



PFAM-550SUB NTSC

Frequency Agile Audio and Video Modulator

Installation And Operation Owners Manual

Please read this manual thoroughly before use.
Keep this manual handy for future reference.

Visit Our Web-Site www.picomacom.com
Contact Us **858.546.5050**
Toll Free **800.421.6511**

SAFEGUARD

Important Information

Product Inspection

Inspect the equipment for shipping damage. Should any damage be discovered, immediately file a claim with the carrier.

Important Safety Instructions

To insure proper installation and operation, take a moment to read this guide before proceeding with the installation. If you have any questions or comments about the **PFAM 550SUB** agile modulator, please contact your dealer or have him contact the **PICO MACOM** Service Center at the phone numbers at the bottom of the page.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE. DO NOT OPEN THE CABINET, REFER SERVICING TO QUALIFIED PERSONNEL ONLY.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

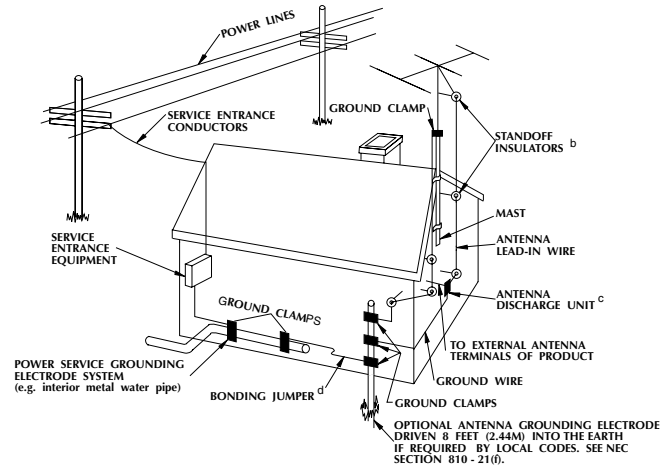
ATTENCION: POUR PREVENIR LES CHOCS ELECTRIQUES, NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR, UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

1. **Read Instructions** - All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** - The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** - All warnings on the appliance should be adhered to.
4. **Follow Instructions** - All operating and user instructions should be followed.
5. **Cleaning** - Unplug this appliance from the wall outlet before cleaning. Use a damp cloth for cleaning. Do not use liquid cleaners or aerosol cleansers.
6. **Do Not Use Attachments** - not recommended by the manufacturer or they may cause hazards.
7. **Water and Moisture** - Do not use this product near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool - and the like.
8. **Accessories** - Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the appliance.
9. **Ventilation** - This video product should never be placed near or over a radiator or heat register. This video product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to. Any slots or opening in the cabinet are provided for ventilation. To ensure reliable operation of his video product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface.

Important Information

10. **Grounding or Polarization** - This video product is equipped with either a three prong plug for 110 VAC use or a two prong flat blade 220 volt type plug. Each type is to be inserted into only the type of receptacle for which they are specifically designed. Do not cut off the round grounding pin of a three prong plug in order to be able to fit into a two prong receptacle as this could cause injury and will void the warranty.
11. **Power Sources** - This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your appliance dealer or local power company.
12. **Power Cord Protection** - Power supply cords should be routed so they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords and plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Lightning** - For added protection for this product during a lightning storm, or when it is left unattended or unused for long periods of time, the unit should be disconnected from power source.
14. **Power Lines** - An outside antenna system should not be located in the vicinity of overhead power lines, other electric light or power circuits, where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them may be fatal.
15. **Overloading** - Do not overload wall outlets and extension cords as this can result in risk of fire or electric shock.
16. **Object and Liquid Entry** - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
17. **Servicing** - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
18. **Damage Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the power-supply cord or plug is damaged.
 - b. If liquid has been spilled, or objects have fallen into the product.
 - c. If the product has been exposed to rain or water.
 - d. If the product does not operate normally by following the operating instruction. Adjust only those controls that are covered by the operating instructions. An improper adjustment may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
 - e. If the product has been dropped or the cabinet has been damaged

EXAMPLE OF ANTENNA GROUNDING ACCORDING TO NATIONAL ELECTRICAL CODE INSTRUCTIONS CONTAINED IN ARTICLE 810 - "RADIO AND TELEVISION EQUIPMENT"



- f. When the product exhibits a distinct change in performance this indicates a need for service.
19. **Replacement Parts** - When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original parts. Unauthorized substitutes may result in fire, electric shock or other hazards.
20. **Safety Check** - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in proper operating conditions.
21. **Outdoor Antenna Grounding** - Before attempting to install this product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges.
 - a. Use No.10 AWG (5.3mm) copper, No.8 AWG (8.4mm) aluminum, No.7 AWG (10mm) copper-clad steel or bronze wire or larger, as ground wire.
 - b. Secure antenna lead-in and ground wires to house with standoff insulators spaced from 4 feet (1.22m) to 6 feet (1.83m) apart.
 - c. Mount antenna discharge unit as close as possible to where lead-in enters house.
 - d. A driven rod may be used as the grounding electrode where other types of electrode systems do not exist. Refer to the National Electrical Code, ANSI/NFPA 70-1984 for information.
 - e. Use jumper wire not smaller than No.6 AWG (13.3mm) copper or equivalent, when a separate antenna grounding electrode is used.

NOTE TO THE CATV SYSTEM INSTALLER:

THIS REMINDER IS PROVIDED TO CALL THE CATV SYSTEM INSTALLER'S ATTENTION TO ARTICLE 820 - 40 OF THE NEC THAT PROVIDES GUIDELINES FOR PROPER GROUNDING AND, IN PARTICULAR, SPECIFIES THAT THE CABLE GROUND SHALL BE CONNECTED TO THE GROUNDING SYSTEM OF THE BUILDING, AS CLOSE TO THE POINT OF CABLE ENTRY AS PRACTICAL.

DESCRIPTIONS

Specifications

Features

- Double heterodyne conversion provides superior spurious harmonic output suppression
- Channels T7 through 78 capable (5.75 to 550MHz)
- 57 \pm 3 dB output, 5.75 to 550 MHz
- SAW filtered and I.F. loop

- Five year warranty*
- Supports HRC, IRC frequency offsets
- Factory aligned to FCC Docket 21006 for frequency offsets and stability
- Professional picture quality
- Front panel -30 dB test point
- Rear panel AC convenience outlet

Description

The PFAM-550SUB is a frequency agile double heterodyne conversion audio/video modulator. Its superior sideband filtering provides adjacent channel compatibility and FCC Docket 21006 frequency accuracy. The PFAM-550SUB provides 57 \pm 3 dB output from sub-band channel T7 through cable channel 78 including HRC and IRC off-set frequencies. The channelization

can be changed by resetting the DIP switches accessed through the front panel. High quality external modulation and RF level controls assure years of reliable operation. The modulator is shipped with all internal adjustments pre-set, and FCC Docket 21006 offsets are standard at no extra cost. Pico Macom Inc. backs the product with a five year limited warranty. *

Specifications

RF

Channels: 89 channels (T7-T13, 2-78 & 95-99)
Output Level: 45 to 57 dBmV, adjustable from front panel
Output Impedance: 75 ohm
Output Return Loss: 15 dB
Audio/Video Ratio: Adjustable -7 to -22 dB below visual carrier
Frequency Stability: \pm 5 KHz in aeronautical band. Conforms to FCC Docket 21006

Spurious Output:

(In-band) CATV channels: -60dBc, A/V ratio @ 15dB
 (In-band) Sub-band -57 dBc, A/V ratio @ 15dB
 (Out-of Band) F \leq 550MHz -54 dBc, A/V ratio @ 15dB

C/N (In Band): >58 dB

C/N (Out-of-Band): >68 dB

Fv+6.5 MHz (Upper Adj. Reject): >60 dBc

Fv-1.5 MHz (Lower Adj. Reject): >60 dBc

I.F. Frequency: 45.75 MHz

Video

Input Level: 0.6 V p-p min for 87.5% modulation

Input Type: Composite video negative sync

Frequency Response: \pm 0.8 dB 30 Hz to 4 MHz

Differential Gain: <3% (10 to 90% APL)

Differential Phase: <2° (10 to 90% APL)

Chrominance Luminance Delay: <50 nsec

Hum and Noise: -60 dB @ 87.5 modulation

Video Signal to Noise: -60 dB minimum (weighted)

Input Level Range: 0.5 V to 1.5 V P-P

Audio

Baseband Input Impedance: 600 ohms unbalanced

Baseband Input Level: 0.5 Vp-p for 25 kHz deviation

Pre-Emphasis: 75 microseconds

Flatness: 1.5 dB max. 50 Hz to 15 KHz

General

Power Input: 117 VAC, 60 Hz or 220 VAC, 60 Hz

Operating Temperature: -10° C to +50°

Dimensions: 19" L x 12" D x 1.75" H

Weight: 8.2 pounds

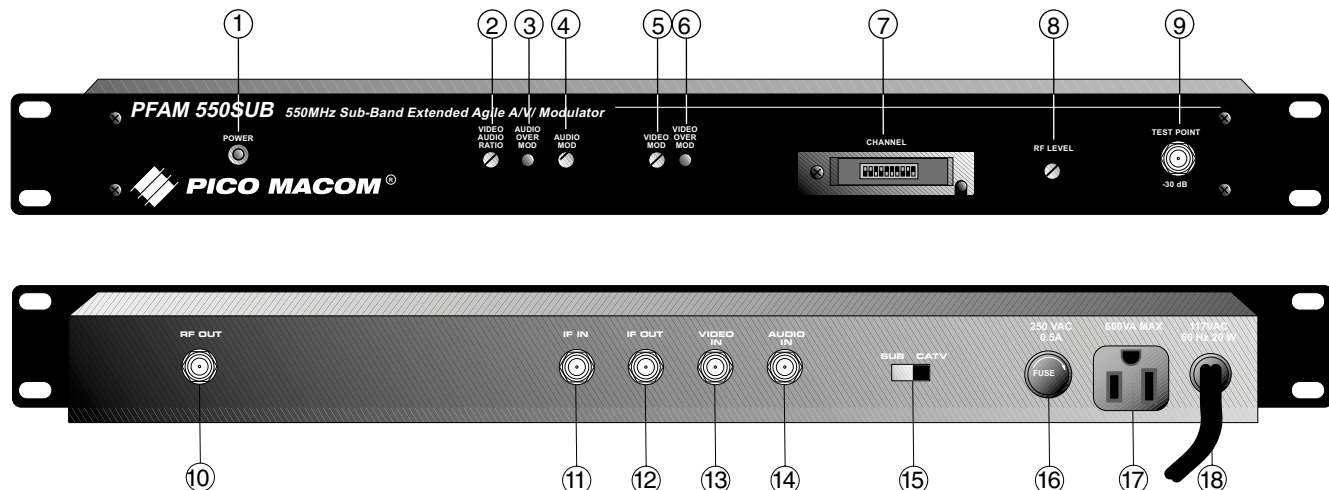
Connectors: All "F" type

* One year warranty if sold outside U.S.A.

(Specifications subject to change without notice)

PANELS

Front and Rear Panels



1. **Power on LED:**
Indicates power is on when lit.
2. **Video/Audio Ratio adjustment:**
Used to set level of audio carrier.
3. **Audio Modulation LED:**
Indicates aural over modulation level when lit.
4. **Audio Modulation adjustment:**
Used to set audio modulation (Volume).
5. **Video Modulation adjustment:**
Used to set video modulation.
6. **Video modulation LED:**
Indicates video over-modulation when lit.
7. **Channel Select:**
Dip switches are used to select desired channel.
8. **RF Output Adjust:**
Used to set output level.
9. **-30dB Output test monitor:**
Used to monitor RF output level.
10. **RF Output:**
Connect this port to distribution system.
11. **I.F. Input:**
Input from I.F. scrambler or I.F. output.
12. **I.F. Output:**
To I.F. input or to scrambling device.
13. **Video Input:**
Accepts video output from satellite receiver, VCR and CCTV camera.
14. **Audio Input:**
Accepts audio output from satellite receiver, VCR and CCTV camera.
15. **SUB CATV:**
When switch is in SUB position, channels 7 to 13 are converted to T7 to T13. When switch is in CATV position, CATV channels 2 to 78 and 95 to 99 are available.
16. **Fuse holder:**
117VAC type - 0.5 amp, 125V slow-blow fuse.
220VAC type - 0.5 amp, 250V slow-blow fuse.
17. **Convenience Outlet:**
117VAC type - shown
220VAC type - 2 flat blade type (not shown)
18. **Power Cord:**
117VAC type - Three wire, standard U.S.A. type.

INSTALLATION

Installation Procedures

Adherence to these precautions will help prevent problems during initial installation of the PFAM 550SUB.

1. Connect the I.F. jumper from the I.F. output to the I.F. input on the rear panel.
2. Connect the **PFAM 550SUB** to a 115 VAC grounded receptacle. Observe the lit LED light indicating power is on.
3. Using a signal level meter or spectrum analyzer, set the output level.
4. Check the aural carrier level. It should be set at 15 dBmV below the video carrier.
5. Connect a 1.0 volt peak-to-peak video source to the **"VIDEO IN"** on rear panel. Connect the **"RF OUT"** to a TV set, and compare the contrast and brightness to a known signal (use off-air signal to ensure a proper modulation level). If necessary, adjust the video modulation until proper contrast is observed.
6. Connect an audio source to the **"AUDIO IN"** on rear of the unit. Set audio modulation (peak deviation) to 25 kHz with the audio modulation adjustment. A known off-air signal and a TV may be used to set adjustment for equal audio level.
7. Connect the **"RF OUTPUT"** to a proper combining network.

WARNING: When connecting the **PFAM 550SUB** directly to a TV set, attenuate the output sufficiently to prevent overdriving the TV. The front panel test point is useful for monitoring modulator output.

FREQUENCY OFFSETS

The Federal Communications Commission requires that cable system modulators which operate in the aircraft communications and navigation bands be off-set in frequency by 12.5 kHz. The PFAM 550SUB PLL

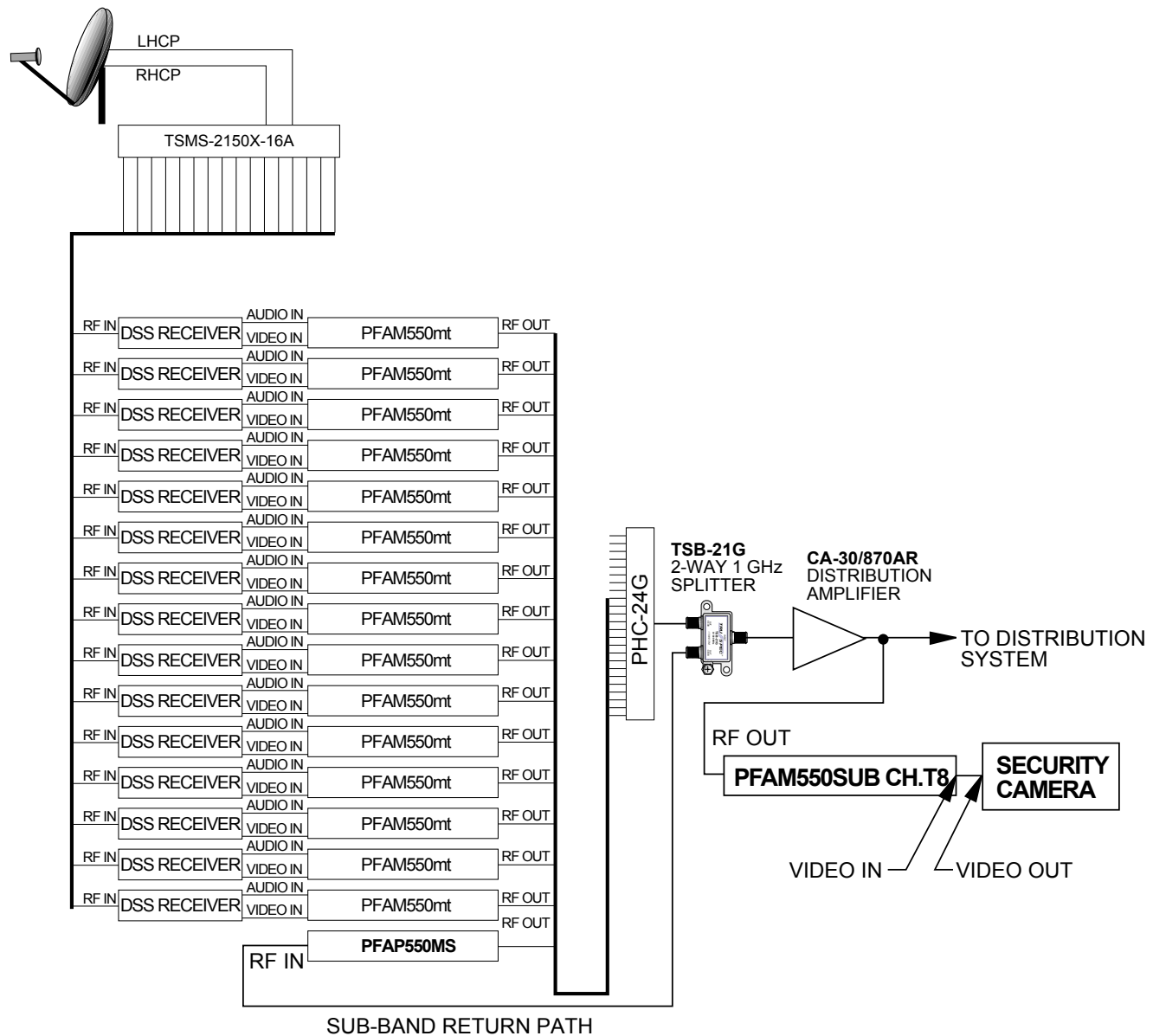
oscillator is factory set to comply with FCC requirements for frequency accuracy (+/- 5 kHz) in the aeronautical communication and navigation bands.

FREQUENCY	CHANNEL	NUMBER	OFFSET
108 to 118 MHz	A,B,C	14,15,16	12.5 kHz
118 to 137 MHz	A-1, A-1	99,98	25 kHz
225 to 328.6 MHz	K - DD	24-40	12.5 kHz
328.6 to 225.4 MHz	FF	42	25 kHz
335.4 to 400 MHz	GG- QQ.....	43-53	12.5 kHz

Harmonically Related Coherent (HRC) video carriers and Incrementally Related Coherent (IRC) video carriers are CATV channel assignment methods to reduce the effect of intermodulation products. The technique is used in expensive phase-locked headends where all units are tied to a master 6.0003 MHz oscillator with a maximum error of 1 Hz.

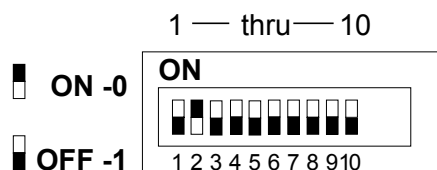
INSTALLATION

PFAM 550SUB 2-Way Application



CHANNEL SELECTION

DIP Switch Settings - Standard



Example:

Adjacent DIP switch drawing illustrates the proper setting for channel 2.

CHANNEL STD. EIA	VIDEO FREQ. MHz	OFFSET CH. VIDEO FREQ. MHz	OSC. FREQ. MHz	S1									
				1	2	3	4	5	6	7	8	9	10
2	2	55.25	1014	0	1	0	0	0	0	0	0	0	0
3	3	61.25	1020	1	1	0	0	0	0	0	0	0	0
4	4	67.25	1026	0	0	1	0	0	0	0	0	0	0
5	5	77.25	1036	1	0	1	0	0	0	0	0	0	0
6	6	83.25	1042	0	1	1	0	0	0	0	0	0	0
A-5	95	91.25	1050	1	1	1	1	1	0	1	0	0	0
A-4	96	97.25	1056	0	0	0	0	0	1	1	0	0	0
A-3	97	103.25	1062	1	0	0	0	0	1	1	0	0	0
A-2	98	*	109.2750	0	1	0	0	0	1	1	0	1	0
A-1	99	*	115.2750	1	1	0	0	0	1	1	0	1	0
A	14	*	121.2625	0	1	1	1	0	0	0	0	0	1
B	15	*	127.2625	1	1	1	1	0	0	0	0	0	1
C	16	*	133.2625	0	0	0	0	1	0	0	0	0	1
D	17	139.25	1098	1	0	0	0	1	0	0	0	0	0
E	18	145.25	1104	0	1	0	0	1	0	0	0	0	0
F	19	151.25	1110	1	1	0	0	1	0	0	0	0	0
G	20	157.25	1116	0	0	1	0	1	0	0	0	0	0
H	21	163.25	1122	1	0	1	0	1	0	0	0	0	0
I	22	169.25	1128	0	1	1	0	1	0	0	0	0	0
7	7	175.25	1134	1	1	1	0	0	0	0	0	0	0
8	8	181.25	1140	0	0	0	1	0	0	0	0	0	0
9	9	187.25	1146	1	0	0	1	0	0	0	0	0	0
10	10	193.25	1152	0	1	0	1	0	0	0	0	0	0
11	11	199.25	1158	1	1	0	1	0	0	0	0	0	0
12	12	205.25	1164	0	0	1	1	0	0	0	0	0	0
13	13	211.25	1170	1	0	1	1	0	0	0	0	0	0

Sub-Band Selection: Channel T7 thru T13 use the same DIP switch settings as standard 7 thru 13. To change to Sub-Band move slide switch on back panel to Sub-Band position.

CHANNEL SELECTION

DIP Switch Settings - Standard

CHANNEL STD. EIA	VIDEO FREQ. MHz	OFFSET CH. VIDEO FREQ. MHz	OSC. FREQ. MHz	S1									
				1	2	3	4	5	6	7	8	9	10
J	23	217.25		1176	1	1	1	0	1	0	0	0	0
K	24	223.25		1182	0	0	0	1	1	0	0	0	0
L	25	*	229.2625	1188	1	0	0	1	1	0	0	0	1
M	26	*	235.2625	1194	0	1	0	1	1	0	0	0	1
N	27	*	241.2625	1200	1	1	0	1	1	0	0	0	1
O	28	*	247.2625	1206	0	0	1	1	1	0	0	0	1
P	29	*	253.2625	1212	1	0	1	1	1	0	0	0	1
Q	30	*	259.2625	1218	0	1	1	1	1	0	0	0	1
R	31	*	265.2625	1224	1	1	1	1	1	0	0	0	1
S	32	*	271.2625	1230	0	0	0	0	0	1	0	0	1
T	33	*	277.2625	1236	1	0	0	0	0	1	0	0	1
U	34	*	283.2625	1242	0	1	0	0	0	1	0	0	1
V	35	*	289.2625	1248	1	1	0	0	0	1	0	0	1
W	36	*	295.2625	1254	0	0	1	0	0	1	0	0	1
AA	37	*	301.2625	1260	1	0	1	0	0	1	0	0	1
BB	38	*	307.2625	1266	0	1	1	0	0	1	0	0	1
CC	39	*	313.2625	1272	1	1	1	0	0	1	0	0	1
DD	40	*	319.2625	1278	0	0	0	1	0	1	0	0	1
EE	41	*	325.2625	1284	1	0	0	1	0	1	0	0	1
FF	42	*	331.2750	1290	0	1	0	1	0	1	0	0	1
GG	43	*	337.2625	1296	1	1	0	1	0	1	0	0	1
HH	44	*	343.2625	1302	0	0	1	1	0	1	0	0	1
II	45	*	349.2625	1308	1	0	1	1	0	1	0	0	1
JJ	46	*	355.2625	1314	0	1	1	1	0	1	0	0	1
KK	47	*	361.2625	1320	1	1	1	1	0	1	0	0	1
LL	48	*	367.2625	1326	0	0	0	0	1	1	0	0	1
MM	49	*	373.2625	1332	1	0	0	0	1	1	0	0	1
NN	50	*	379.2625	1338	0	1	0	0	1	1	0	0	1
OO	51	*	385.2625	1344	1	1	0	0	1	1	0	0	1
PP	52	*	391.2625	1350	0	0	1	0	1	1	0	0	1
QQ	53	*	397.2625	1356	1	0	1	0	1	1	0	0	1
RR	54	403.25		1362	0	1	1	0	1	1	0	0	0
SS	55	409.25		1368	1	1	1	0	1	1	0	0	0
TT	56	415.25		1374	0	0	0	1	1	1	0	0	0
UU	57	421.25		1380	1	0	0	1	1	1	0	0	0
VV	58	427.25		1386	0	1	0	1	1	1	0	0	0
WW	59	433.25		1392	1	1	0	1	1	1	0	0	0

CHANNEL SELECTION

DIP Switch Settings - Standard

CHANNEL STD. EIA	VIDEO FREQ. MHz	OFFSET CH. VIDEO FREQ. MHz	OSC. FREQ. MHz	S1									
				1	2	3	4	5	6	7	8	9	10
XX 60	439.25		1398	0	0	1	1	1	1	0	0	0	0
YY 61	445.25		1404	1	0	1	1	1	1	0	0	0	0
ZZ 62	451.25		1410	0	1	1	1	1	1	0	0	0	0
AAA 63	457.25		1416	1	1	1	1	1	1	0	0	0	0
BBB 64	463.25		1422	0	0	0	0	0	0	1	0	0	0
CCC 65	469.25		1428	1	0	0	0	0	0	1	0	0	0
DDD 66	475.25		1434	0	1	0	0	0	0	1	0	0	0
EEE 67	481.25		1440	1	1	0	0	0	0	1	0	0	0
FFF 68	487.25		1446	0	0	1	0	0	0	1	0	0	0
GGG 69	493.25		1452	1	0	1	0	0	0	1	0	0	0
HHH 70	499.25		1458	0	1	1	0	0	0	1	0	0	0
III 71	505.25		1464	1	1	1	0	0	0	1	0	0	0
JJJ 72	511.25		1470	0	0	0	1	0	0	1	0	0	0
KKK 73	517.25		1476	1	0	0	1	0	0	1	0	0	0
LLL 74	523.25		1482	0	1	0	1	0	0	1	0	0	0
MMM 75	529.25		1488	1	1	0	1	0	0	1	0	0	0
NNN 76	535.25		1494	0	0	1	1	0	0	1	0	0	0
OOO 77	541.25		1500	1	0	1	1	0	0	1	0	0	0
PPP 78	547.25		1506	0	1	1	1	0	0	1	0	0	0

* THESE CHANNELS SHALL BE OFFSET IN ACCORDANCE WITH FCC RULING SECTION 76.612

WARRANTY

Five Year Limited Warranty*

Limited Warranty

Pico Macom warrants to the original purchaser that all of its new products are of sound design, quality materials and workmanship at the time of manufacture and will be free from related defects for one year from the original purchase date. **Pico Macom** will repair or, at its discretion, replace without cost to the original purchaser, the product which, upon inspection by **Pico Macom**, appears to be defective or not conforming to factory specifications. **Pico Macom** will cover the cost of parts, labor, and return freight from factory.

Five-Year Limited Warranty

Most products designated as “Headend Electronics” are further covered by an extended 4-year period beyond the expiration of the original 1-year warranty, for a full 5-year period. Qualified equipment requiring factory repair during the extended 4-year period is covered under our re-certification program. Recertification fees under this program shall not to exceed 20% of the product’s List Price and whenever possible, **Pico Macom** will attempt to upgrade performance to the latest improved specification.

Warranty Limitations

This warranty excludes coverage of damage or inoperability resulting from (1) use or installation other than in strict accordance with **Pico Macom’s** written instructions, (2) disassembly or repair by someone other than **Pico Macom** or a **Pico Macom** authorized repair center, (3) misuse, misapplication or abuse, (4) alteration, (5) lack of reasonable care or (6) wind, ice, snow, rain, lightning, power surges, or any other weather conditions or acts of God. Pico Macom’s warranty with respect to third-party proprietary sub-assembly modules and/or private-label products are limited to the duration and terms of third-party vendors’ warranty. Pico Macom shall in no event and under no circumstances be liable or responsible for any consequential, indirect, incidental, punitive, direct or special damages based upon breach of warranty, breach of contract, negligence, strict tort liability or otherwise or any other legal theory, arising directly or indirectly from the sale, use, installation or failure of any product acquired by buyer from **Pico Macom**. This limited warranty extends to the original purchaser.

Pico Macom reserves the right to modify or discontinue this warranty at **Pico Macom’s** sole discretion without notification. No other warrantees are expressed or implied.

* One year warranty if sold outside U.S.A.



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