

**PLANAR MONOLITHIC INDUSTRIES, INC.**

**TEST DATA**

**ON**

**6.0 TO 18.0 GHz**

**18dB GAIN**

**4 STAGE**

**LOW NOISE FRONT END AMPLIFIER  
(LNA)**

**PMI MODEL No: PMI-20A4-618**

**(SERIAL NUMBERS: PM41010, 41012, 41013, 41014,  
41015, 41016, 41017, 41018 & 41020)**

**DESIGNED  
BY  
A. K. GORWARA**

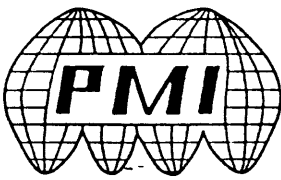
**TESTED  
BY  
B. BAKER**

**REPORTED  
BY  
P. WOOD**

**DECEMBER 9, 1995**

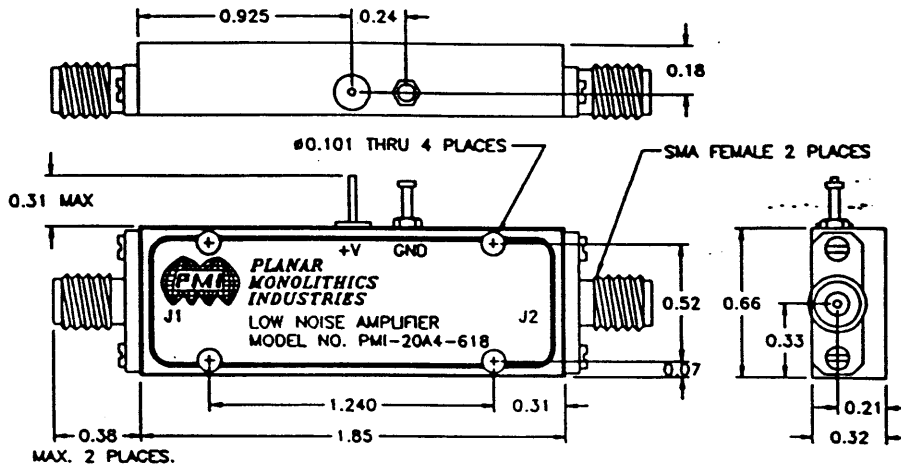
**PLANAR MONOLITHICS INDUSTRIES, INC.**

**ENGINEERING AND CORPORATE OFFICES: 1112 PERKIOMENVILLE ROAD, PERKIOMENVILLE, PA 18074  
MANUFACTURING AND SALES OFFICES: 7311-G GROVE ROAD, FREDERICK, MD 21704  
TELEPHONE: 301-662-4700, FAX: 301-662-4938**



**PLANAR MONOLITHIC INDUSTRIES, INC.**

## 6.0 TO 18.0 GHz, 4 STAGE, LOW NOISE FRONT END AMPLIFIER



## PMI MODEL No: PMI-20A4-618

### SPECIFICATIONS:

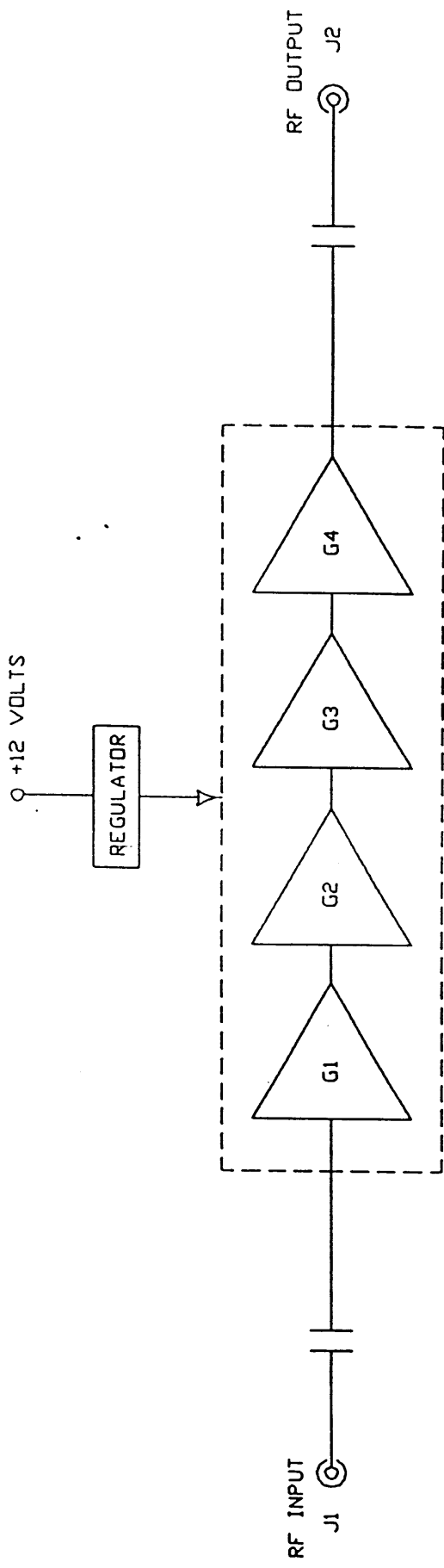
- FREQUENCY RANGE : 6.0 TO 18.0 GHz
- GAIN : 18 dB MIN. @ ROOM TEMPERATURE
- FLATNESS :  $\pm 1.25$  dB MAX.
- VARIATION/TEMPERATURE :  $\pm 3.0$  dB MAX. @ -55 TO +70°C
- NOISE FIGURE : 6.0 dB MAX.
- POUT @ 1 dB COMPRESSION : +13 dBm MIN.
- VSWR (IN/OUT) : 2.0:1 MAX.
- DC POWER SUPPLY : +12 vdc @ 180 mA
- SIZE/WEIGHT : 1.85" X 0.66" X 0.32", <3

**DECEMBER 9, 1995**

**PLANAR MONOLITHICS INDUSTRIES, INC.**

**ENGINEERING AND CORPORATE OFFICES: 1112 PERKIOMENVILLE ROAD, PERKIOMENVILLE, PA 18074**  
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**TELEPHONE: 301-662-4700, FAX: 301-662-4938**

# FUNCTIONAL SCHEMATIC



PLANAR MONOLITHICS INDUSTRIES  
7311F GROVE RD., FREDERICK, MD. 21701  
TEL: (301) 662-4700 FAX: (301) 662-4938

APPROVALS	DATE
DRAWN <i>W/gp</i>	9/23/93
CHECKED <i>G.S.B.</i>	9/25/93

PRODUCT FEATURE  
PMI-20A4-618

LOW NOISE FRONT END 4 STAGE AMPLIFIER

SIZE A SHEET 2 OF 2 Dwg. # 100-3689



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PH41010

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+19.1 dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.9 dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-10.2 dB IN -11.1 dB OUT	✓
8	DC SUPPLY	+12V @ 180 mA TYPICAL	85 mA	✓

PRODUCTION MANAGER APPROVAL: [Signature]

DATED: 5/26/95

QA/QC APPROVAL: [Signature]

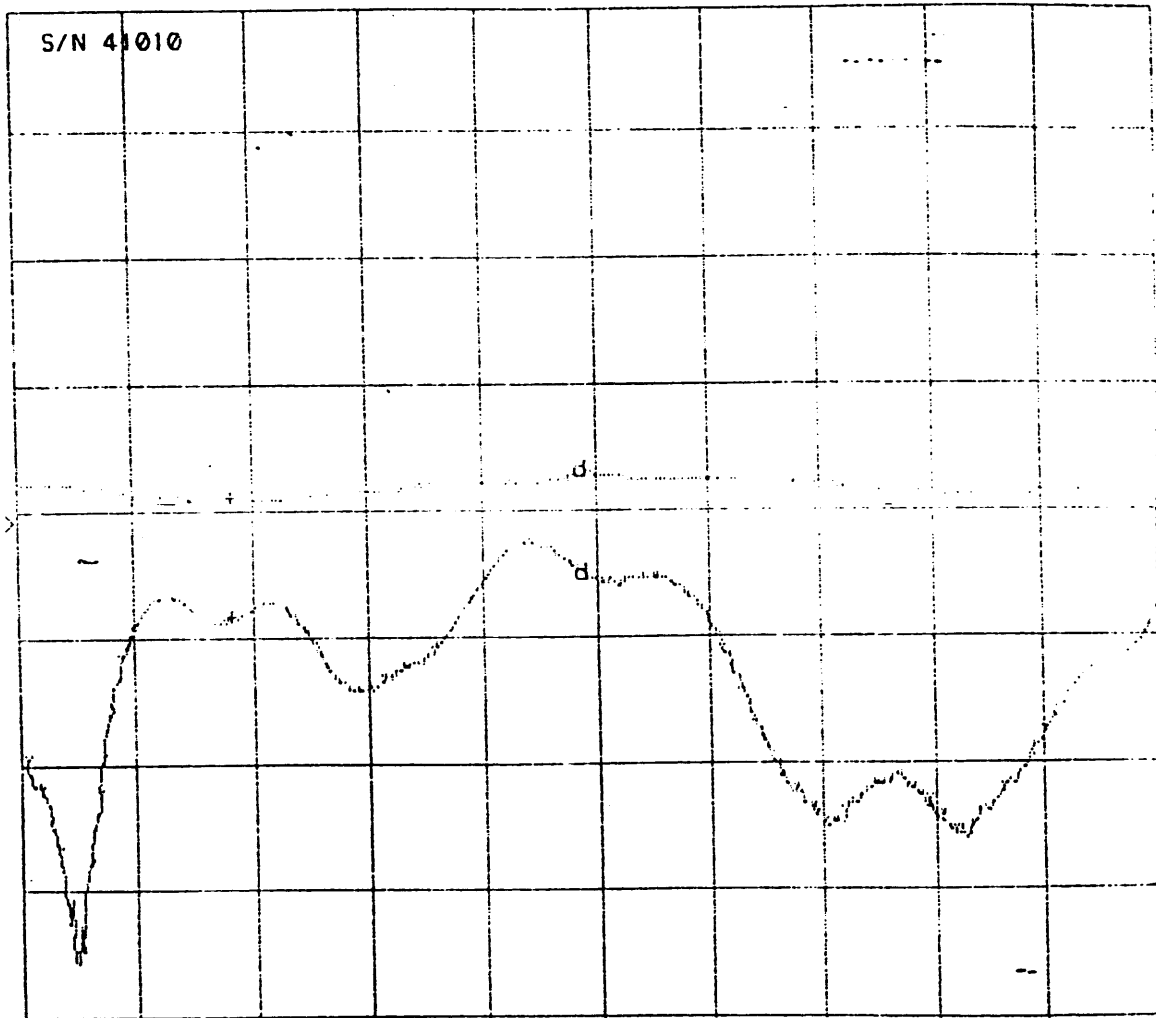
DATED: 5/26/95

[Signature] 5/18/95  
[Signature] 5/18/95

B.B. 5/18/95

CH1: A -M - 2.08 dB  
10.0 dB/ REF + 18.00 dB

CH2: S -M - 1.59 dB  
5.0 dB/ REF - 9.54 dB



STRT +6.0000GHz    CRSRd +3.7499GHz    STOP +18.0000GHz

...



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM41013

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+18.5db	✓
3	FLATNESS	±1.25 dB MAX.	±0.95dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-10.3dB IN -13.9dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	85 mA	✓

PRODUCTION MANAGER APPROVAL: R. Afelt DATED: 5/26/95  
QA/QC APPROVAL: INSP BY QI DATED: 5/26/95

R. Afelt  
5/11/95

M. J.  
5/11/95

B.B.  
5/11/95



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM4101Z

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+19.7dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.9dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-10.8dB IN -13.5dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	90mA	✓

PRODUCTION MANAGER APPROVAL: R. F. Fobler

DATED: 5/26/95

QA/QC APPROVAL: INSP BY 01

DATED: 5/26/95

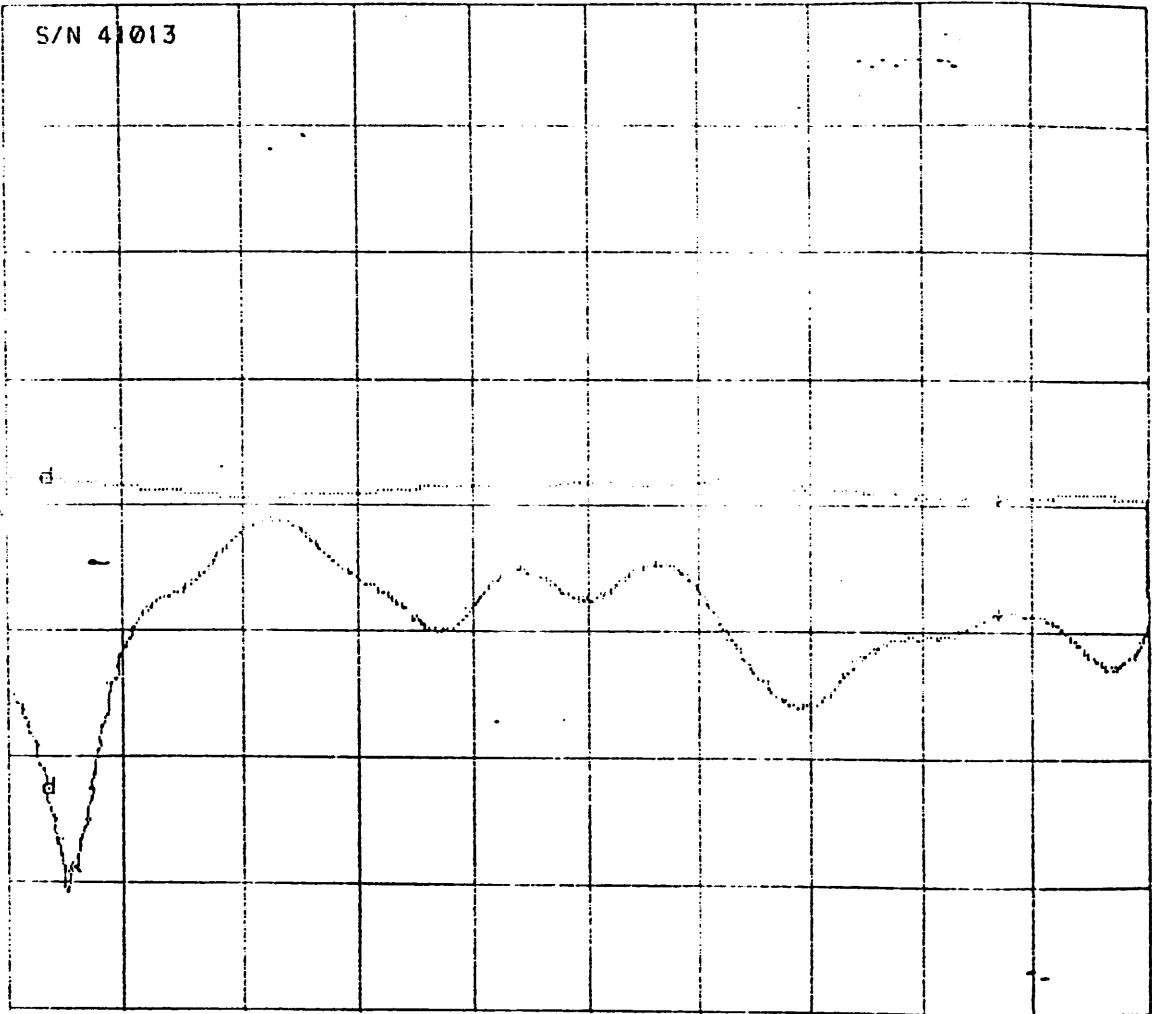
R. F. Fobler  
5/18/95

INSP  
5/17/95

B.B.  
5/18/95

CH1: A -M - 1.79 dB  
10.0 dB/ REF + 18.00 dB

CH2: S -M - 0.00 dB  
5.0 dB/ REF + 0.00 dB



STRT +6.0000GHz CRSRd +10.050GHz STOP +18.0000GHz





JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: DM41014

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	20.15 dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.65 dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-9.9 dB IN -10.5 dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	80 mA	✓

PRODUCTION MANAGER APPROVAL: R. Mohr

DATED: 5/26/95

QA/QC APPROVAL: INSP BY: Q1

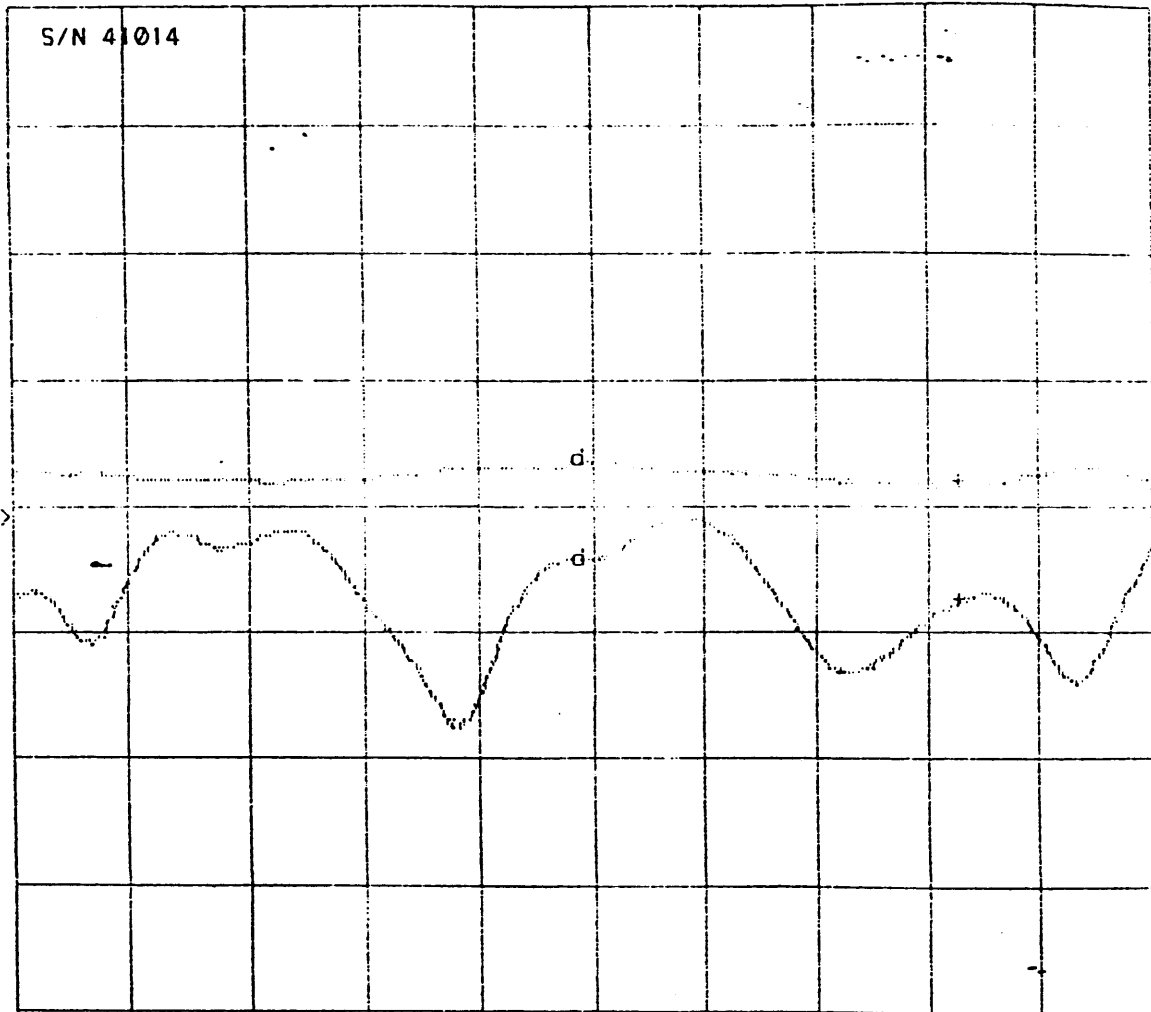
DATED: 5/26/95

R. Mohr 5/11/95  
M. J. 5/11/95

B.B. 5/11/95

CH1: A -M - 1.88 dB  
10.0 dB/ REF + 18.00 dB

CH2: B -M - 1.88 dB  
5.0 dB/ REF - 9.54 dB



STRT +6.0000GHz    CRSRd +3.9300GHz    STOP +18.000GHz



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM41015

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	21.3 dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.95 dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	PGUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-12.6dB IN -10.3dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	100mA	✓

PRODUCTION MANAGER APPROVAL: R. M. Miller  
QA/QC APPROVAL: INSPI BY Q1

DATED: 5/26/95  
DATED: 5/26/95

R. M. Miller  
5/27/95  
M. J.  
11/19/95

B.B.  
11/18/95



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM41016

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+18.6dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.85dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-10.1dB IN -12.6dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	90 mA	✓

PRODUCTION MANAGER APPROVAL: [Signature]  
QA/QC APPROVAL: [Signature]  
INSP. BY: Q1

DATED: 5/26/95  
DATED: 5/26/95

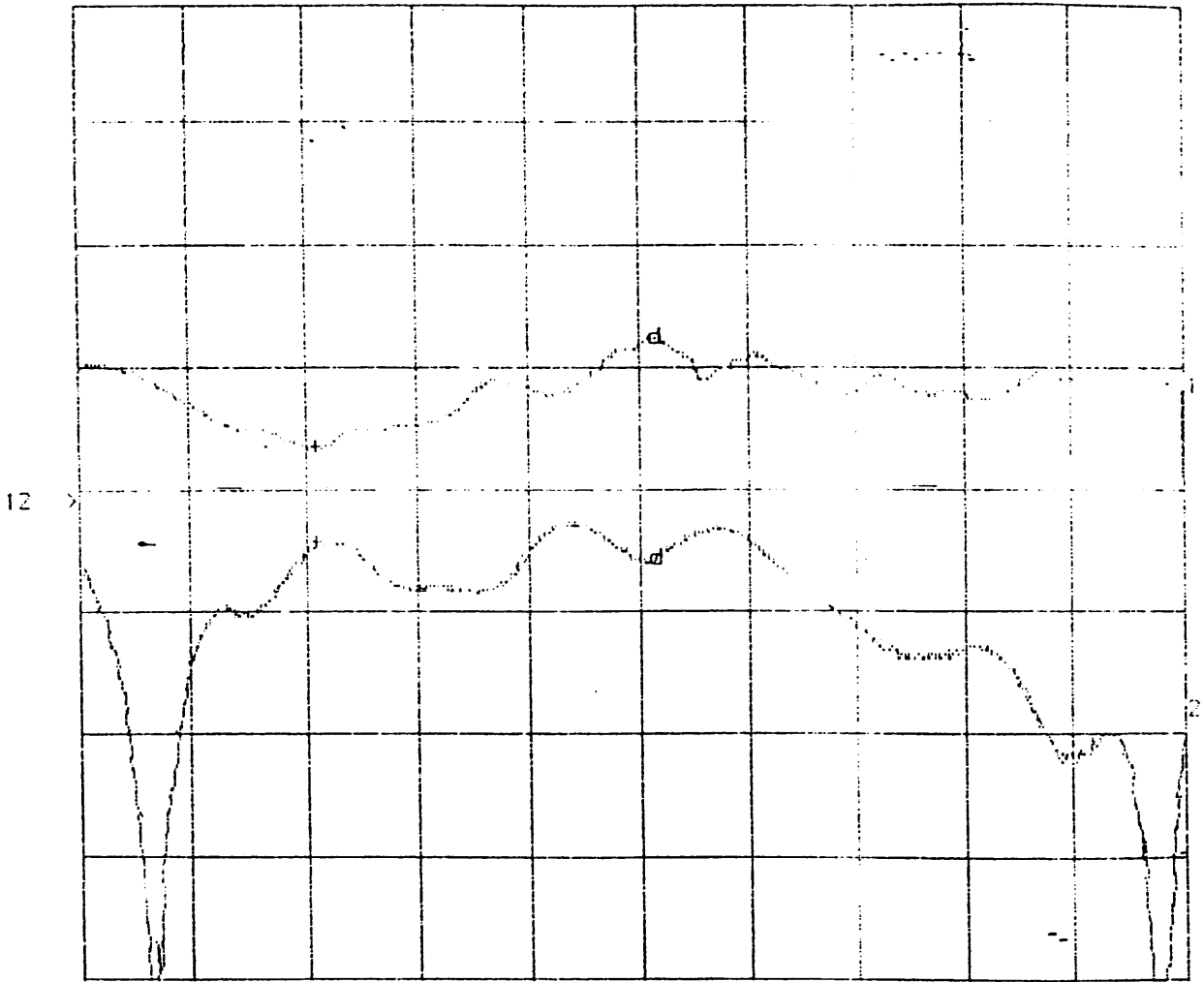
[Signature] 5/18/95  
[Signature] 11/17/95

B.B. 11/18/95

41016

CH1: A -M - 1.83 dB  
2.0 dB/ REF + 18.00 dB

CH2: B -R - .49 dB  
5.0 dB/ REF - 9.54 dB



STRT +6.0000GHz    CRSRd +3.6599GHz    STOP +18.0000GHz



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM41017

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+19.6dB	✓
3	FLATNESS	±1.25 dB MAX.	±1.1dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-9.9dB IN -12.1dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	90mA	✓

PRODUCTION MANAGER APPROVAL: R. John  
INSP. BY: QI

DATED: 5/26/95  
DATED: 5/26/95

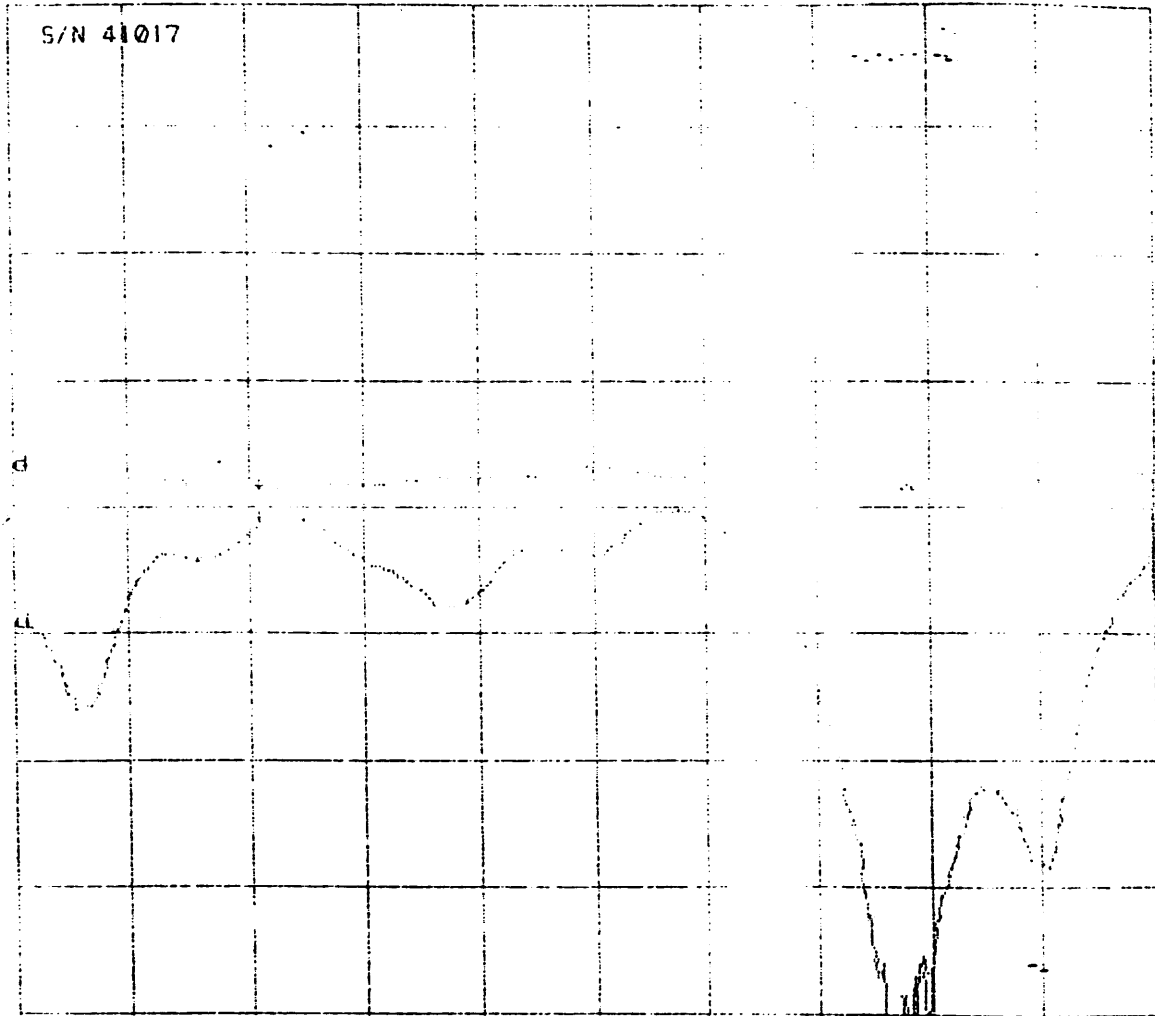
R. White  
5/15/95

Mc  
5/17/95

B.B.  
5/26/95

CH1: A -M - 1.93 dB  
10.0 dB/ REF + 18.00 dB

5.0 dB 9.64 dB



STRT +6.0000GHz CRSRd +2.6099GHz STOP +18.0000GHz

2.3.1



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM41018

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+18.8dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.85dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-10.0 dB IN -12.6dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	95 mA	✓

PRODUCTION MANAGER APPROVAL: [Signature]

DATED: 5/26/95

QA/QC APPROVAL: [Signature]

DATED: 5/26/95

[Signature] [Signature]  
5/11/95 5/11/95

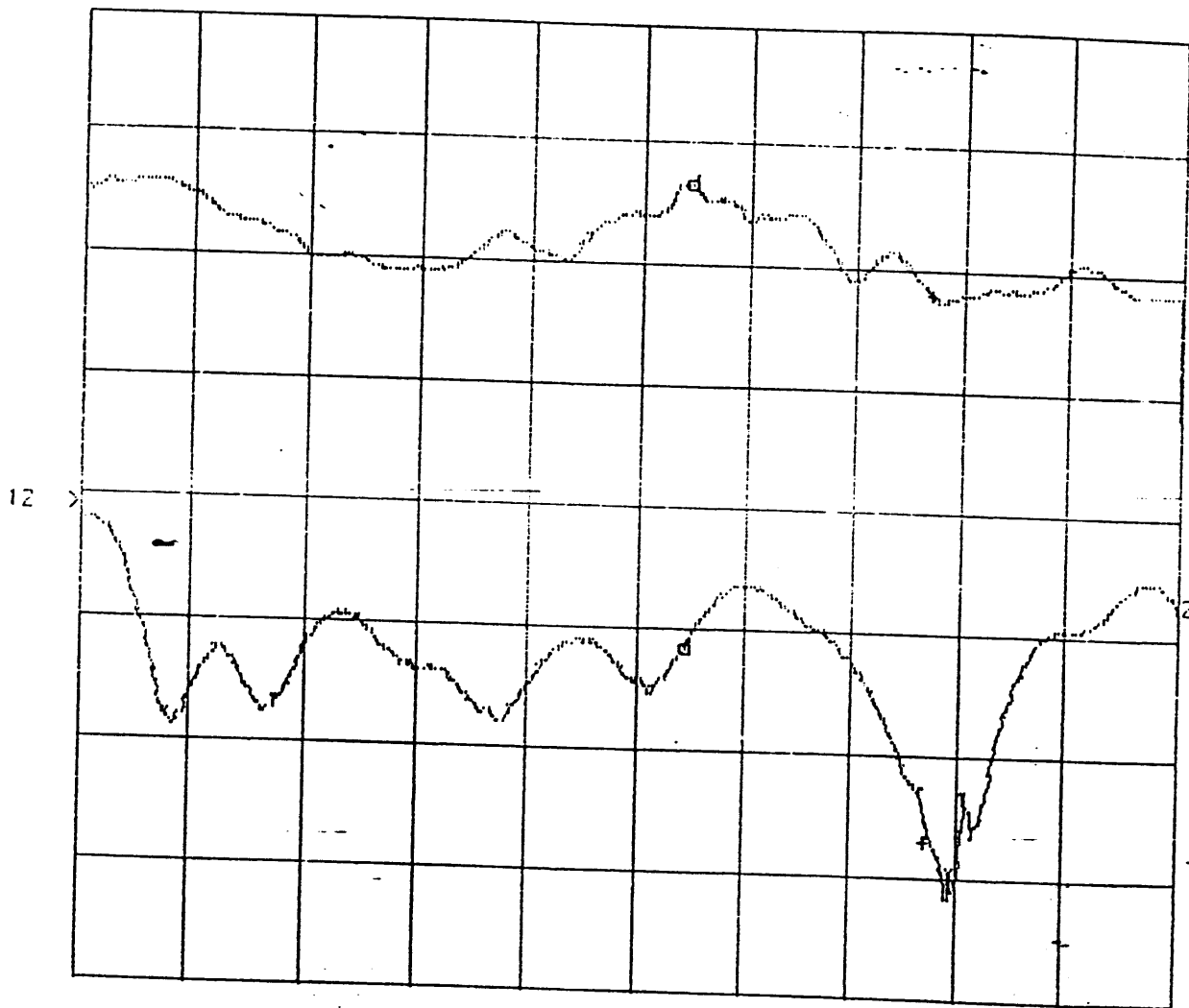
B.B.  
5/11/95



41018

CH1: A -M - 1.82 dB  
2.0 dB/ REF + 18.00 dB

CH2: B -M - 7.77 dB  
5.0 dB/ REF - 9.54 dB



STRT +6.0000GHz

CRSRd +2.8200GHz

STOP +18.000GHz

2.1



JOB NO: 4111P-2R2

SUMMARY TEST DATA  
ON  
PMI LOW NOISE AMPLIFIER

CUSTOMER: NORTHROP  
JOB NO: 4111P-2R  
MODEL NO: PMI-20A4-618  
SERIAL NO: PM41020

TESTED BY: B.B.  
DATE: 5/26/95

TEST ITEM NO.	PARAMETERS	SPECIFIED VALUE	MEASURED VALUE	REMARKS QA/QC
1	FREQUENCY RANGE	6.0-18.0 GHz	PASS	✓
2	GAIN @ +25°C	18 dB MIN	+20.4 dB	✓
3	FLATNESS	±1.25 dB MAX.	±0.8 dB	✓
4	VARIATION/TEMP. (-55°C TO +70°C)	±3.0 dB MAX.	PASS	✓
5	NOISE FIGURE	6.0 dB MAX.	PASS	✓
6	POUT @ 1dBm COMPRESSION	+13 dBm MIN.	PASS	✓
7	VSWR, IN/OUT	2.0:1 MAX.	-1.3 dB IN -9.6 dB OUT	✓
8	DC SUPPLY	+12V @180 mA TYPICAL	100 mA	✓

PRODUCTION-MANAGER APPROVAL:

*[Signature]*

DATED: 5/26/95

QA/QC-APPROVAL:

BY: 01

DATED: 5/26/95

*[Signature]* 11/17/95

*[Signature]* 11/28/95