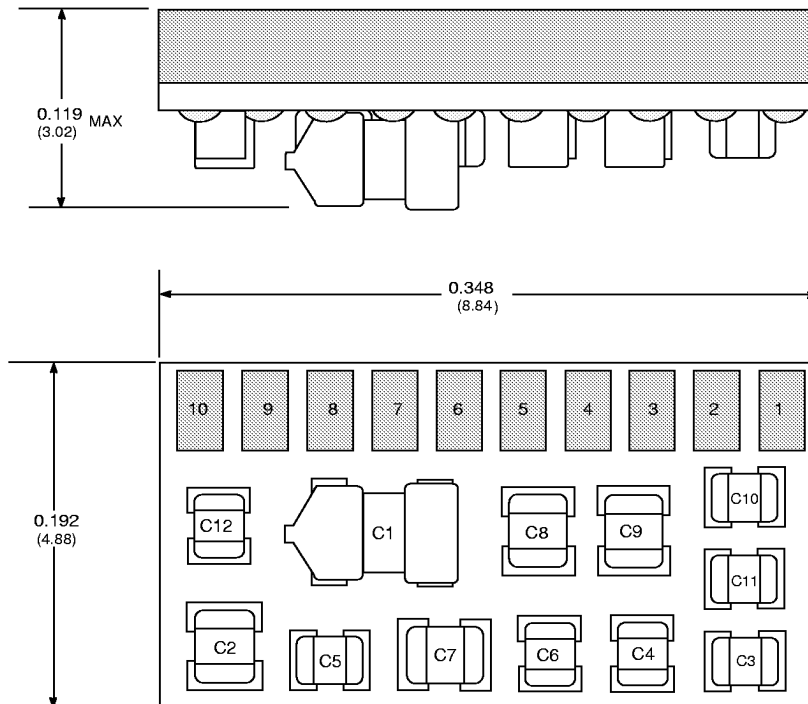
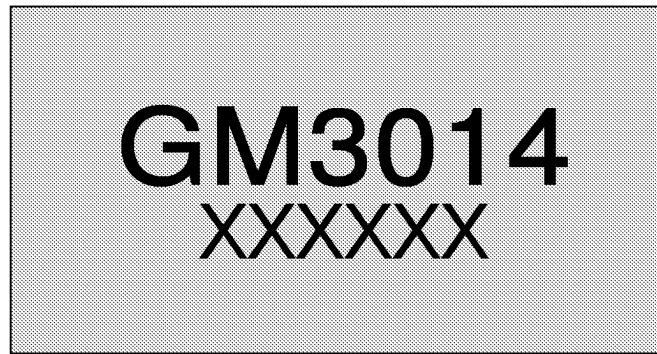


Fig.10 Assembly Diagram



Dimension units are inches.
 Dimensions in parenthesis are in millimetres
 converted from inches and include minor rounding errors.
 1.000 inches = 25.40 mm.
 Pad size 0.045 x 0.025 (1.14 x 0.64)
 Dimension tolerances: ± 0.005 (+0.13) unless otherwise stated.
 Pad numbers and capacitor numbers for illustration only.
 XXXXXX - work order number.
 This hybrid is designed for point to point manual soldering.

Fig. 11 Hybrid Layout & Dimensions

DOCUMENT IDENTIFICATION: DATA SHEET

The product is in production. Gennum reserves the right to make changes at any time to improve reliability, function or design, in order to provide the best product possible.

REVISION NOTES:

Updated to Data sheet

Gennum Corporation assumes no responsibility for the use of any circuits described herein and makes no representations that they are free from patent infringement.

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